BOROONDARA

Draft Public Lighting Guidelines

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Responsible Directorate: Places & Spaces
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Acknowledgement of Traditional Owners

The City of Boroondara acknowledges the Wurundjeri Woi-wurrung people as the Traditional Owners and original custodians of this land, and we pay our respects to their Elders past and present.

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1 Introduction

1.1 Purpose

Public lighting can help make public spaces safer, more usable and enjoyable for all.

The City of Boroondara is committed to providing smart and sustainable public lighting in public areas. The purpose of these guidelines is to ensure a consistent and coordinated approach to planning, designing and installing lighting in the City of Boroondara. The guidelines will help to ensure that lighting is best practice, fit-for-purpose, and supports a vibrant and safe city while meeting Council's sustainability objectives.

1.2 Objectives

The key objectives of these Guidelines are to:

- Guide Council decision-making for lighting projects
- Ensure a consistent and coordinated approach to lighting in public open spaces
- Ensure lighting in the city is appropriate and fit-for-purpose
- Minimise the environmental impacts of lighting, including impacts on wildlife
- Support community health and safety
- Support a vibrant night time environment
- Ensure lighting requests from the community are responded to appropriately and consistently
- Ensure lighting design and implementation is consistent with Council plans, policies and strategies.
- Outline maintenance responsibilities for public lighting assets

Broadly speaking, these Guidelines define the following:

Where, when and what: inform and guide Council's decision making for public lighting, to decide where and when public lighting is needed, and if so, what sort of lighting should be installed.

Consistency: help Council staff, lighting design consultants and others consistently apply sustainable lighting principles and standard design requirements to new public lighting installations, replacements and repair programs and maintenance.

Performance levels: communicate Council's public lighting minimum efficiency and standard design requirements.

1.3 Scope

These Guidelines have been designed to comply with all relevant Australian laws and legislation, and to comply with and complement the following standards, policies, codes and strategies set out in the Public Lighting Policy.

1.3.1 Who should use these guidelines

These Guidelines should be used by internal Council staff, and any external contractors with a formal role in the design and management of public lighting in City of Boroondara, including:

- engineers
- asset planners and managers
- lighting service managers
- landscape architects
- urban designers
- place managers
- lighting designers
- developers
- land managers
- maintenance staff and contractors

1.3.2 When to use these guidelines

All new public lighting, excluding private lighting and lighting on Department of Transport and Planning roads in City of Boroondara, must adhere to these Guidelines.

Council staff should use these Guidelines when:

- installing new lighting in a previously unlit area including community requests for new lighting.
- replacing/upgrading/modifying existing public lighting.
- considering the potential removal of existing public lighting.

Council staff can use the Guidelines to inform briefs for lighting design, as well as to assess lighting designs to ensure they meet the required minimum Australian Standards for lighting in different circumstances and meet Council's style and technical specifications.

The Guidelines should be provided to external lighting design contractors, developers, urban designers and engineers as part of brief documents, to guide their applications for public lighting design and installation.

2 Responsibility for public lighting in Council

Responsibility for the management, planning, design, construction, integrating, maintenance and renewal related to public lighting is split between different Council departments and CitiPower/United Energy (Distribution Network Service Providers or DNSPs). Table 1 summarises the areas of responsibility.

Table 1: Responsibility for public lighting by Council Department

Lighting type	Service owner	Planning and design	Construction	Renewal	Maintenance
Street Lighting - Unmetered (May include some carparks and open space)	Asset and Capital Planning	Asset and Capital Planning Traffic and Transport for Traffic Management Devices (TMDs) Placemaking Capital Projects	DNSPs	DNSPs	DNSPs
Off-Street Metered Lighting (parks and open space)	Open Space and Trees	Open Space and Trees	Open Space and Trees	Asset and Capital Planning	Asset and Capital Planning
Off-Street Metered Lighting (Shared paths)	Traffic and Transport	Traffic and Transport	Traffic and Transport	Asset and Capital Planning	Asset and Capital Planning
Council Owned Car Park Lighting (e.g. Shopping centres)	Asset and Capital Planning	Asset and Capital Planning Capital Projects	Asset and Capital Planning Capital Projects	Asset and Capital Planning	Asset and Capital Planning

