



CITY OF PERTH

THE CITY OF PERTH

LIGHTING STRATEGY



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MESSAGE FROM THE LORD MAYOR - LISA SCAFFIDI



Perth is proudly known as the City of Lights – an honour bestowed on our great city in 1962 when US astronaut John Glenn commented on the visibility of Perth from space as he completed his solo orbit of Earth. Since then, we have come a long way as a capital city. In recent years, we have focussed on the city centre being a destination that is vibrant and exciting – whether as a resident or visitor. Part of this success has been due to improvements to our public space and the presentation of the city – both day and night.

The City of Perth has undertaken various lighting projects as part of these city enhancement activities, including feature lighting of heritage buildings, bold lighting treatments to tree-lined avenues and the dynamic lighting of Council House.

In 2012, the City of Perth was the first Australian capital city to become a member of the

international organisation LUCI, based in Lyon, France. Comprising over 100 members, including 70 cities worldwide, LUCI is now an organisation recognised throughout the world in the field of urban lighting excellence.

I am now delighted to present this Lighting Strategy which has been developed to provide a comprehensive framework for future lighting initiatives – both for public and private developments. It's all about reinforcing the city image and economy of Perth at night-time in line with the City's vision for the future. This of course includes being aware of our environmental responsibilities and taking action to ensure Perth remains The City of Lights in a sustainable and energy resilient manner.

Lisa M Scaffidi
Lord Mayor

BACKGROUND

The City of Perth Lighting Strategy reviews and supersedes the Draft Lighting Strategy dated December 1995 and is part of a group of strategies which provides the framework for the development of the City. The aim of the Lighting Strategy is to provide a holistic approach to lighting and ensure a safe, vibrant and exciting city to attract the attention of residents and visitors alike by improving the quality, efficiency and consistency of lighting.

It is envisaged that the Strategy has a 10-year lifespan, while the Action Plan would require a 2-year review cycle. However, due to possible local government reform, the strategy may require review and expansion to cover a greater geographical area.

Perth is a beautiful city with a unique setting and wonderful vantage points such as Kings Park from which to view the city. By day, the city presents a clean, fresh appeal which dwindles as the office function of the city closes down at night to the fact that evening activities are too concentrated in specific areas of the city, while other areas can be perceived as deserted'.

This need not continue to be the case. Planning can and should be applied to the subject of lighting in the same manner as it is applied to other day time aspects of urban development. It is a paradox that at present, the capital invested in the daytime presentation of the city cannot be revealed at night because of poor lighting in some areas of the city.

The unique qualities that give Perth its Sense of Place during the day are:

- The river;
- Views;
- City streets and public spaces;
- Built form; and
- Landscaping.

The challenge for the implementation of this strategy is to encapsulate the unique qualities of Perth by day and transfer these into a night time environment to cater for residents, workers, tourists and visitors alike. Lighting will play a key role in shaping the perception of future retail environments, and in attracting more residents into the city and make Perth an even more liveable and attractive city in the future.





1 INTRODUCTION



1.1 PURPOSE OF THE LIGHTING STRATEGY

Sustainability is a crucial topic for our cities of tomorrow, to a greater extent than can be imagined. With global warming and climate change an accepted fact by most people, the impact to our economy and way of life are becoming real not just speculation as in the recent past. The increasing demand for energy is a clear driver for local governments to take a new and sustainable approach to energy management.

The strategy also aims to enhance people's experience of the city at night while ensuring improvements

to safety and amenity. When used properly, light discourages criminal activity, reduces the fear of crime and enhances natural surveillance opportunities. The intention of the lighting strategy is to create spaces that deter crime through improved lighting.

The City of Perth's, 'Towards an Energy Resilient City', strategic directions paper identifies that 51% of the city's greenhouse gas emissions are associated with commercial buildings. It is estimated that 35% of the emissions from commercial buildings are from lighting.

The strategy recognises that brighter is not always better for lighting in the public realm. Whilst street lighting is less than 1% of city wide total greenhouse emissions, it is a significant component of the City of Perth corporate emissions (21%). As such the City is taking leadership in replacing inefficient light fittings with more efficient and lower maintenance LED light sources.

Greenhouse gases are not the only pollution of concern. The over-lighting of buildings and public

spaces contributes to light pollution where a significant percentage of lighting is reflected upward into the night sky, producing what is described by the Perth Astronomical Observatory as 'sky glow'.

Efficient lighting sources and techniques will be a major consideration of this strategy and could result in the use of less electricity as well as cost savings for the City and reducing greenhouse gases and light pollution.

1.2 LINKS WITH OTHER POLICIES, STRATEGIES & STUDIES

- Capital City Perth: A 10 Year Strategy for the Perth City Area
- An Urban Design Framework – A Vision for Perth 2029
- Lights Assets, Asset Management Plan 2014
- Forrest Place Master Plan 2008
- City Planning Scheme No2
- Economic Development Strategy 2010-2029 (updated 2014)
- City of Perth Safe City, Community Safety and Crime Prevention Plan 2010-2013
- Forgotten Spaces – Revitalising Perth Laneways 2007
- Gehl Architects - Perth 2009, Public Space and Public Life
- Energy Resilience Policy (2010) and Energy Resilience Directions Paper (2010)

A recommendation of the 2009 Gehl Architects study is to develop a lighting strategy to ensure that pedestrian routes and main public spaces are well lit. Presently, only a few streets and spaces in the city have dedicated lighting for pedestrians and in many streets lighting on the sidewalks is insufficient.

1.3 ORGANISATIONAL CONTEXT

The City of Perth adopts an Integrated Planning Approach. The below diagram depicts the components that make up the City of Perth’s Integrated Planning and Reporting Framework (IPRF), showing the interaction between the plans and the influence of the informing strategies. The intent of the IPRF is to ensure the priorities and services provided by the City of Perth are aligned with our community needs and aspirations.



The **Strategic Community Plan, Vision 2029+**, is our long term strategic direction that expresses the community’s vision for the future together with the strategies to address strategic community outcomes. This drives the City of Perth’s **Corporate Business Plan**, which is the detailed implementation plan for services, key projects and capital investments over the next four years.

A key component of the City’s Corporate Business Plan is the actions to activate the **City’s Informing Strategies**. These Informing Strategies are created to address specific focus areas for the City, with emphasis on meeting the outcomes of the Strategic Community Plan.

The City’s key strategic enablers show how we are equipped to deliver on the commitments made in the Corporate Business Plan. These key strategies are:

- **Long Term Financial Plan**
This plan allows for appropriate decision making with emphasis on financial sustainability.
- **Workforce Plan**
This plan identifies the workforce requirements needed for current and future operations.
- **Corporate Asset Management Plan**
This plan provides guidance on service provision to inform the City’s financial and key service needs.

The **Annual Budget** is then created based on the projected costing of year one of the Corporate Business Plan, with opportunity to review during the mid-year budget review processes.

1.4 BENEFITS TO THE CITY OF THE PLANNED USE OF LIGHT

A planned use of light will result in the following benefits to the City of Perth:

- The City can be made more legible and easier for people to use after dark, thus encouraging more people to use the city at night and also to walk or use public transport at night thus reducing car reliance;
- Good lighting can assist to make a reduction in the night-time crime rate of an area;
- Energy efficient lighting can achieve savings in the amount of energy used and a reduction in greenhouse gas emissions;
- Improve retail trade and the night time economy by encouraging citizens and visitors to remain in the City in the evening;
- Good lighting significantly reduces the night-time vehicle/pedestrian accident rate, the cost savings easily paying for the improved lighting. Work by the International Commission on Illumination studied road accident data in a number of countries and came to the conclusion that road lighting reduces accidents at night by 30%².
- Supports the increases of tourism and length of stay through activation;
- Highlights unique qualities of the city; and
- Provides a stimulus for a more cosmopolitan, vibrant and interesting city.



2 LIGHTING STRATEGY OBJECTIVES

2.1 MAIN OBJECTIVES

The following objectives have been formulated for the planned use of light;

- 1 Discourage crime and reduce the fear of crime.
- 2 Encourage citizens and visitors to remain in the city in the evening, improving retail trade and improving the night-time economy.
- 3 Provide a co-ordinated lighting infrastructure plan for Perth that will guide work carried out by the City of Perth, private developers and other development agencies.
- 4 Achieve savings in the cost of electricity, maintenance of infrastructure and significantly cut greenhouse gas emissions.
- 5 Support prosperity and economic success – attract investment and tourism in the global economy.
- 6 Enable a clear understanding of the composition of the City at night.
- 7 Identify the City as a leader in good environmental practice in the use of light in a coherent manner.
- 8 Become the first Australian city to achieve membership of a group of international cities (LUCI) founded to exchange knowledge and promote a culture of sustainability in lighting.
- 9 Develop a unique suite of multifunctional poles and components (PerthPole) to minimise clutter, avoid confusion for street users and create new economic opportunities.

2.2 EIGHT KEY PRINCIPLES

The following Eight Key Principles underpin the objectives;

- 1 Improve the illumination of the city to ensure public safety and enjoyment, and support development and growth of the night-time economy.
- 2 Differentiate areas of the City through varied lighting.
- 3 Create a nightscape postcard image of the City for tourists by illuminating the outline of buildings to make a strong night-time statement that is uniquely Perth.
- 4 Road and street lighting planning to define street hierarchy.
- 5 Reduce sky glow caused by obtrusive external lighting.
- 6 Implement sustainable lighting standards in future projects to reduce energy and maintenance costs and to show leadership in the community.
- 7 Special events Illumination / 'Festival' lighting.
- 8 Engage with the community to encourage other organisational, property owners and businesses to contribute to the objectives of the strategy.



