



DESIGNING  
**OUT**  
crime

“designing  
in people”

LIGHTING FOR CRIME PREVENTION



Office of  
Crime Prevention

# Introduction

Designing Out Crime (DOC) and Crime Prevention Through Environmental Design (CPTED) use a set of principles that have great potential in reducing crime and unwanted behaviours throughout the community. For further information on DOC, see the Designing Out Crime Planning Guidelines, available from the Office of Crime Prevention's website: [www.crimeprevention.wa.gov.au](http://www.crimeprevention.wa.gov.au).

One of the principles of Designing Out Crime is **Surveillance**.

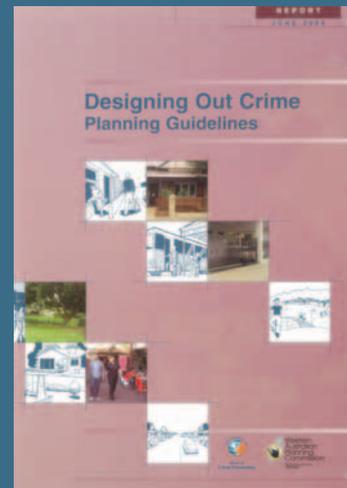
Lighting plays an important role in improving Surveillance in darker areas and to maintain Surveillance at night. Lighting can contribute to crime prevention because:

- 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.
- People are encouraged to use well-illuminated areas, which increases activity and thereby further deters crime and unwanted behaviours.

Most lighting systems are developed primarily around Australian Standards, but this may not ensure that enough consideration has been given to lighting that will deter crime and improve safety perception.

The following sections are not intended to be used in the place of Australian Standards, but are intended to provide further information about crime prevention lighting issues to consider during the design of a lighting system.

Note: Selection and design of lighting for crime prevention (as with all Designing Out Crime strategies) should stem from a security/crime risk assessment.



## Australian Lighting Standards

There are numerous Australian Standards for designing lighting for traffic and pedestrian safety, including:

- AS/NZS 1158.0:2005 Lighting for roads and public spaces – Introduction.
- AS/NZS 1158.3.1:2005 Lighting for roads and public spaces – Pedestrian area (Category P) lighting – Performance and design requirements.
- AS 1158.4-1987 The lighting of urban roads and other public thoroughfares – Supplementary lighting at pedestrian crossings.
- AS/NZS 1158.5:2007 Lighting for roads and public spaces – Tunnels and underpasses.
- AS/NZS 1158.6:2004 Lighting for roads and public spaces – Luminaires.

These Standards provide good information on design of Luminaires (lamps/lights) and design of lighting systems for different pedestrian area-types. However, there are some crime prevention lighting issues that are either not considered in detail in the Standards, or are left to the individual to solve.

# Further lighting issues to consider for crime prevention

The following sections outline crime prevention lighting issues that are either not considered in detail by Australian Standards, or are left to the individual to solve.

## Site-specific lighting requirements

Australian Standards attempt to provide enough information to guide the lighting design for all pedestrian area types. However, there is no way for a standard to appropriately cater for every unique situation. Some sites will inevitably require special lighting solutions that the standards cannot provide.

### **What the standards say about lighting for specific pedestrian areas:**

The following is an excerpt from Australian Standards, which demonstrates how the Standards detail site-specific lighting requirements:

AS/NZS 1158.0:2005 Lighting for Roads and Public Spaces details pedestrian areas requiring illumination, eg:

#### **“3.2.21 Verge**

*The area between the edge of the carriageway (which may or may not be defined by kerbs) and the property line. It may include a nature strip, footpath, unsurfaced road shoulder, fence or other vertical structure adjacent to the property line.”*

### **Further considerations for site-specific lighting requirements:**

A potential issue with sections like the one above is that they define specific boundaries of areas that require illumination but cannot possibly take into account all the unique requirements of unique (real) locations.