Lighting type	Service owner	Planning and design	Construction	Renewal	Maintenance
Council Owned Car Park Lighting (e.g. pavilions/parks etc.)	Open Space and Trees	Open Space and Trees Capital projects	Open Space and Trees Capital projects	Asset and Capital Planning	Asset and Capital Planning
Creative and feature lighting, includes catenary lighting	Asset and Capital Planning	Capital Projects Placemaking	Capital Projects	Asset and Capital Planning	Asset and Capital Planning

Support Roles	
Smart Lighting	The roles listed in this table regularly seek advice from Asset and Capital Planning on the type of lighting management system to be applied for each project.
Audits	Where audits are required during project planning, design or delivery, the department responsible should consult with: • Strategic Asset Management for light spill audits related to AS/NZS 4282 • Strategic Asset Management for light level audits related to AS/NZS 1158 Strategic Asset Management is responsible for condition audits of assets every 5 years.
Data Management	For metered lighting data, Asset and Capital Planning is the custodian responsible for storing the data and approving its use and access. This includes Council-owned car park lighting and other metered lighting assets. For metered lighting data, Asset and Capital Planning is responsible for defining the data collection template, data quality requirements and completeness checks. The planning and design team must complete the required data and forward it to Asset and Capital Planning for review and updating.

Support Roles	
Public requests	Requests from residents and users of Boroondara's public spaces relating to over lighting, spill lighting, additional lighting or new lighting are managed by the Service Owner.

3 New public lighting – principles and overarching process

When planning for new public lighting Council staff should apply the following principles and process.

3.1 Guiding principles for public lighting

For all new public lighting in City of Boroondara Council area the guiding principles below will need to be considered. Depending on the circumstances, the guiding principles listed below may oppose each other. For example, lighting a major shared path through biodiversity sites as listed in the Urban Biodiversity Strategy. Each principle on its own is not to be taken as absolute and instead needs to be weighed up and considered against the other principles as part of the overall design process.

a) Minimising negative impacts on the environment

Lighting can be harmful to biodiversity (in particular, insects and nocturnal animals) and people. Poorly designed lighting can also reduce the visibility of the night sky. In addition, the trenching or boring required for grid connected lighting can be damaging to tree root zones and other flora. Or lighting location can require pruning of trees, which reduces tree canopy and creates an ongoing maintenance burden.

These impacts must be weighed against human benefits and minimised to the greatest extent possible in areas of high environmental value or along biodiversity links. Lighting should incorporate controls and techniques that are designed to minimise harmful impacts. This includes avoiding lighting where possible, providing only minimum luminance where required, using fixtures which minimise up-light or spill and using off-grid solar lighting where the impact of trenching and boring is considered damaging. Protecting pockets of darkness to support native fauna should be prioritised where possible**.**

b) Maximising energy efficiency and minimising climate impacts

Council is committed to replacing legacy lighting to LED, and in doing so will contribute to creating a cooler, greener and more resilient city with a low carbon footprint.

While Council purchases its electricity from 100% renewable energy, reducing overall energy use through energy efficient lighting technologies (e.g. Solar lighting, LED bulbs, sensors, timers, and dimmers) reduces overall energy demand, making it easier for the grid to draw on a higher percentage of renewable sources and limiting the need for new energy generation.

c) Making better use of open space

While public spaces are most active during the day, lighting should be designed to extend the site's character into the night, creating a warm and welcoming environment that supports evening use. Selective all-night lighting should be provided only where required.

d) Assisting walking, cycling, public transport and safe driving

Lighting should allow for higher visibility and encourage people in City of Boroondara to walk, cycle and take public transport.

e) Improving safety and security

Lighting is a key tool for creating a safe night time environment. When used effectively, it can contribute to improving gender equity, personal safety, perceptions of personal safety and accessibility by illuminating safe pedestrian travel routes.

Council will avoid creating a false sense of safety by not installing lighting in remote or poorly surveyed locations. For example, where choices exist for Council staff to light either a pathway adjacent to the edge of a park or a pathway internal to a park that both lead to the same destination, then in consideration with other design factors, the optimal choice may be to light the edge path.

f) Ensuring economically sustainable assets are installed and managed

At the scoping stage, a high-level business case analysis should be conducted to ensure that only lighting assets that are easy to install, have low maintenance requirements and are cost effective over the life of the asset are deployed.