3 THE CITY'S STRUCTURE AND FORM

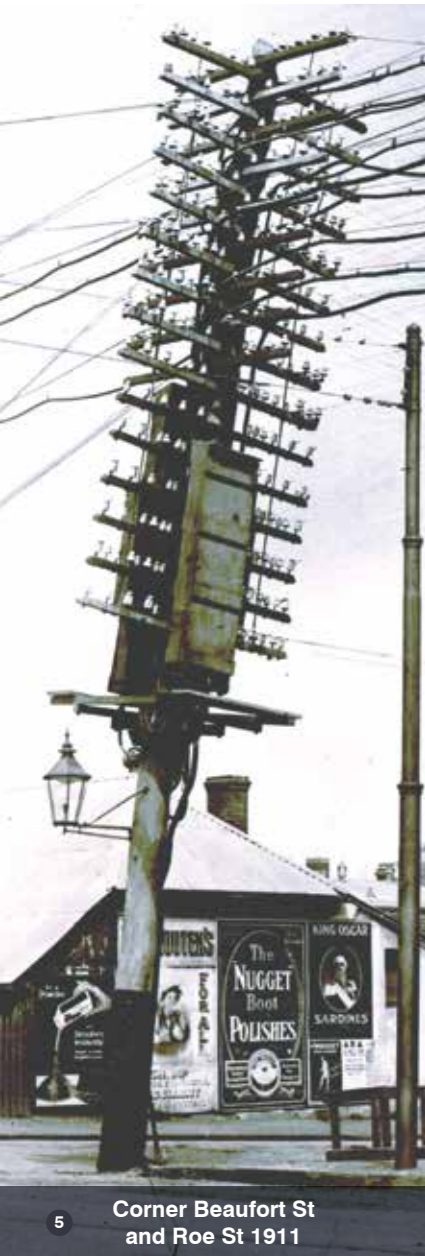
3.1 BACKGROUND

The earliest recorded installation of urban lighting in Perth was in 1843 with three lamp posts erected outside a hotel in Hay Street as a security and advertising measure. The lamps were gas powered and provided a sharp white light from the incandescence of a gas mantle. At the turn of the century the trend moved towards electrically powered lighting as gas lighting was not largely popular in Perth. As time progressed and technology advanced, newer high pressure sodium lamps were adopted as the principal source to illuminate highways, and it is this light source that has mainly been used in central Perth.

Much of the existing street lighting has been developed for basic lighting needs in a utilitarian approach. Previous design emphasis has been largely focussed on the motor vehicle, not the pedestrian, and mainly complies with the Australian Standards, with a few exceptions. There is however, more to the process of creating a well lit city than just adhering to the current lighting standards, which should be considered as the bare minimum, and fails to address many other considerations such as facial recognition and the use of white light with a good colour rendering and the use of colour temperature as an orientation aid.

In order to position itself amongst international cities, Perth needs highly visible and interesting contemporary lighting to encourage and support a night time economy. Apart from the views from Kings Park and South Perth, much of the City fades into obscurity after office lighting is extinguished and distant night-time views fail to express the identity of the city centre.

The challenge for the City is to implement a strategy that captures the unique qualities of Perth by day and transfer these to a night time environment to create a robust night time economy that attracts residents, workers, visitors and tourists alike.

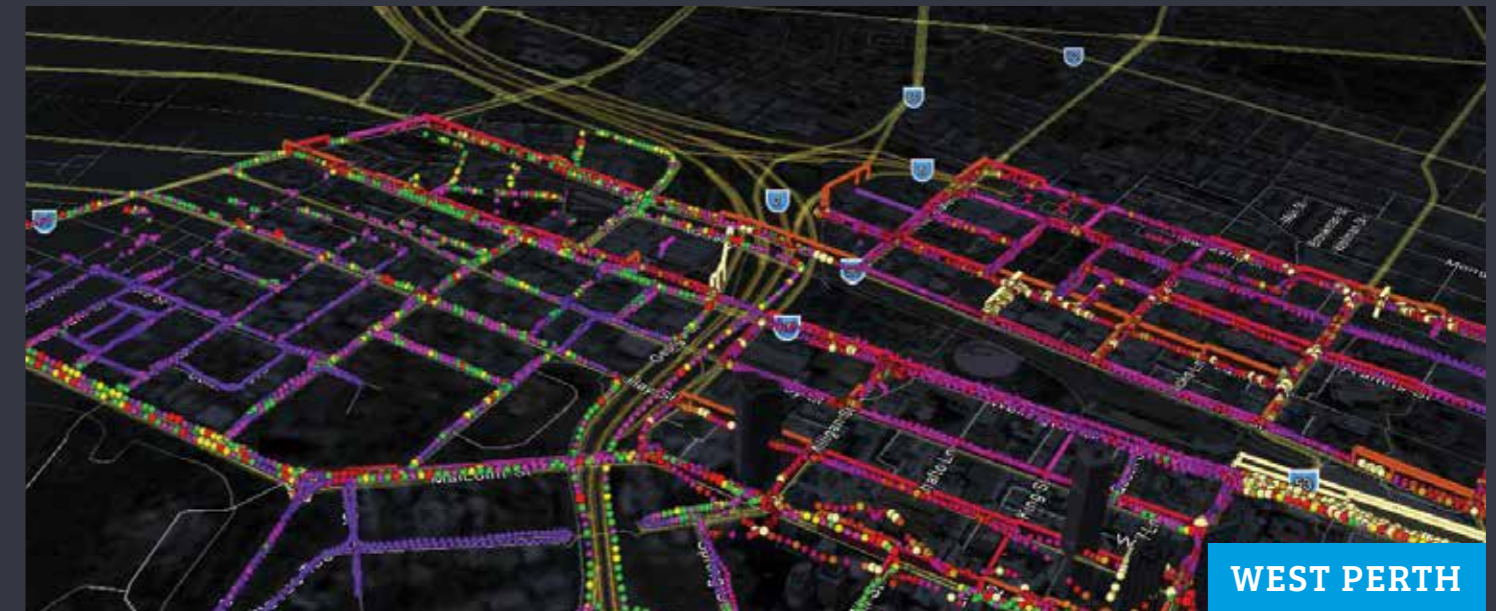
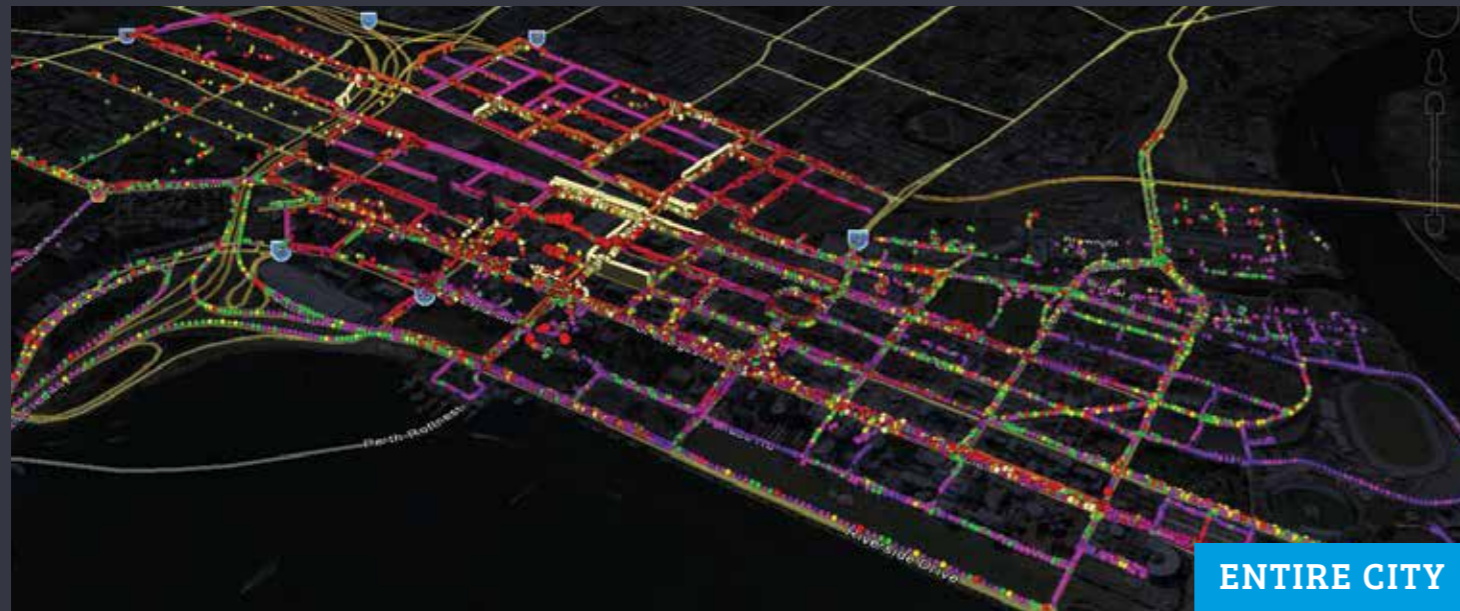


5 Corner Beaufort St and Roe St 1911



40 LUX 30 LUX 20 LUX 10 LUX 0 LUX

The photometric survey clearly identifies areas that are poorly lit (≥ 10 lux). It also demonstrates that lighting levels are essentially random across the city and do not reinforce the structure or centres of night time economy.