For example, a verge may be adjacent to a property line that is undeveloped bush-land. If this scenario was illuminated to Australian Standards, the verge would be illuminated but the adjacent land may not be. If this were the case, the verge (containing a pathway) may be illuminated, but adjacent bush-land may not be illuminated. This scenario would result in the creation of opportunities for crime such as:

- Using dark bush-land (adjacent to an illuminated pathway) as a hiding place for offenders.
- Using dark bush-land as a potential place to ambush pedestrians moving along the illuminated pathway.

In this situation, other crime prevention methods may be warranted, but are not included in Australian Standards.



For example: an alternate pedestrian route may be suggested to pedestrians by illuminating an alternate pathway (eg. the other side of the road if suitable, away from the bush-land). Or, additional lighting may be provided to illuminate the adjacent bush-land or provide strategic glare.

The design of lighting in this area illuminates the pathway, but the area adjacent to the path (on the right) is very dark.



Another potential issue with illuminating specific boundaries is when pedestrians stand in the illuminated boundary it can make it difficult to see out into surrounding areas.

This provides opportunities for offenders to watch potential victims in the illuminated areas, whilst remaining unseen in the darker surrounding areas.

This may also deter pedestrians from using the illuminated spaces due to perceived risk.

When standing in well lit areas it can be difficult to see out into darker surrounding areas.

## Glare (AS/NZS 1158.0:2005 Section 3.4.7)

### **What the standards say about glare:**

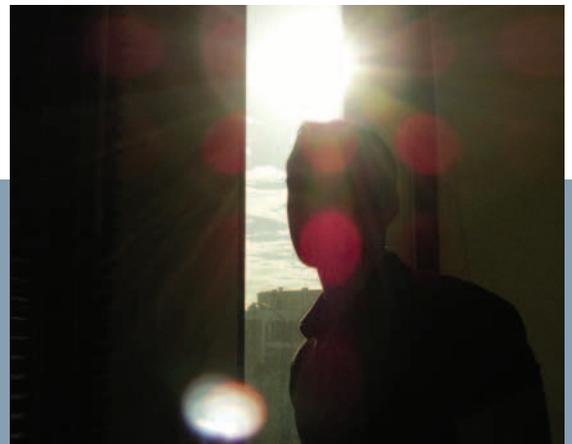
Australian Standards generally discuss glare as a negative effect that requires management or avoidance. Glare refers to lighting that causes discomfort or the partial inability to see.

### **Further considerations for glare:**

Glare that negatively affects normal users of a space or residents of an area should be avoided. Similarly, glare that obscures surveillance of offenders committing crimes must also be avoided. However, used properly, glare can also be used as a crime prevention tool.

For example, directional glare lighting can be used to enable normal users to see one direction (eg. out into potential risk-areas surrounding a site) whilst making it difficult for intruders to see the normal users (in the other direction). Glare lighting could be used in the example described on the previous page. If lighting was directed into the non-occupied bush-land it would allow pedestrians on the footpath to see into the bush-land, but make it difficult for potential offenders in the bush-land to see towards the footpath due to glare.

The photo (right) demonstrates the difficulty of seeing into glare. The person in the photo is looking toward the camera and would be able to see the photographer clearly, but the photographer cannot see them clearly because of glare. Glare lighting can be used to create "one-way vision". If this concept is used for crime prevention, it must enhance normal user's vision and obscure potential offender's vision (not the other way around).



## Risk of Crime (AS/NZS 1158.3.1:2005 Section 1.1 and Table 2.1)

What the standards say about risk of crime:

Australian lighting standards includes risk of crime as a criterion for the selection and design of lighting. The standard suggests the use of a table (provided) and to select whether the risk of crime in the area is High, Medium or Low.

### Further considerations for risk of crime:

The inclusion of risk of crime as a criterion for the selection and design of lighting is a step in the right direction. However, there is no guide as to how to determine the risk level, or to define what is High, Medium or Low. Also, there is no distinction between different types of crime, which may have an impact of lighting requirements.