All lights and parts need to be commercially available in Australia with preference for Australian design and lighting suppliers. When selecting products, best possible environmental outcomes should also be considered for end-of-life disposal and recycling.

g) Showcasing urban and natural features in an effective way

When people are visiting City of Boroondara, they should see and enjoy our urban features, for example, monuments, signs, and public art. Lighting can be an effective way of highlighting such features in key locations at selective times.

3.2 Design process for the lighting of public spaces

To ensure that public lighting is designed and installed in compliance with these Guidelines, designers should use the following step-by-step decision-making process to determine if, when, where, and how lighting should be installed:

- **Step 1:** Establish the need for lighting (Section 4)
- **Step 2:** Determine site type and site-specific considerations (Section 5)
- **Step 3:** Determine the lighting requirements (Section 6)
- **Step 4:** Determine the luminaire and pole type (Section 7)
- **Step 5:** Integrate smart technology into the design process (Section 8)
- **Step 6:** Follow the appropriate approval process for new lighting (Section 9)

Each of these steps is described in more detail in the relevant sections.

4 Establishing the need for lighting

Lighting should be targeted and provided only where it serves the objectives of public lighting in Boroondara. Most importantly it should be fit for purpose, that is, provide a level of luminance which is suited to the location and use of the site and provided at the times of activity (which may change over time).

Public lighting can often be treated as a peripheral "afterthought" in streetscape and landscape projects, often relegated to the final stages of design. To ensure a cohesive urban environment, lighting should be integrated during the conceptual phase. It is critical that the stakeholders identified in section 1 are consulted early, ensuring their input at the outset allows for a design that reflects the community's cultural, environmental, and practical needs, ultimately fostering a safer and more inclusive night time environment.

The lighting of spaces surrounding a proposed project should be considered as part of the project.

Reasons that new lighting may not be required include:

- adequate lighting is already available from an alternate source such as street, public transport zone, car park, or any other adjacent lighting (in some locations this can reduce the number of new lights installed).
- adequate lighting already exists but is obscured/shaded by trees which can be pruned or the existing lighting bracket can be rotated or extended to reduce shading
- the area is one where lighting is not recommended (as identified in section 4).

  This might include:

  - biodiversity sites or along biodiversity corridors.
  - the installation or location will require excess damage or pruning of trees.
  - night time activity is not considered appropriate.
  - there is an identified risk that lighting may promote inappropriate behaviour after hours.

There may also be safety reasons that new lighting is not needed or recommended. Whilst this may seem contradictory, it is important to not light spaces that may be remote or poorly surveyed and thus create false perceptions of safety. Reasons include:

- an area does not have sufficient natural (passive) surveillance looking into the space from houses or businesses facing the space or passing vehicular and pedestrian traffic.
- an area/pathway leads to a dead end or otherwise unsafe area with little natural (passive) surveillance.

New lighting should also only be considered if one or a combination of the following apply:

- there is a pedestrian travel route that provides a legitimate shortcut from an area of high activity.
- new lighting will increase or maintain Council's desired outdoor activity.

- the site allows for passive surveillance.
- in response to a road or public safety issue, noting the considerations of broader Council plans such as the Boroondara Asset Plan 2025-35, Healthy Ageing in Boroondara 2020 and the Boroondara Community Plan 2025-35, which identify the need to improve accessibility, perceptions of personal safety and the creation of inclusive places that lighting can support in many cases.

Other considerations should include an assessment of whether:

- activity or traffic will be all night/all week or only for a portion of the night/week (relevant smart lighting control methods can be utilised if lighting is for part of the night/week).
- a new power supply connection will be required and if so the cost to provide power to a site.
- the area/location can support the required infrastructure.

5 Determining the site type and site-specific considerations

Once the need for public lighting has been established, the second step of the decision-making process should determine the site type and any site-specific considerations such as:

- the aim of lighting in the area: for example, aesthetic, to create atmosphere, for safety or to guide preferred usage patterns.
- whether the area is a 'high risk' security or accident area, or vandalism risk area, based on evidence.
- whether the site is within a biodiversity site or along a biodiversity corridor.
- the type of users and usage function, as well as usage patterns for the area (e.g. recreation, commuter), as this may indicate particular lighting controls that can be applied.