40 LUX 30 LUX 20 LUX 10 LUX 0 LUX

3.2 CODES OF PRACTICE

The standards below set minimum requirements for lighting in the public realm and the strategy augments these codes. All exterior lighting in the City of Perth should meet or exceed the following standards;

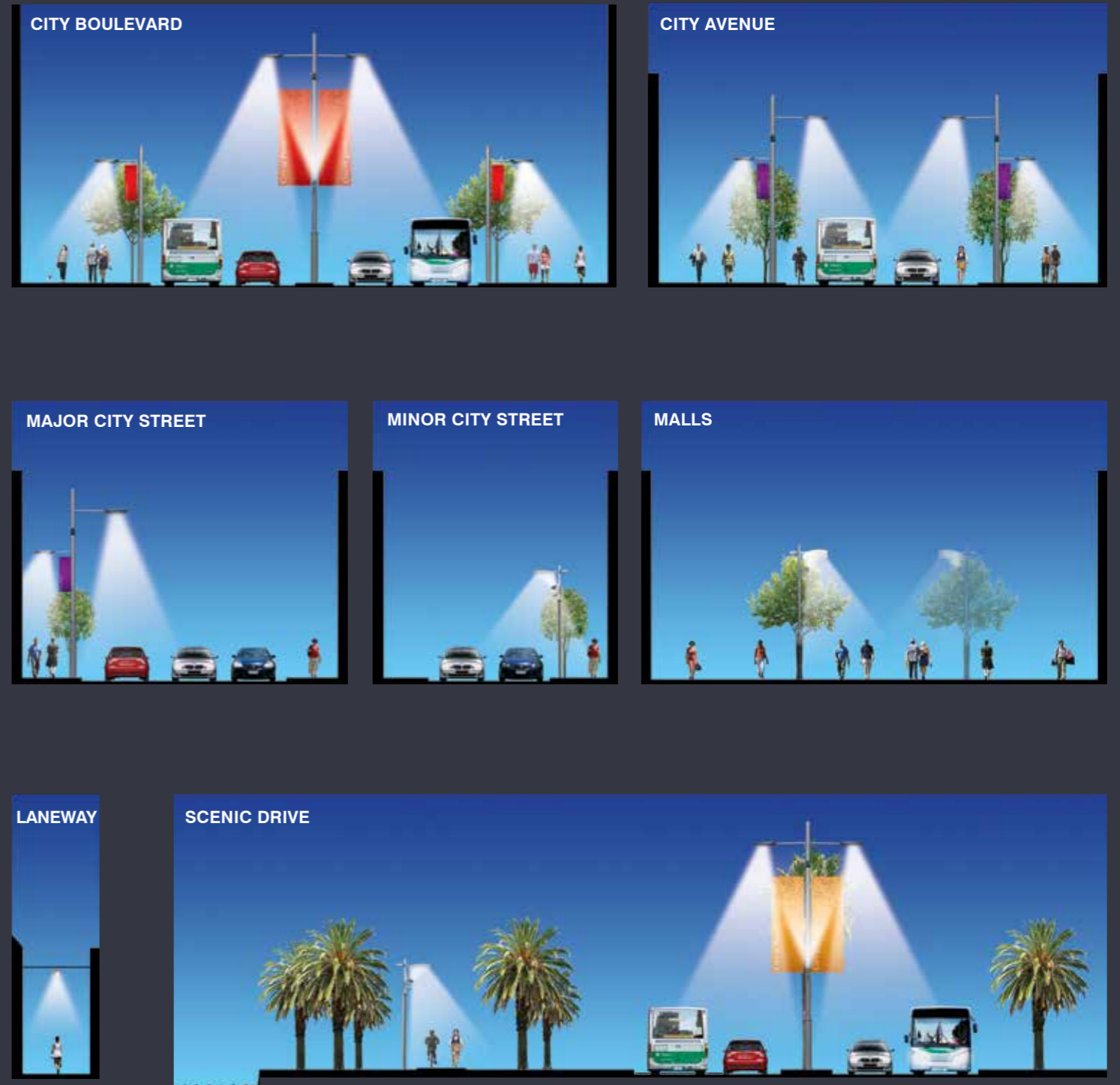
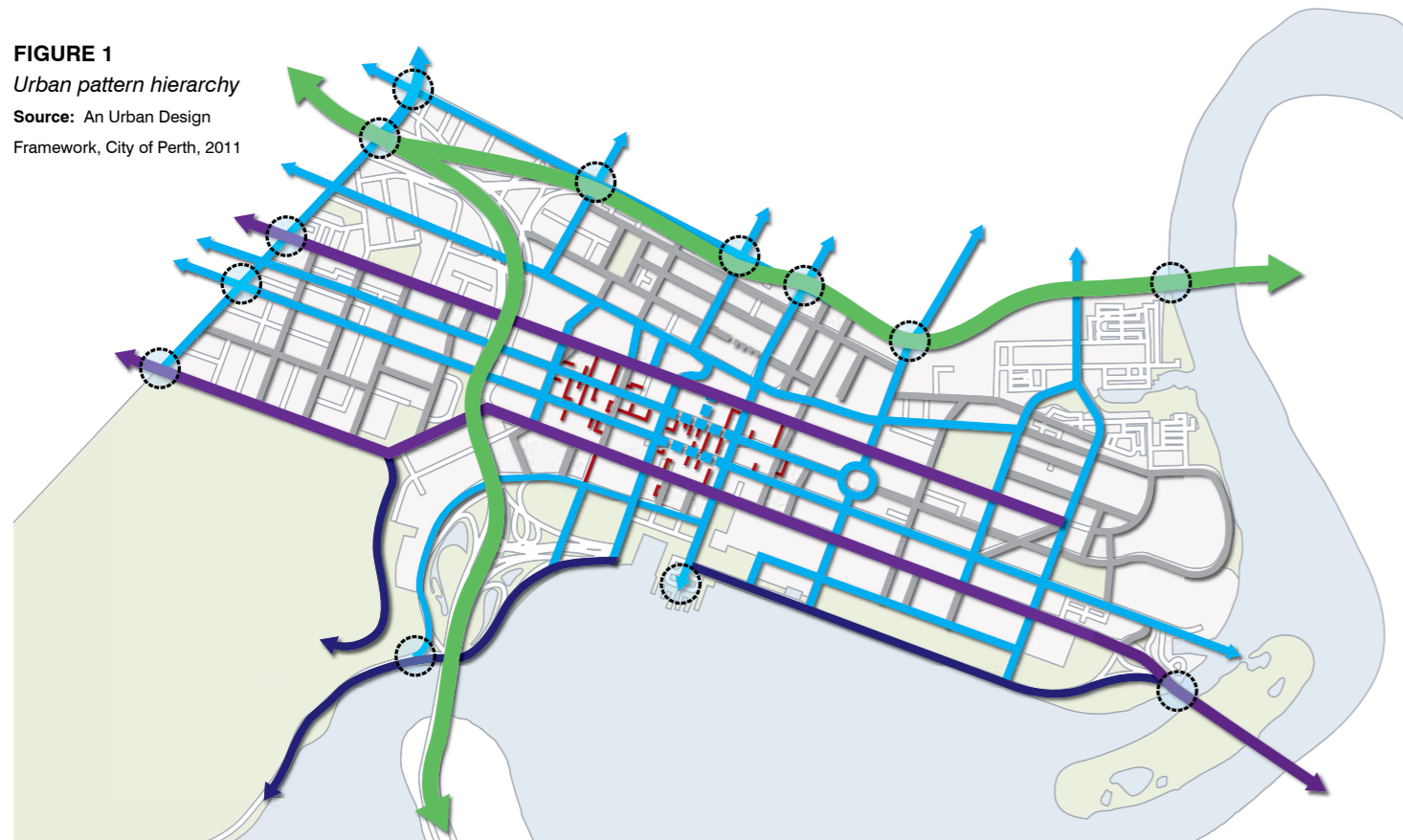
- AS/NZS 1158 series: Lighting for roads and public spaces;
- AS 3665: Simplified definitions of lighting terms and quantities;
- AS 4282: Control of the Obtrusive Effects of Outdoor Lighting;
- CIE 150: Guide on Limitation of Obtrusive Light from Outdoor Lighting;
- CIBSE: Environmental Considerations for Exterior Lighting;
- IESNA Model Lighting Ordinance (obtrusive light);
- Heritage Perth: Light Up The City – Technical Requirements;
- AS1798: Lighting poles and bracket arms – Preferred dimensions;
- NABERS – National Australian Built Environment Rating System; and
- Green Star – Green Building Council of Australia.

In general, all new and improved road and street lighting should be designed to comply with these standards. Whilst the Standards are not mandatory and are, in some areas, open to interpretation, installations completed in accordance with these will be of a high quality and ensure that the authority is not open to criticism for failing to comply.

3.3 SPATIAL HIERARCHY

Emphasis of the characteristic pattern which gives the city an image, a sense of place and a means of orientation is an objective of the City's Urban Design Framework. Perth has an image and character in its city pattern which depends upon views, topography, streets, built form and landscaping. This pattern gives an organisation and sense of purpose to the city and denotes the extent and special nature of precincts by identifying and making prominent the centres of activity. The pattern also assists in orientation for pedestrians, vehicle users and public transport users. Lighting can reveal the city at night by accentuating the urban pattern and create a general feeling of well being and safety, or if it is inadequate it can cause insecurity and confusion. Based on the UDF, the spatial hierarchy has been further refined as part of the Lighting Master Plan.