Risk of crime for a particular area can be better determined through a more detailed, structured analysis. This may include:

- Site visit of the area to assess local conditions and gather evidence (eg. signs of crime/graffiti), to assess site-specific issues so lighting can be designed in the most appropriate way to manage these.
- An assessment of local crime statistics (and comparison with other areas) to assist the assessment of whether risk of crime is High, Medium or Low.
- Community consultation to assess safety perception and anecdotal crime evidence from the local community.



Ideally, a structured risk assessment process should be used to assist the development of a lighting design that will match the requirements of the unique local area.

## Security Lighting (AS/NZS 1158.3.1:2005 Section 1.1)

### What the standards say about security lighting:

The main purpose of the lighting covered in this Standard is to:

*“assist pedestrians to orientate themselves and detect potential hazards and to discourage fear of crime and crime against the person while protecting the integrity of the night time environment through control of light spill and glare”*

It does not cover:

*“lighting intended specifically as security lighting for building exteriors, nor does it cover lighting for video surveillance”*

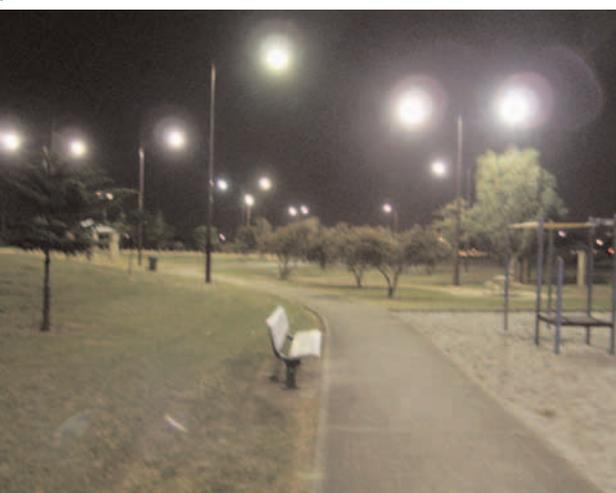
### Further considerations for security lighting:

Lighting required specifically for security and/or CCTV may have further considerations, including:

#### Consideration for specific lighting (or avoidance of lighting) around particular areas or assets.

For example, illuminating an asset in a populated area may enhance natural surveillance and therefore enhance security. However, illuminating an asset in a non-populated area may simply draw attention to it by passers-by, thereby potentially raising the likelihood of crime.

Similarly, illuminating an area (eg. a park or pathway) at night may indicate to users that it is appropriate and safe to use at night. Illuminating a potentially unsafe area at night may give users a false sense of security and may in fact put them at risk.



A crime risk assessment will assist in determining what type of threats are likely for an area or asset, and then, whether these threats are likely to be increased or decreased by using lighting.

Consideration should be given to risk prior to illuminating areas/assets at night.

## Lighting for CCTV

Some CCTV cameras can provide images in low light conditions, but generally CCTV requires support from lighting in order to provide footage that can be of value for monitoring, investigations or provision of evidence.

Considerations for lighting to support CCTV should include:

- Consideration for even/continuous lighting levels that do not create shadows or dark spots to ensure clarity of footage.
- Ensuring that lighting does not create glare for the cameras (thereby obscuring or flaring images).
- Consideration for lighting that provides good colour rendition (See following section).

## Colour Rendering AS/NZS 1158.3.1:2005 (Section 2.7 COLOUR RENDERING)

Colour rendering refers to the ability of the light source to accurately reflect the colour of objects.

For example, some lighting types (eg. sodium based lighting) make objects look more yellow than they normally look.