Guidance on how the guiding principles in section 3.1 shall be applied to different lighting sites and applications is detailed in sections 5.1 and 5.2 below.

5.1 General considerations

5.1.1 Areas of high vandalism or high crime

Guidance/Recommendations:

- Lighting may be installed, in accordance with the Crime Prevention through Environmental Design Guidelines. This includes:
  - ensuring that lighting is installed at a height that prevents vandalism or where lighting is used at a lower level, vandal-proof fittings are be used.
  - The use of sensor lighting on building perimeters to deter graffiti.

- The use of higher colour temperatures (>4000K) for the benefit of CCTV imagery) lighting may be installed with timers based on a needs assessment.
- Avoid excessive lighting on buildings and highlight building entrances and colonnades, alcoves and other recesses. Lighting is to focus on quality and distribution, enhance forms and materials, accent details or decoration and emphasise the dimensional nature of objects and surfaces. Up lighting is to be avoided to prevent glare and light spill.

Controls (e.g. dimming, switching, sensors):

- Sensor lighting can be an effective tool to limit graffiti/vandalism. Timers are to be installed linked to operation hours/peak usages hours of the associated site or building.
- Timers should be adjusted seasonally.

5.1.2 Creative and feature lighting

Examples include uplighting, catenary lighting and lighting of signs, trees, buildings, monuments, art.

Feature lighting may be considered where the installation:

- is not located within an area of environmental significance/sensitivity.
- contributes to place making.
- highlights prominent public artwork (e.g. wall murals).
- assists with reducing vandalism and/or increasing public safety.

Guidance/Recommendations:

- Permanent feature lighting is to be limited to landscapes and other elements that have special public significance to reduce unnecessary lighting and associated energy use.
- Feature lighting of building facades is to be avoided.
- Bud lighting in trees is not to be used as it can damage leaves and branches, limit effective maintenance of the trees and is often damaged during tree maintenance activities.
- Tree up lighting is to be avoided.
- where place-making/urban renewal is planned for a retail centre, Council will explore options to augment existing street lighting with dedicated pedestrian area lighting and/or creative/feature lighting.

Controls (e.g. dimming, switching, sensors):

- Timers are to be installed linked to operation hours/peak usages hours of the associated site or building.
- Timers should be adjusted seasonally. For metered connection points, remote dimming is encouraged where usage patterns allow, or where activity is not desired after certain hours. Switching off is not recommended for shopping strip lighting.
- For unmetered street lighting, Council stakeholders should work with the DNSPs to implement remote dimming where usage patterns allow.

5.1.3 Threatened/critical species habitat areas

Guidance/Recommendations:

- applicable to any known habitat areas for species on the Victorian Flora and Fauna Guarantee Act 1988 Threatened List or the Environment Protection and Biodiversity Conservation Act 1999 List of Threatened Fauna.
- in general, lighting should not be considered due to negative impacts on flora and fauna, unless exceptional, extenuating circumstances apply.
- the design solutions outlined in section 5.2 to control light pollution should be considered when selecting luminaire and pole types.
- where lighting is installed, it must (unless constrained by DNSP approvals, whereby it must get as close to as possible):
  - not exceed 2700K.
  - contain little or no blue, violet and UV wavelength lighting.
  - have 0% UWLR.
  - be species-appropriate (refer to the National Light Pollution Guidelines for Wildlife).

Controls (e.g. dimming, switching, sensors):

If lighting is installed, use remote dimming and timers to turn lights off or down when usage levels drop off or no longer exist, or where activity is no longer desired after certain hours. For example:

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

Smart motion sensors can be considered to override (where applicable) the operating schedules on detection of pedestrian/cyclist movement along paths.

5.1.4 Site specifics

5.1.4.1 Activity centres, shopping strips and shopping centre interfaces

Purpose and application:

This section applies to Council-managed lighting in activity centres, shopping strips, public realm interfaces, Council-owned car parks, pedestrian links and laneways that serve retail and commercial areas. It does not apply to privately owned lighting except where that lighting affects, or interfaces with, Council-managed public realm.

Lighting in activity centres and shopping strips should support pedestrian visibility, wayfinding, access to public transport, evening activity, amenity and perceptions of safety. Additional lighting may be considered where evidence or site assessment shows that existing lighting does not adequately support pedestrian-focused public realm, including upgraded streetscapes, laneway connections, car park access routes and areas identified for placemaking.