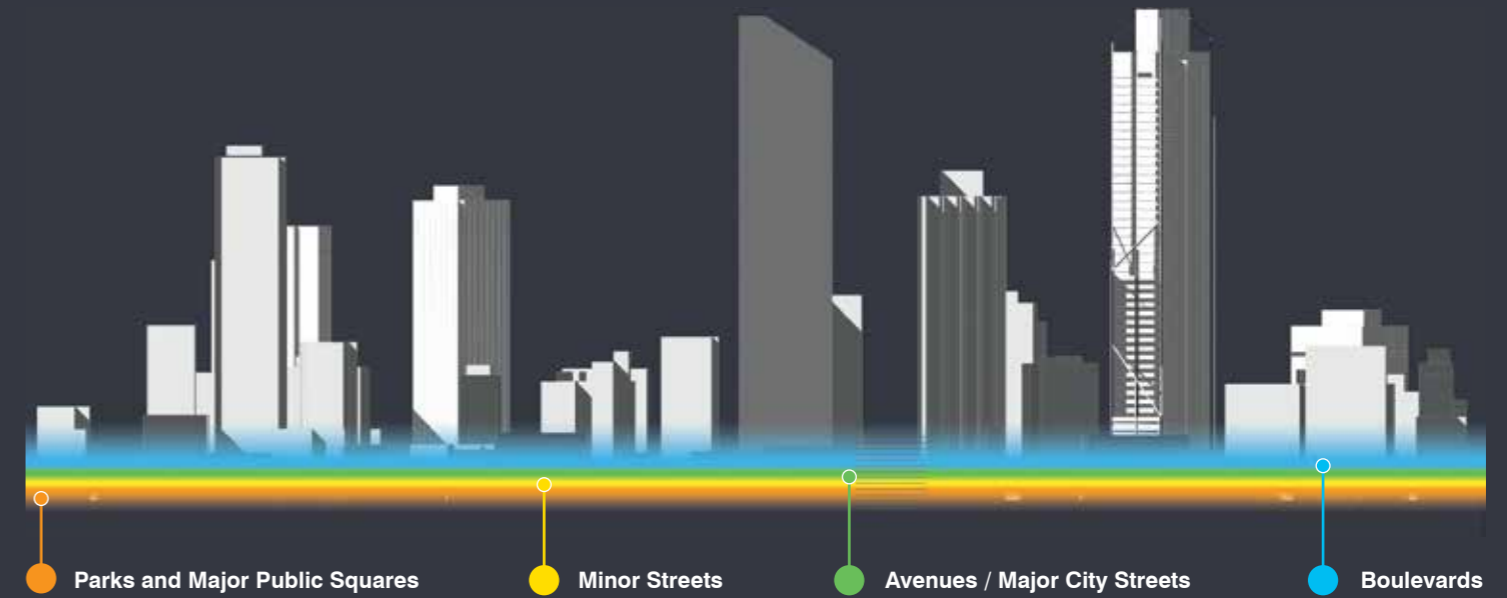
FIGURE 1
Urban pattern hierarchy
Source: An Urban Design Framework, City of Perth, 2011



3.4 LIGHTING HIERARCHY

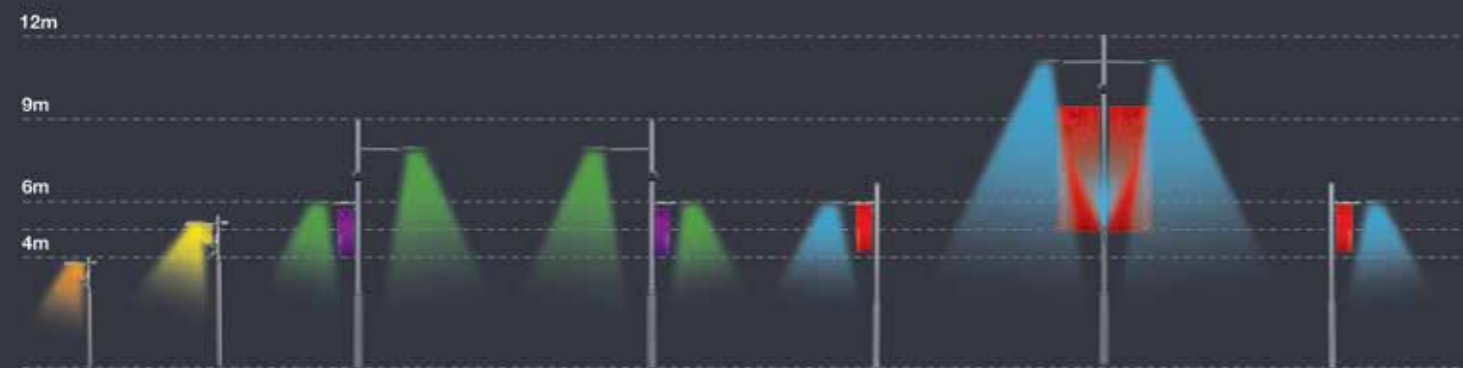
Some of the fundamental principles underpinning the city pattern relates to the city's overall visual structure and the role played by streets, district edges, nodes and landmarks. Nodes are areas where there is a convergence or change of movement, or places of physical character such as a square or piazza.

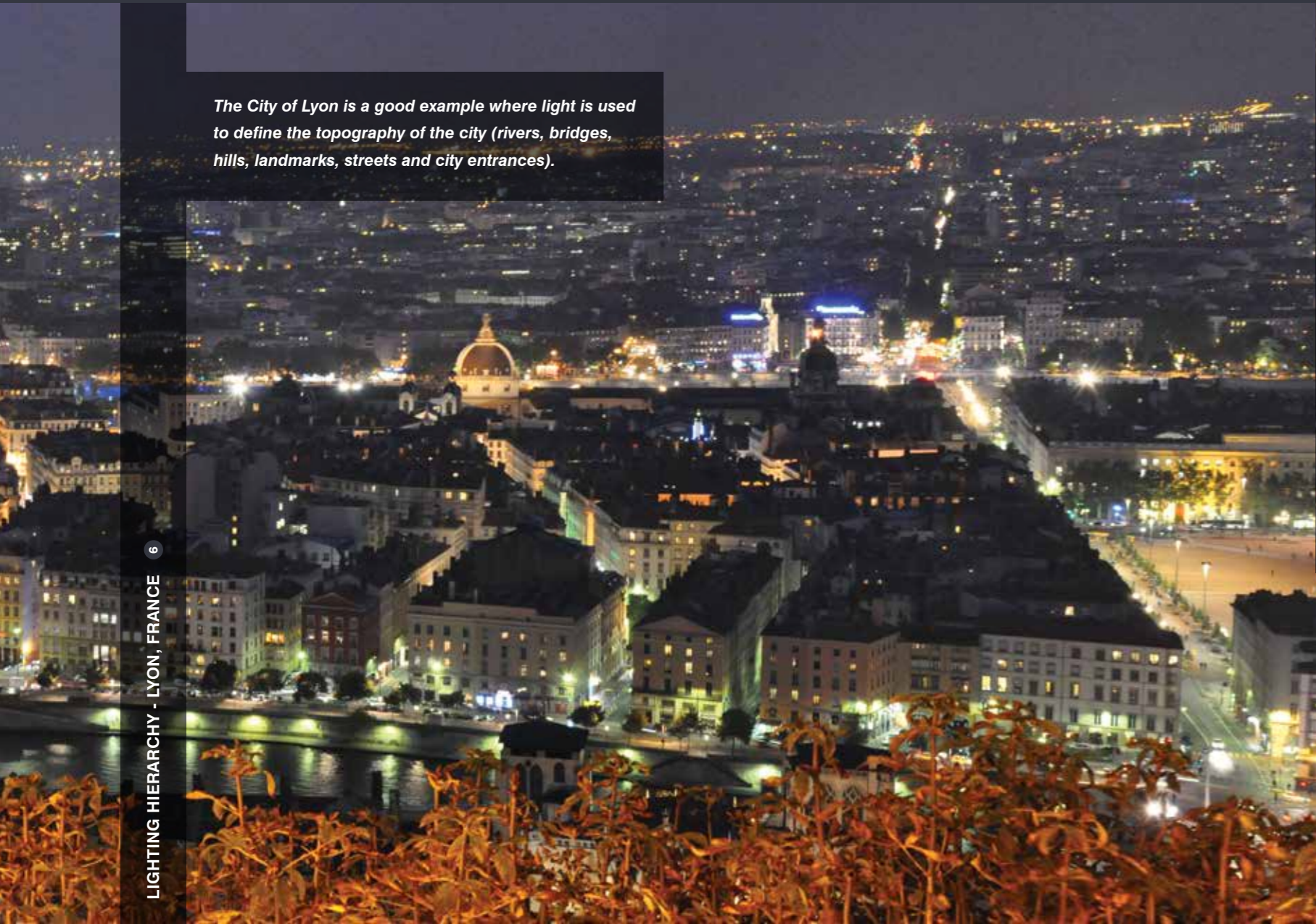
The pattern of major streets can be made more visible and apparent to users of the street network at night if the lighting of major streets is different from that of minor streets. The difference between major and minor streets can be made clearer by varying the apparent brightness, spread and colour temperature of light, as well as the height, spacing and scale of street fixtures.



A LIGHTING HIERARCHY

- Parks & Major Public Squares
4m - 6m, ± 2500k
- Minor Streets
4.5m - 6m, ± 3000k
- Avenues / Major City Streets
9m, ± 4500k
- Boulevards
12m, ± 5000k





The City of Lyon is a good example where light is used to define the topography of the city (rivers, bridges, hills, landmarks, streets and city entrances).