### What the standards say about colour rendering:

AS/NZS 1158.3.1:2005 (Section 2.7 COLOUR RENDERING) suggests:

*“The choice of light source should be based on an analysis of all the factors relevant to the particular application including aesthetics, environmental, lamp mortality and lumen depreciation, lamp cost, energy use, etc.*

*Compatible with the operational and economical requirements of the lighting scheme, in general the type of light source used should have the highest colour rendering index (CRI) possible.”*

### Further considerations for colour rendition:

The choice of light source should also be based on analysis of local crime and security lighting requirements. Some potential crime prevention related factors that may be relevant, that are not mentioned, include:

### Lighting colour to support safety perception

Research suggests that facial recognition is improved with the use of white light that provides good colour rendition. This also improves most people's perception of safety. British lighting standards recognise this and permit lower overall levels of lighting if the lighting sources provide the required colour rendition criteria. Australian Standards take this issue into account for low light levels (eg. P4 and below).

### Lighting colour to support accuracy in reporting incidents

Different coloured lighting can change the perceived colour of objects. For example, the photos below demonstrate how white light provides an accurate colour rendition of the individual's blue clothing, whilst the yellow light makes the clothing appear green.

An inaccurate description of a potential offender could result in Police overlooking the potential offender, or it could create “reasonable doubt” in a court of law, thereby allowing a potential offender to avoid prosecution.



Different coloured light sources can make objects appear different colours.

## Lighting Levels for Pedestrian Areas (AS/NZS 1158.3.1:2005 Tables 2.6 to 2.7)

### What the standards say about lighting levels:

The following information has been sourced from Tables 2.6 to 2.7 in AS/NZS 1158.3.1:2005. These are the highest lighting levels (lux levels) listed in the Standard for use in these areas if they are assessed as having a “high crime risk”.

**Pathways** – (assessed as having a high risk of crime) the highest average horizontal illuminance listed for this area (P1) is 7 lux.

**Public activity areas** – (assessed as having a high risk of crime) the highest average horizontal illuminance (P6) is 21 lux.

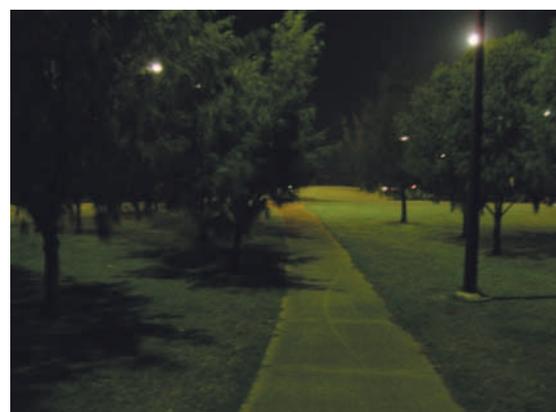
**Connecting elements** (eg. steps, stairways, footbridges, subways) (assessed as having a high risk of crime) the highest average horizontal illuminance (P10) is 35 lux.

**Outdoor car parks** – (assessed as having a high risk of crime) the highest average horizontal illuminance (P11a) is 14 lux.

### Further considerations for lighting levels:

The lux levels listed for the (high risk of crime) areas above are not very high. For example, compare them with the following:

Source	Lux level (average)
Moonlight	1 lux
Candle at distance of 30 cm	10 lux
Bright Office or sunrise/sunset on a clear day	400 lux
Sunlight on an average day	100000 lux



Lux levels taken on the pathway in this photo ranged from 0 lux to 14 lux. This light level does not appear to be very bright, and may not be sufficient to address fear of crime. The numerous shadows and dark areas provide potential opportunities for crime or other unwanted behaviours.

Some organisations develop their own lighting guidelines that exceed the levels listed in Australian Standards.

The following table provides a comparison of lighting levels listed in Australian Standards with guidelines developed by the Government of Western Australia’s Public Transport Authority (PTA), and the ACT Crime Prevention and Urban Design Resource Manual issued by the Australian Capital Territory Government, who had chosen at the .