Where public realm upgrades or retail centre improvements are proposed, Council should consider whether dedicated pedestrian lighting, creative or feature lighting, or targeted car park and laneway lighting is required to complement existing street lighting. Decisions should balance pedestrian safety, accessibility, amenity, environmental impacts, energy use, maintenance obligations and impacts on nearby residents and businesses. Creative and feature lighting should support placemaking but must not be relied on as the primary functional lighting source.

Council-owned car parks serving activity centres should be assessed together with pedestrian links to shopping strips, public transport stops, laneways and other key destinations. Lighting decisions should consider actual and expected night time use, passive surveillance, accessibility, crime-prevention considerations, light spill and the availability of existing lighting. Refer to section 5.1.7.1 for car park-specific guidance and section 6.1 for desirable lighting categories.

Controls (e.g. dimming, switching, sensors):

For metered connection points, remote dimming is encouraged where usage patterns allow or where activity is not desired after certain hours. Switching off is generally not recommended for shopping strip lighting because pedestrian activity, passive surveillance and access to public transport may continue later into the evening. Any dimming schedule should be based on local conditions and reviewed if activity patterns change.

For unmetered street lighting, Council stakeholders should work with the DNSPs to implement remote dimming where usage patterns allow. Dimming schedules should reflect local activity patterns and should not compromise pedestrian routes, public transport access, passive surveillance or road safety.

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

5.1.5 Open space

5.1.5.1 Biodiversity sites or sites along biodiversity corridors

Examples include open space along the Yarra River and Gardiners Creek

Guidance/Requirements:

In general, lighting should not be considered for biodiversity sites or sites along biodiversity corridors due to negative impacts on local flora and fauna, unless exceptional, extenuating circumstances apply.

Where lighting is installed, the following should be considered (in order of preference and depending on the purpose of the lighting):

- lights with site-specific optics or baffles (to minimise light spill) and the use of dimming or switching after hours of use.

- use of a low CCT (at or below 3000K with preference for lighting with lower blue light content).
- lighting mounted low to the ground e.g. bollards.

If lighting is installed, the design solutions outlined in section 5.2 to control light pollution should be considered when selecting luminaire and pole type.

Controls (e.g. dimming, switching, sensors):

If lighting is installed, use remote dimming and timers to turn lights off or down when usage levels drop off or no longer exist, or where activity is no longer desired after certain hours. For example:

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

Smart motion sensors can be considered to override (where applicable) the operating schedules on detection of pedestrian/cyclist movement along paths.

5.1.5.2 Local, Small Local and Small Local Links

Examples of Local Parks include Mary MacKillop Reserve, Bowen Gardens and Windella Avenue Reserve.

Guidance/Requirements:

Generally, not lit however lighting may be considered where there is a thoroughfare for pedestrians and/or cyclists to or from a destination such as activity centres, transit stops or community facilities.

Controls (e.g. dimming, switching, sensors):

If lighting is installed, use remote dimming and timers to turn lights off or down when usage levels drop off or no longer exist, or where activity is no longer desired after certain hours. For example:

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

5.1.5.3 Playgrounds

Lighting is not appropriate as playground activity is better suited to daylight hours.

5.1.5.4 Recreation areas

Guidance/Requirements:

- lighting will only be considered where adjacent paths are lit
- for basketball courts and skate parks lighting should generally not be installed unless used for organised competitive sporting activities
- Push-button arrangements for non-organised sport can be used, if deemed suitable on a case-by-case basis

Controls (e.g. dimming, switching, sensors):

Adaptive remote-managed lighting is to be used.

If lighting is installed, remote timers must be used, with lighting to be switched off no later than 10:00 pm and dimmed over a short shoulder period (e.g. 15 minutes) to allow safe departure from the area.

5.1.5.5 Regional, Municipal and Neighbourhood Parks

Example includes:

Regional Parks include Victoria Park and Hays Paddock

Municipal Parks include Macleay Park, St James Park and Outer Circle Linear Park.