FLORENCE HUMMERSTON PARK

LIGHTING HIERARCHY - LYON, FRANCE 6

3.5 PARKS AND GARDENS

It is neither practical nor desirable to totally illuminate large areas of parks or gardens at night. Lighting within parks and gardens should be sufficient to allow safe passage of pedestrians/public in an energy efficient manner, and where practical illuminate specific features.

Lighting within various parks and gardens will depend on their locality. Some local, small open spaces may be adequately lit by street lighting. For larger parks and gardens, path lighting may be all that is required to be lit at night. Good path lighting will help direct pedestrians to the safest, most frequently used paths. The remainder of the space should remain dark at night with the accent being on park edges and main entrances to help identify safe walking routes unless large areas are used for organised night activities.

A nighttime photograph of a city skyline, featuring several prominent skyscrapers illuminated with lights. The city lights extend into the distance, creating a dense pattern of lights against the dark sky. A semi-transparent blue banner is overlaid on the lower portion of the image, containing the text '4 ECONOMIC, ENVIRONMENTAL AND SOCIAL CONTEXT'.

4 ECONOMIC, ENVIRONMENTAL
AND SOCIAL CONTEXT

4.1 ECONOMIC DEVELOPMENT OF THE CITY AT NIGHT

A clear approach to lighting is crucial to the performance of the city's evening economy, specifically its population-driven industries. These industries mainly include consumer services businesses in the areas of retail, entertainment, hospitality and tourism.

The nature of population-driven industries makes them oriented towards servicing a given population, and they require effective place activation and management in order to capture an adequate proportion of visitor expenditure. Their commercial success is largely dependent on a high level of pedestrian flow and the unplanned purchases that they can generate; the Retail Traders' Association estimates that approximately half of all transaction for these types of businesses is unplanned³.

Improving place management of the city through high-quality lighting that directs pedestrian flow to major commercial nodes and past shop windows will support the performance of local businesses within population-driven industries. By encouraging an increased length of visit and by attracting more visitors to the city, the lighting strategy will contribute to businesses with an opportunity to capture a greater proportion of expenditure from a larger expenditure pool (Figure 2).

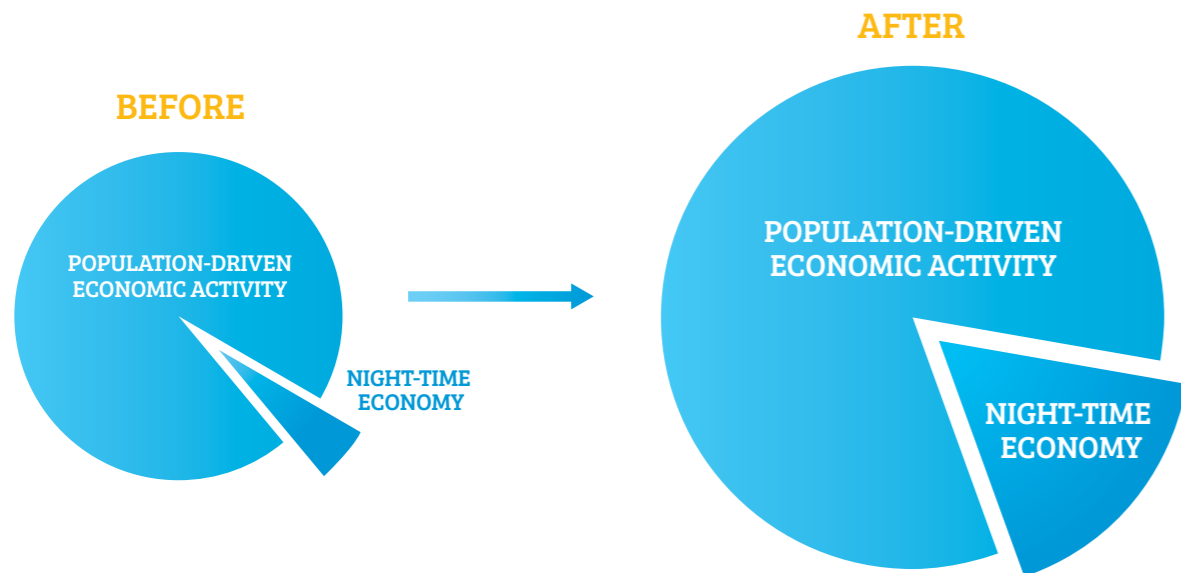


FIGURE 2
Indicative increase in
night time economy
Source: City of Perth, 2011



BURY STREET

EXPECTED ECONOMIC BENEFITS

By means of comparison, the City of Adelaide's lighting strategy was expected to achieve more than \$12 million per annum in increased expenditure capture, and generate related employment opportunities within population-driven industries⁴. Adelaide's upgraded lighting infrastructure is expected to extend the length of stay per visit for one-third of all visitors, leading to significant increases in expenditure during this time.

It is reasonable to expect that the City of Perth will achieve similar increases in expenditure capture by achieving the following expected benefits:

- Increased length of stay per visit to the city;
- Increased visitation to the city;
- Increased expenditure capture for population-driven businesses;

- Greater on-street activation at night-time;
- Improved value proposition for the whole city as a destination by adding to its point of difference from suburban centres;
- Reduced costs related to anti-social behaviour (e.g. avoided property damage, reduced security measures, reduced clean-up costs) for local businesses and the City of Perth;
- Improved well-being and enhanced quality of life for city residents by improved safety, reduced crime and vandalism, and increased offerings for enjoyment;
- Increased capacity to host well-attended events in the night-time; and
- Uplift in local property values in the long term due to the factors above.



MURRAY ST MALL



FORREST PLACE 7

LIVERPOOL, ENGLAND

The experience of other cities has demonstrated that improvements to city lighting schemes can be a key factor in reinvigorating a night time economy. A study commissioned by the Liverpool City Redevelopment Authority in 2005, following lighting upgrades between 2003 and 2005, showed that more than one-third of visitors indicated that the improved lighting encouraged them to increase their expenditure within the city centre. These findings are attributed to an increased incentive to remain in the city centre through improved pedestrian amenity and legibility, as well as improved perceptions of safety. The study estimated that investment in lighting upgrades generates additional expenditure capture of \$5 million per annum⁵.

Case Study

A good combination of ambient lighting and artistic lighting for stage performances.





4.2 SOCIAL AND SAFETY ISSUES

Improved lighting is closely tied to reductions in crime rates and improved levels of public safety. Areas which are well lit and have opportunities for passive surveillance (or “eyes on the street”) are far less likely to experience incidents of criminal or anti-social activity. Lighting also improves perceptions of safety for visitors to an area, encouraging increased lengths of stay and assisting in building a critical mass that supports population-driven industries.

It has been established by Painter and Farrington⁶ that good street lighting reduced the amount of crime and were able to establish that the cost saved by the community in one year from reduced crime was greater than the cost of installing a new lighting system. Perception of personal safety in cities is an important consideration in the design and management of public spaces. Our feeling of safety impacts on participation

in community life, our mental and physical health. For these reasons, safety is one of the key areas of the City of Perth 2029 Vision which states:

In 2029, Perth is recognised as one of the safest cities in the world. The city is people-oriented, a social hub that attracts people to its heart day and night. The atmosphere is friendly and engaging. People feel safe to visit the city after dark, promenade along its streets, visit its attractions and use its transport systems.

There is a wide range of factors that contribute to a feeling of safety including individual behaviour, media, law enforcement, personal experience and environmental design. Lighting is a critical element of environmental design and contributes not only to our sense of safety but also to crime prevention and management.

City of Perth commissioned research of residents, businesses and visitors⁷ indicated that 82% of respondents considered the city very safe / safe in the day time. However, feelings of safety in the evening fell to 36% with a further 28% who felt neither safe/unsafe.

The 2014 SafeCity Survey⁷ indicated the key factors that had improved night safety in the CBD and Northbridge in the past year were increased number of activities and people on the streets at night. Between 25 and 35% has also noticed increased lighting in public places and streets. When asked “what actions would contribute most to improving safety”, respondents indicated more police in the streets at night the highest (76%) with improved street lighting and more CCTV cameras equal at 36%.

Crime Prevention through Environmental Design (CPTED) is a set of principles that have potential for reducing crime

and unwanted behaviours throughout the community. One of these principles is surveillance, and lighting plays an important role in improving surveillance in darker areas and maintaining surveillance at night. This can be through active surveillance such as CCTV or police / security services or passive surveillance through “eyes on the streets”.

Lighting can contribute to crime prevention for the following reasons:

- People feel safer in well-illuminated areas because they can see what and who is around them;
- It increases the risk of offenders being seen, reported and potentially apprehended; and
- People are encouraged to use well-illuminated areas, which increases activity and thereby further deters crime and unwanted behaviours.



The City of Perth Safer Design Guidelines encompass CPTED principles and include integrated lighting guidelines for developers. The purpose of the Safer Design Guidelines is to:

- Minimise the opportunity and reduce the risk of crime;
- Reduce the fear and risk of crime for people using private and public space;
- Lower the incidence of crime in the local government area rather than simply displace it;
- Improve the quality of life of residents, especially vulnerable groups, by reducing their fear of crime;
- Create a more sustainable environment by improving usage of public spaces and reducing maintenance and crime associated costs; and
- Provide public and private developers with convenient and clear direction on responsible

authority's requirements with regard to design incorporating CPTED and community safety principles.

Whilst lighting alone cannot achieve all CPTED objectives, when used appropriately in conjunction with CPTED principles, lighting can significantly contribute to a safer community and the vision for the City of Perth.