Area	AS/NZS 1158.3.1:2005 Lighting for Roads and Public Spaces	PTA Lighting Guideline	*ACT Resource Manual
Pathways – highest (eg for high risk crime areas) average horizontal illuminance (P1)	7 lux	7 lux	7 – 20 lux
Public activity areas – highest (eg for high risk crime areas) average horizontal illuminance (P6)	21 lux	21 – 150 lux	20 – 150 lux
Connecting elements (eg. steps, stairways, footbridges, subways) – highest (eg for high risk crime areas) average horizontal illuminance (P10)	35 lux	40 – 150 lux	35 – 150 lux
Outdoor car parks – highest (eg for high risk crime areas) average horizontal illuminance (P11a)	14 lux	14 lux	14 – 50 lux

## Labeling for Luminaires (AS/NZS 1158.6:2004 Section 1.6.3)

### What the standards say about labelling for luminaires:

Australian Standards suggest the following information be included on labels for luminaires:

- The lamp type and rating.
- Where applicable, the lamp envelope type, e.g. clear or diffuse.
- In Australia, the year of manufacture of the luminaire. (Provision of this information is optional in New Zealand).



### Further considerations for labelling:

To facilitate maintenance of luminaires labels can be used to provide unique luminaire (or luminaire pole) numbering. Using a system like this in conjunction with labels that include prompts and contact information, users of a space can be encouraged to report lighting that is damaged or not functioning to facilitate timely maintenance.

### Further lighting issues to consider for different area types

The following sections outline some specific lighting issues to consider for: entertainment areas, residential areas, commercial areas, public transport and taxi ranks.

Light coloured paint on ceilings surfaces can enhance lighting and visibility in enclosed car parks.

## Entertainment Areas

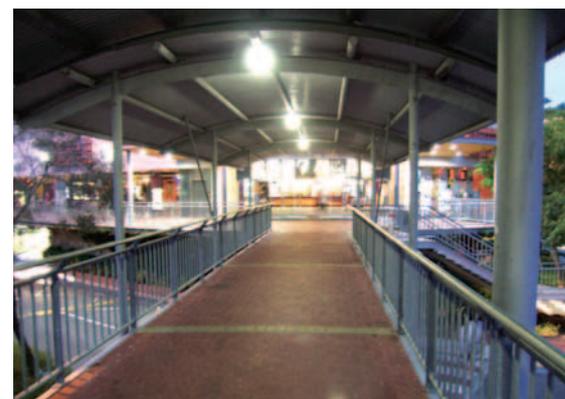
Entertainment areas may have unique lighting requirements due to a number of factors, including:

- Local crime activity.
- Busy night-time activity.
- Mix of people using the areas at night.
- Use of parking potentially located in darker/lonely surrounding areas.
- Use of public transport to get to entertainment areas, which may not operate in close proximity to passenger's destination.
- Potential higher-risk patronage including young people and alcohol-affected people.
- Use of facilities such as ATMs at night, which may be targeted by robbers.
- Higher illumination of entertainment areas may create light pollution for surrounding areas.

The unique factors above may require special lighting considerations to assist in managing risk.

The following lighting strategies should be considered for entertainment areas:

- Illumination of car parks to deter crime and facilitate safety perception.
- Sufficient illumination of surrounding darker areas, alleyways or potential hiding or entrapment spots, should be provided to deter crime and unwanted behaviours and provide good surveillance opportunities for patrons.
- Sufficient illumination of routes to telephones/information stations/ATMs.
- Illumination of way-finding landmarks or signage.
- Use of ultraviolet light in toilets or problem areas to deter drug use (if required).



Sufficient lighting should be provided to facilitate safe pedestrian access to and from car parks.

- Illumination of concave or shadowy areas along pedestrian routes.
- If possible avoid extreme contrast between light and dark surfaces that may create glare.
- If CCTV is used in an area design lighting so that luminaries do not create glare for the CCTV cameras, and ensure the areas covered by CCTV are illuminated to a level that provides CCTV footage of value.
- Carefully consider colour rendition – white light will improve safety perception and accurate portrayal of colours so offenders can be accurately described to Police.