Night lighting and safety audits have been conducted in December 2011 and January 2012, at key areas that residents and workers identified as feeling unsafe at night. Many of these were away from central business areas and key findings in these locations were a lack of light for pedestrians, as most lighting targets vehicular traffic and not pedestrians. Some locations lacked lighting, whilst others had adequate lighting for vehicles.

However, this did not spill onto footpaths as trees or foliage obstructed direct light or lights were too far apart for pedestrians. These factors created inconsistent lighting levels and restricted surveillance, therefore leading to a lack of a feeling of safety for people walking alone at night.

As the city's residential and visitor population continues to grow, it is critical the City of Perth ensures that people feel safe to walk or cycle the streets, parks, riverside and other public spaces in the evening to access accommodation, dining, entertainment venues and public transport. Lighting which focuses on pedestrian needs, in conjunction with other CPTED principles, is a key contributor to the development of a safe and vibrant city and needs to reflect the street hierarchy and functionality of particular locations.

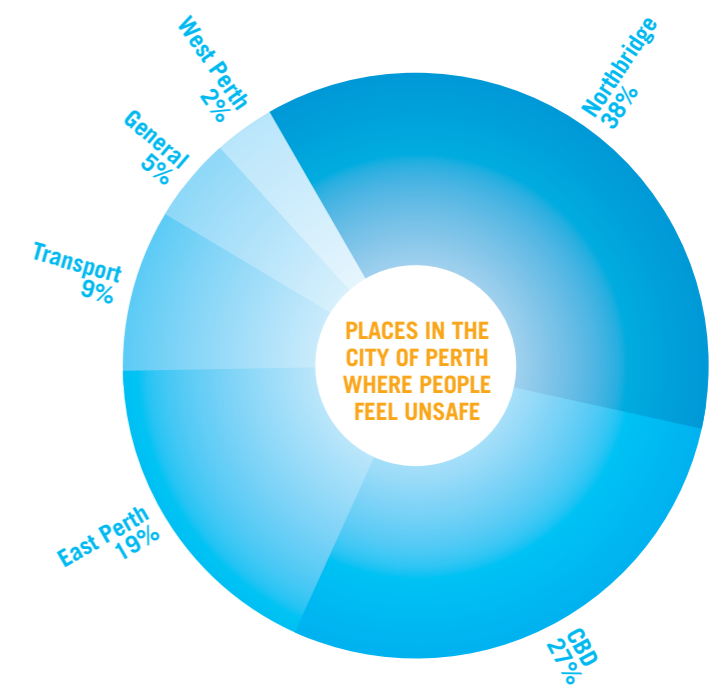


FIGURE 3.
Locations where people feel unsafe

4.3 ENVIRONMENTAL CONCERNS

ENERGY EFFICIENCY

One of the primary objectives of the Lighting Strategy is to reduce the amount of power consumed by public lighting. Existing street lighting should be converted to the latest energy-efficient technology and monitored for consumption, efficiency and maintenance. The over-lighting of public spaces and buildings should be discouraged so that the level of illumination matches the intensity of use by pedestrians and motorists.

Lighting is a major consumer of energy in the city with the interior lighting of commercial buildings accounting for 35% of greenhouse gas emissions. While street lighting is less than 1% of city wide total greenhouse emissions, it is a significant component of City of Perth corporate emissions (21%)



City lights before Earth Hour

9



City lights during Earth Hour

10



View of the Milky Way

11



View of the Milky Way with urban light pollution

12

LIGHT POLLUTION

The environmental cost of exterior lighting can be reduced by careful planning as light is a highly efficient trespasser. A significant proportion of the electrically generated energy directed into street lighting is directed upward into the night sky creating sky glow, and is considered to be an ever increasing problem by the Perth Astronomical Observatory. Another source of light pollution is glare, the uncomfortable brightness of a light source when viewed against a dark background. Glare from poorly designed flood lighting of buildings, exterior sports facilities and poor road lighting can create a form of visual chaos that is difficult to overcome with well-designed lighting.

Light needs darkness for us to focus and to separate the important from the unimportant. Buildings that are over-lit compete with surrounding streetlights and 'wash out' more subtle lighting while requiring more energy and contributing to greenhouse gasses. Inefficient outdoor lighting requires more electricity, depleting the Earth's energy resources and contributing to more greenhouse gases and more pollution.

4.4 CULTURAL & FESTIVAL LIGHTING

The City of Perth has presented a number of events where lighting has been used to enhance the experience of those attending. Events such as the Christmas Light Switch On, The Nativity and New Year have always featured lighting effects to create atmosphere and excitement, making the events a more enjoyable experience.

Lighting for events has in recent years advanced considerably with imaginative lighting using 3D mapping technology now possible on buildings and other features. This has been well demonstrated in events such as Vivid Sydney which promotes a variety of lighting techniques and innovation. This event, which takes place over a period of 10 days in winter, draws thousands into the city centre around Circular Quay. These types of festivals are becoming common place around the globe with several cities using their buildings as backdrops for projections and lighting techniques. The cost of these festivals however can be extensive and their success relies on sponsorship and public support.

Lighting Urban Communities International (LUCI) recently published a report on the success of light festivals after contacting 26 cities hosting over 30 light events and looking at 10 case studies from around the world. The report⁸ takes a detailed look at the qualitative and quantitative evaluation tools that were used to

demonstrate the positive impacts of the festival and concludes that while evaluation methods may vary, the general consensus was that these festivals had an overall positive effect.

To meet the demands for lighting at events the City needs to ensure that the lighting design for the city is flexible enough to take additional lighting when required for events. This has been facilitated in the designs used in Forrest Place and at the Northbridge Piazza to date and future opportunities should be considered where new lighting is designed for an event space.



13



14



15



16

4.5 FEATURE LIGHTING

BUILDING LIGHTING

The co-operation of key building owners is essential in delivering a unified display that includes the whole of the central city. Taller buildings should make a stronger statement than shorter buildings and the lighting signature should be fully integrated with the building's form. A small number of special buildings should be highlighted with most of the city's fabric appearing as a backdrop. Small energy efficient LED luminaires should be used in a collective way for impact while avoiding the use of the building's internal lights.

The lighting of buildings should be based on the use of light sources that create a clear contrast with those used for the street lighting. When lighting public and private buildings and structures such as bridges, the use of primary and saturated colour should be avoided except during festival occasions. Saturated colours overwhelm the natural colour of the materials in buildings and the permanent presence of colour soon tires the eye with any surprise factor wearing thin after a while. Priority should be given to the following features and locations:

- Street corners;
- Entrances of buildings;
- Shop fronts;
- Entrances; and
- Colonnades.

PUBLIC SPACES

Streets extend beyond the property line to include laneways, car parks, shop fronts and building entrances. Street lighting is usually designed around the motor car with the centre of the street more brightly lit than the edges, whereas a streets layered edges and pathways are more important to pedestrians. Lighting at night should help create a perception of the street space expanding to include a building's ground floor interiors, but to save energy, interior lighting should be switched off after midnight. As part of the City Switch Green Office program, the City works with office tenants to achieve energy efficiency, thereby reducing greenhouse gas emissions.

According to Gehl Architects Perth Public Spaces Public Life 2009 and more recent lighting and safety audits, only a few streets and spaces in the city centre have dedicated lighting for pedestrians. In many streets, lighting is insufficient for pedestrians on footpaths.

STREET EDGES

The dimension of light poles on footpaths should relate to a human scale and the height of lanterns kept as low as possible. Streetlights should be located where they provide good light to building frontages so



that visual interest is concentrated on the street edge. Ensure a holistic approach is taken to major and minor spaces and that lighting turns the corner into side streets and resolves the junction between one lighting layout and another at intersections. Passers-by are invited to enter spaces if lighting is continuous and of high quality, whereas poorly lit spaces can undermine the effectiveness of public street lighting.

HERITAGE PLACES

Lighting of heritage places provides an opportunity to celebrate the City's cultural heritage in an engaging and accessible way. It also provides new and exciting ways to experience heritage places. Lighting of heritage places can be used to highlight heritage significance associated with architectural features and landmark qualities. It can also be used to enhance the social and historical significance of a place. A strategic and integrated approach is required to ensure that the lighting of heritage places also assists in other ways such as wayfinding in general and for specific events and identifying St Georges Terrace as the City Spine.

Such lighting schemes can achieve:

- Enhanced image of the city's title 'City of Lights';
- Enhances aesthetic appearance of heritage places at night;
- A greater sense of identity and culture;
- Encourage more frequent evening visits by residents and tourists and enhance night time orientation; and
- Increased awareness and perception of Perth's cultural heritage.



Interior lighting of commercial and retail buildings accounts for 35% of greenhouse gas emissions in the city.



Perth revitalised by the application of low energy feature lighting to many buildings.



5 COMMUNICATION /
CONSULTATION

COMMUNICATION / CONSULTATION

The Strategy is being informed through internal and external consultation with a wide range of organisations, including:





6 IMPLEMENTATION

The following chapter describes **seven key aspects** of implementing the lighting strategy. Please refer to the Lighting Strategy Action Plan for full details.

6.1 LIGHTING TASKFORCE

It is recommended that a Lighting Taskforce should be formed for implementing the lighting strategy. The scope of work for the group should include:

- Ensuring that the objectives and content of the Lighting Strategy are made available to all developers, State Government agencies, planners, architects, landscape architects, engineers and all those responsible for developments in the city;
- Encouraging and promoting high quality lighting initiatives in both the public and private sectors;
- Having the authority to comment on lighting proposals prior to Development Assessment approval;
- Securing the continued involvement of all parties who participated in the preparation of the lighting strategy;
- Contributing to 'A Good Lighting Practice Guide' that defines the basics of good external lighting design; and
- Maintaining active liaison with the media and the promotion of lighting as a community issue and benefit.