## Public Transport and Taxi ranks

Public transport and taxi ranks may have unique lighting requirements due to a number of factors, including:

- Local crime activity.
- Night-time activity.
- Mix of people using the areas at night.
- Use of parking potentially located in darker/lonely surrounding areas.
- Potential higher-risk patronage including young people, women, the elderly and alcohol-affected people.

The unique factors above may require special lighting considerations to assist in managing risk.



Provide illumination of important signage to assist way finding and access to contact information.

The following lighting strategies should be considered for public transport and taxi ranks:

- Provide even/uniform illumination of adjacent car parks and pedestrian routes from transport to high-use surrounding facilities/areas.
- Sufficient illumination of surrounding darker areas, alleyways or potential hiding or entrapment spots, should be provided to deter crime and unwanted behaviours and provide good surveillance opportunities for patrons.
- Sufficient illumination of routes to telephones/information stations/ATMs.
- Illumination of way-finding landmarks or signage.
- Use of ultraviolet light in toilets or problem areas to deter drug use (if required).
- Illumination of concave or shadowy areas along pedestrian routes to surrounding main thoroughfares.
- If CCTV is used in an area design lighting so that luminaries do not create glare for the CCTV cameras, and ensure the areas covered by CCTV are illuminated to a level that provides CCTV footage of value.
- Carefully consider colour rendition – white light will improve safety perception and accurate portrayal of colours so offenders can be accurately described to Police.

## Residential Areas

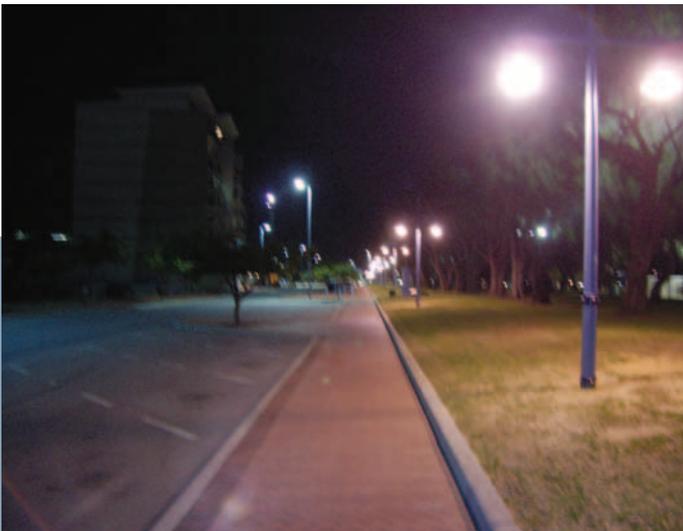
Residential areas may have unique (external) lighting requirements due to a number of considerations, including:

- Local crime activity.
- Deterrent to burglary.
- Enhanced safety perception.
- Potential higher-risk residents including children and the elderly.
- Enhancing safe use of local facilities (eg. telephone booths, public transport, pathways, public toilets, parks and shops).

The unique factors above may require special lighting considerations to assist in managing risk.

The following lighting strategies should be considered for residential areas:

- External lighting for all sides of residential buildings (operable from inside).
- Motion triggered external lighting for individual houses and buildings.
- Design lighting systems to provide even, uniform levels of lighting, minimising shadows and dark areas.
- Use lighting with good colour rendition in areas and access ways used by pedestrians.
- Consideration of potential risks before deciding to illuminate parks, public toilets etc at night.



Use lighting with good colour rendition in areas and access ways used by pedestrians.



Consider potential risks before deciding to illuminate parks, public toilets etc, at night.