It is envisaged that the taskforce should be small and comprise the necessary degree of political and business community influence, design skills, technical knowledge and environmental awareness. It should not become too large and cumbersome and be chaired by someone who understands and will promote the benefits that lighting can bring to the development of a night-time economy in the City. The City is currently implementing a review of resources for the effective implementation, maintenance and control of lighting.



6.2 LIGHTING MASTER PLAN

The aim of the Lighting Master Plan for Perth is to encapsulate the unique qualities of Perth by day and transfer these into a night time environment to cater for residents, workers, tourists and local visitors alike. The unique qualities that give Perth its Sense of Place during the day are;

- The river;
- Views;
- Buildings;
- Streets and other public spaces;
- Character precincts; and
- Landscaping.

The lighting strategy shows how these elements can be lit to create a stronger and more legible urban structure to reveal the city at night. Good, well-planned lighting can make a city more legible and thus easier to use after dark for the most vulnerable users, people.

The lighting master plan provides a holistic approach to the city lighting strategy by looking at lighting from the overall large-scale city pattern down to the micro environment of streets, parks, squares and buildings.

WEST PERTH

CENTRAL CORE

- Gateways
- Night Time Economy - Existing
- Night Time Economy - Future
- Parks and Gardens
- ::: Ceremonial Route - St Georges Terrace
- :::: Important City Streets

PARLIAMENT HOUSE
OBSERVATORY
BARRACKS ARCH
HIS MAJESTY'S THEATRE
OLD PERTH BOYS SCHOOL

BARRACKS ARCH
HIS MAJESTY'S THEATRE
OLD PERTH BOYS SCHOOL
WESLEY CHURCH
GPO
ART GALLERY
TOWN HALL
LIBRARY
TREASURY BUILDING
COUNCIL HOUSE
CONCERT HALL

EAST PERTH



6.3 GOOD LIGHTING PRACTICE GUIDE

It is recommended that the basics of good lighting practice be defined in a published booklet. This booklet should address issues such as glare, light pollution, light colour, and integrating lighting within a building fabric. The publication should be available to all these trades and professions involved in exterior lighting.

6.4 LIGHTING AND PLANNING

BACKGROUND

Currently, there is minimal planning legislation or guidance on the lighting of private developments in Western Australia at a State or local level. Existing local government lighting strategies/policies primarily deal with public street lighting, security lighting and lighting of outdoor sporting facilities. The absence of regulatory lighting provisions within the existing planning framework has meant that the lighting of private buildings in Perth has generally occurred in an ad hoc and uncoordinated manner.

The City of Perth's City Planning Scheme No.2 (2004) currently provides for the illumination of commercial buildings and public spaces to ensure public safety and to add character to the streetscape. The Council has implemented these provisions by requiring the illumination of buildings, public art and signage in the city.

IMPLEMENTATION

The Lighting Strategy will provide further guidance for the illumination of private development in the city. A proactive approach will be undertaken to ensure the lighting design of any new and existing buildings conform to the objectives and principles of the Lighting Strategy. Lighting will be discussed at pre-lodgment and development approval stages for new developments to ensure that the design considers the Lighting Strategy. Discussions will be facilitated with landowners of existing key landmark buildings to promote the illumination of their facades.

The City Planning Scheme No.2 (2004) provisions will be reviewed to reference the Lighting Strategy. Guidelines for developers, architects and building owners will be developed to ensure appropriate lighting on private development in keeping with the overall city wide strategy.

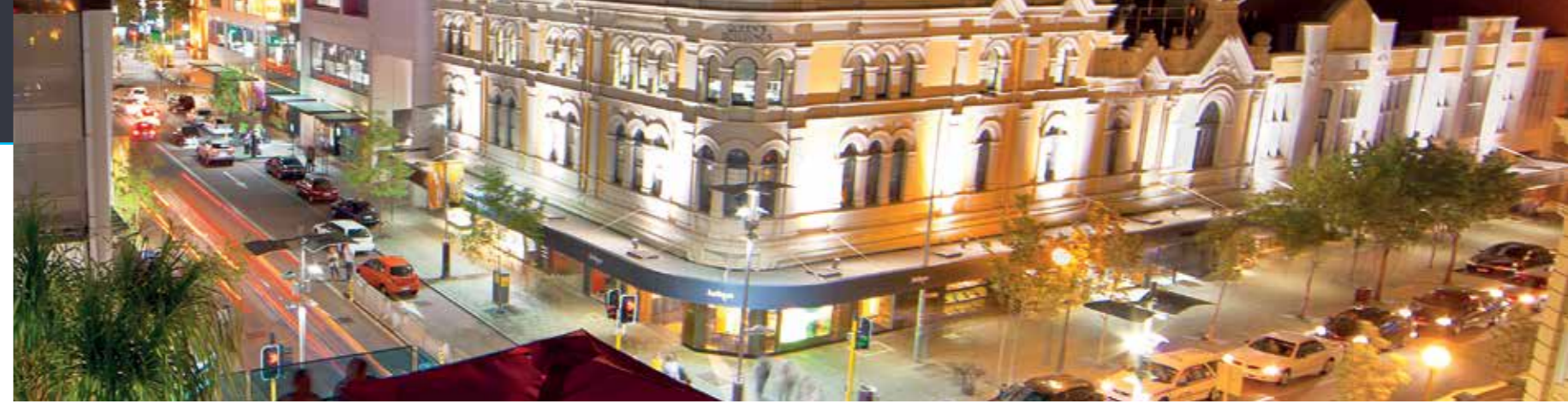
Implementation of a facilitative approach to the lighting of private development in the city should provide for greater visual coGENCY and presentation of the city at night in the manner desired in the Lighting Strategy. To this end, the City of Perth will need to work closely with the State Government to ensure a coordinated approach to lighting in the city is achieved.

6.5 MAINTENANCE

The City of Perth 'Lights Assets', Asset Management Plan recognises that keeping lighting assets in good condition over their lifetime requires regular maintenance, monitoring of performance and the capture of lessons learned from the specification and installation of these assets. Proactive programs can be planned to ensure that the quality and safety of lighting is a key part of maintaining lighting assets using information management. By using a database to understand the location and condition of assets, forward planning can enable the quality and safety of lighting to be maintained.

The Goals and Objectives of the Lights Asset Management Plan are:

- Identify ageing assets to determine priorities for condition assessment. Use the condition assessment result to determine forward works and financial requirements from financial year 15/16 onwards;
- Identify current levels of service and service level gap to determine key performance measurements required;
- Review capital works program concerning lighting upgrade and repainting program. Use this information to refine future demand management plan and resource analysis;
- Review past operational and maintenance expenditures to determine future budget requirements and to identify opportunities in reducing life-cycle cost such as power consumption and reactive maintenance; and
- Calculate initial life-cycle cost based on past expenditures to project future demand and new assets life-cycle cost requirements.



6.6 MONITORING AND CONTROL OF THE PUBLIC LIGHTING SYSTEM

At present, data on the performance of the public lighting system is limited and not all of this lighting is owned by the City. In order to achieve the following outcomes lighting installations in the city would be of benefit:

- Reduction in energy consumption;
- Better maintained equipment;
- Compliance with security requirements;
- Infrastructure modernisation;
- Better quality service; and
- Cost control.

To achieve the above, the City needs to improve the design, monitoring and management of lighting installations. This can be achieved through varying forms of control or management systems that allows specific areas of public realm lighting to be controlled remotely. With advancing technology wireless systems of monitoring and control are available.

A vehicle for achieving the desired outcomes is the Lights Asset Management Plan to manage and monitor performance in conjunction with some form of Control Management System (CMS). The Lighting Taskforce could also investigate the potential for public/private partnerships as a means of achieving energy savings.

The Lights Asset Management Plan also proposes the following actions:

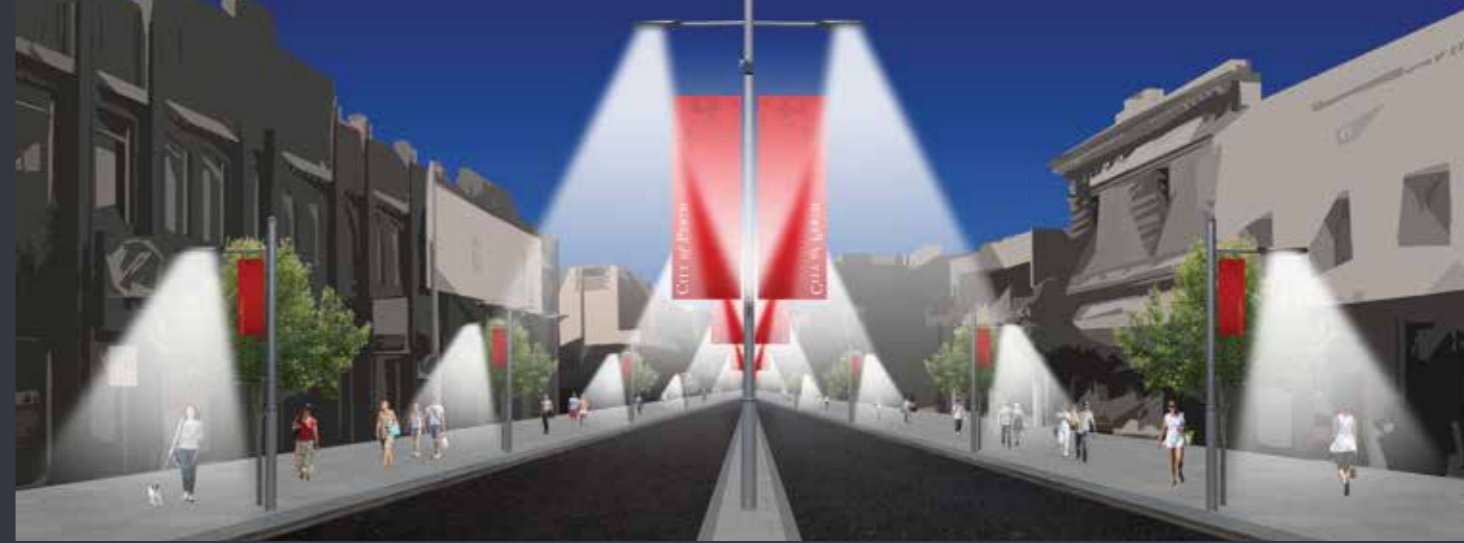
- Identify risks associated with lights assets and mitigate through a more proactive approach such as regular inspection and maintenance regimes;
- Improve stakeholder relationships by developing information regarding the asset's financial and operational performance to influence better decision making;
- Interrogate developed asset register to support strategic life-cycle management; and
- Number all light poles for easy identification by the contractors and members of the public to improve the level of service.