## Commercial Areas

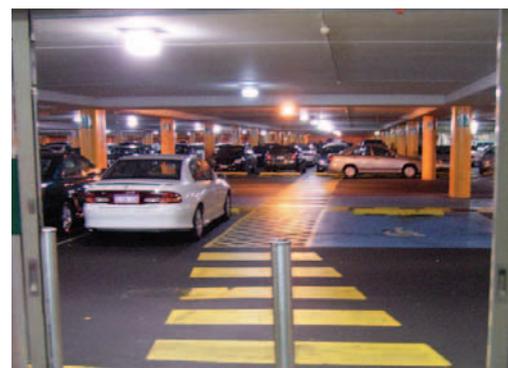
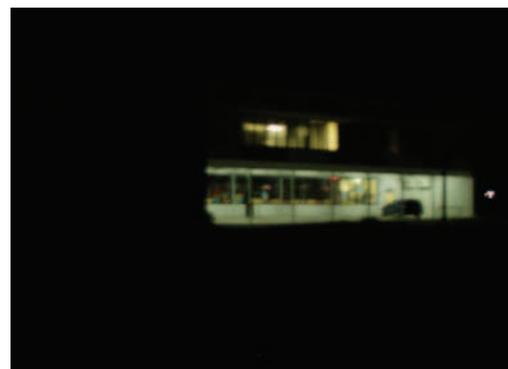
Commercial areas may have unique (external) lighting requirements due to a number of considerations, including:

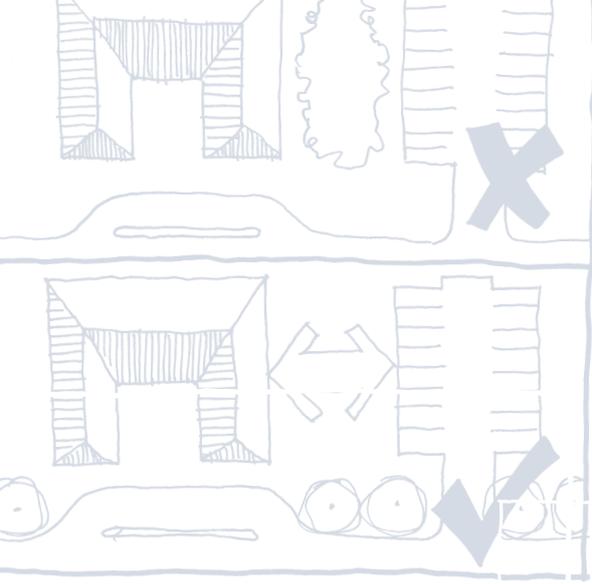
- Local crime activity.
- Potential high value assets in stock.
- Deterrent to burglary.
- Busy night-time activity (late night trading).
- Use of public transport to get to commercial areas.
- Enhanced safety perception for shoppers.
- Potential higher-risk patrons including children and the elderly.
- Enhancing safer use of facilities (eg. telephone booths, public transport, pathways, public toilets).
- Use of facilities such as ATMs at night, which may be targeted by robbers.
- Higher illumination of commercial areas may create light pollution for surrounding areas.

The unique factors above may require special lighting considerations to assist in managing risk.

The following lighting strategies should be considered for commercial areas:

- Specific lighting requirements for specific areas should be developed from a proper risk assessment process (eg bright lighting may minimise one particular risk, but make another risk more likely).
- Provide even/uniform illumination of car parks and pedestrian routes from car parks to commercial areas.
- Use of enhanced lighting (higher levels / different colour renditions) in strategic locations to deter loitering.
- Avoid light spillage /pollution to surrounding areas.
- If CCTV is used in an external area, design lighting so that luminaires do not create glare for the CCTV cameras, and ensure the areas covered by CCTV are illuminated to a level that provides good-value CCTV footage.
- Carefully consider colour rendition – white light will improve safety perception, and accurate colour so offenders can be accurately described to Police.
- Use of ultraviolet light in toilets or problem areas to deter drug use (if required).
- Illumination of concave or shadowy areas along pedestrian routes to surrounding main thoroughfares.
- Consider redundancy within the lighting design – the loss of one luminaire should not mean that a significant portion of the area becomes darkened.
- Consider the type and positioning of surrounding vegetation to avoid lighting being compromised by growing plants.





## Contact

For further designing out crime information, please visit our website at [www.crimeprevention.wa.gov.au](http://www.crimeprevention.wa.gov.au) or contact:

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