Intelligent lighting systems respond to the variations in natural light and the level of usage, leading to energy savings.

5 PM



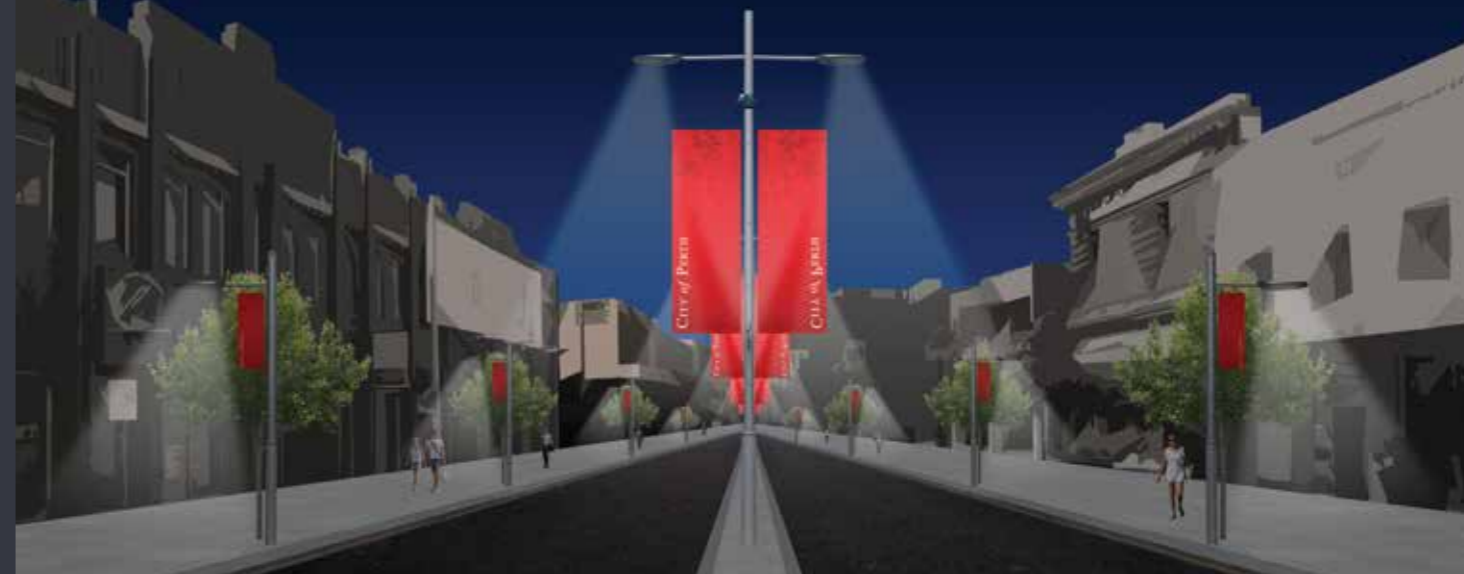
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7 PM



3 AM



6.7 KEY STRATEGIC PROJECTS

The following Key Strategic Projects are considered to be priority actions in the implementation of the Lighting Strategy. A summary of these key projects is provided below. Please refer to the **Lighting Strategy Action Plan** for full details.

SOLAR LIGHTING DEMONSTRATION PROJECTS

Solar or Photovoltaic (PV) lighting, as it is more commonly known, is a technology that is being swept into prominence by the obvious visual nature of its 'green' characteristics, and by society's overwhelming endorsement of the demonstration for renewable energy in public venues. Opportunities exist to undertake demonstration projects using PV cells for park lighting and other projects in the CBD to demonstrate the city's desire to conserve our natural resources.

STANDARDISATION OF LIGHT POLES

The development of a simple but elegant, multi-functional alternative to the conventional galvanised steel poles supplied by Western Power has commenced in order to adopt a cohesive approach to the long-term planning of lighting in the City. These "Perth Poles" will become a strong unifying element throughout the City.

In addition to supporting a range of road/street lighting lanterns, the multi-functional pole can be designed to carry other components such as traffic signal lights, mobile phone transceivers, wi-fi hotspots, equipment for illuminating building elevations, banners, CCTV cameras, signage, street name signs, direction devices, and support for overhead catenary cables where required. They can also be designed to facilitate the use of both high level vehicular roadway lighting and low level pedestrian pavement lighting.

These will then reflect Perth's status as a leader in contemporary design and enhance its proposed status as the 'City of Lights'. There is also the potential to link the design of this equipment to that of other street furniture.

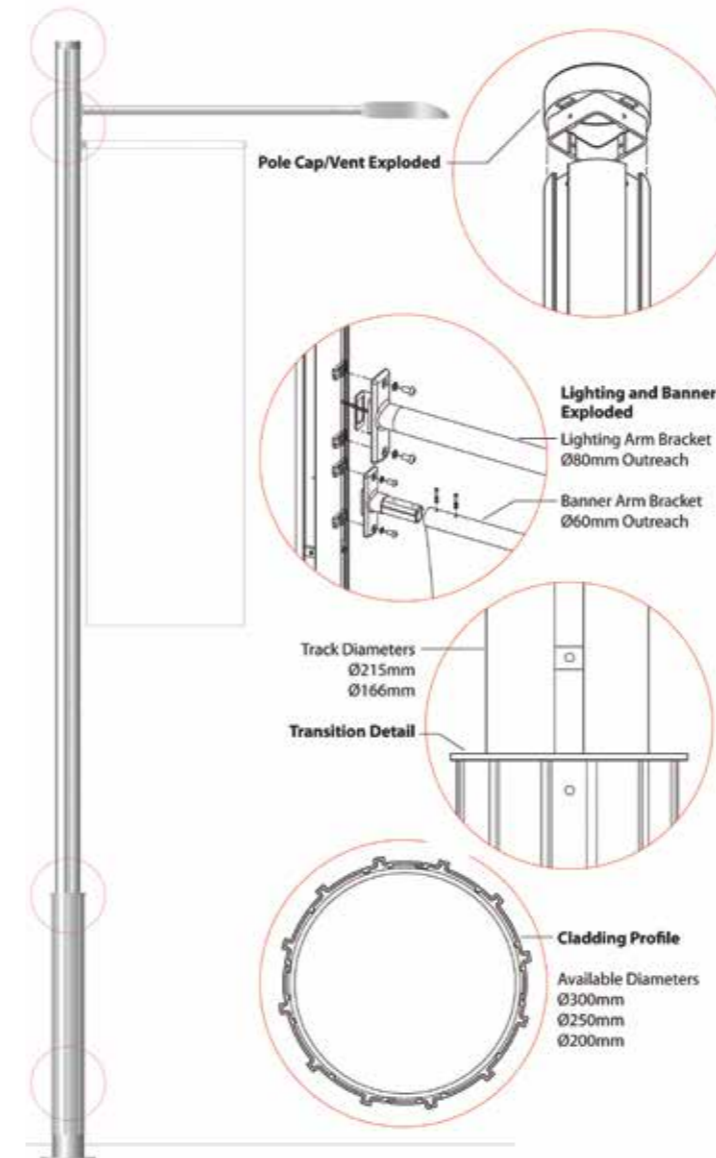
PRIORITY LIGHTING PROJECTS

Night time audits of the city have identified the following areas that should be considered a high priority in terms of improved lighting:

- St Georges Terrace lighting;
- Roe St lighting upgrade;
- West Perth;
- East Perth;
- Wellington Square;
- Sherwood Court and Howard Street; and
- Fielder Street.

These projects have been given precedence as they respond to several lighting issues at once, including safety and amenity for pedestrians. To avoid lighting being considered in isolation, these lighting upgrades should be implemented in parallel with major capital works projects. Where paving, landscaping, infrastructure and street furniture are due for replacement, new lighting should be considered a priority.

The successful implementation of the Lighting Strategy requires the preparation of a detailed Action Plan which accompanies this document. The Action Plan translates the objectives of the strategy into a range of specific lighting projects that can be accurately costed. Opportunities exist for partnering with private companies where a portion of the lighting upgrade is funded from the energy savings made.



APPENDIX

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Image 17

Lightplan Lighting