Neighbourhood parks include Frog Hollow Reserve, Summerhill Park and Canterbury Gardens

Guidance/Requirements:

- light only paths and thoroughfares through parks, not lawns.
- Wherever possible, avoid lighting trees/vegetated areas.
- avoid lighting dead-ended paths, unless the path provides access to a facility within the park that is used during night time hours.
- lighting should only be considered for large parks under the following circumstances:
  - if there is a thoroughfare for pedestrians/cyclists.
  - if it promotes or maintains appropriate night time physical activity (e.g. a running track or walking circuit).
  - a public benefit or demand exists (e.g. for a dog park, running track or walking circuit).

Controls (e.g. dimming, switching, sensors):

Use remote dimming and timers to turn lights off or down when usage levels drop off or no longer exist, or where activity is no longer desired after certain hours. For example:

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

Smart motion sensors can be considered to override (where applicable) the operating schedules on detection of pedestrian/cyclist movement along paths.

5.1.5.6 Shared Paths (off road)

Guidance/Requirements:

Lighting may be installed on shared paths, however, generally do not light paths in threatened/critical species habitat areas.

Controls (e.g. dimming, switching, sensors):

Lights may be installed with the use of remote timers and/or dimmers. For example:

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

Smart motion sensors can be considered to override (where applicable) the operating schedules on detection of pedestrian/cyclist movement along paths.

5.1.6 Public toilets

Public toilets, including access routes, will only be lit if appropriate for extended opening hours.

5.1.7 Roads and car parks

5.1.7.1 Car parks

Guidance/Requirements:

- lighting may be installed where there is evidence of night time use or a reasonable expected need, such as car parks serving activity centres, shopping strips, sports facilities, community facilities, public transport access or other destinations with evening activity.

Pedestrian links between the car park and the facility or precinct it serves should be assessed as part of the car park lighting decision. Lighting should be provided where it supports a safe and direct route, improves accessibility, connects to public transport or shopping areas, and avoids creating isolated lit areas with poor passive surveillance.

Lighting decisions should balance user safety, accessibility, amenity, vehicle and pedestrian movement, light spill to adjoining properties, energy use, biodiversity impacts, infrastructure constraints and whole-of-life asset costs. Existing nearby lighting should be considered before additional lights are proposed.

Controls (e.g. dimming, switching, sensors):

Lights may be installed with remote timers aligned to the operating hours of the associated site or building, or with remote dimming based on the car park's night time usage pattern. Controls should reduce unnecessary lighting when activity is low while maintaining safe access for expected users. Switching off or dimming below the relevant design category should only be considered where supported by usage data, site assessment and consideration of pedestrian routes, passive surveillance, public transport access and nearby residents.

5.1.7.2 EV charging locations

Guidance/Requirements:

- Where an EV charger is located on an existing network pole, lighting should be provided only where it supports safe public access, visibility of the charger and associated footpath or parking bay and does not duplicate adequate existing lighting.
- Where an EV charger is located in a Council-owned car park, lighting should be assessed as part of the broader car park lighting design. A light may be installed directly over or near the EV charger where required to support safe access, charging

equipment use, wayfinding, accessibility, vehicle movement and passive surveillance.

- Lighting decisions should consider expected charging hours, user access needs, existing lighting levels, accessible parking requirements, impacts on adjoining properties, glare, light spill, environmental sensitivity, electrical infrastructure constraints, maintenance access and whole-of-life costs.
- If an EV charger is located in or near a shopping strip, public transport stop or laneway connection, lighting should be coordinated with the adjoining public realm so that safe and legible pedestrian access is provided without creating unnecessary additional lighting.

Controls (e.g. dimming, switching, sensors):

Lights associated with EV charging locations may use remote timers, dimming or sensor-based controls where this is compatible with expected charging activity and public access needs. Controls should reduce unnecessary lighting during low-use periods while maintaining adequate visibility for users, accessible parking bays, pedestrian connections and vehicle movement.

Smart motion sensors can be considered to override operating schedules where this improves user access and safety without causing excessive light spill, glare or impacts on adjoining residents. Switching off should only be considered where charging access is not intended after certain hours or where adequate alternative lighting remains available.

5.1.7.3 Laneways

Guidance/Requirements:

- Laneways are generally not lit where infrastructure, space, maintenance access or light spill constraints make lighting impractical or disproportionate to the public benefit. Where a suitable alternative pedestrian or cycling route exists with minimal additional travel time and distance, and that route has adequate existing lighting, users should generally be directed to the existing footpath network.
- Lighting may be considered where a laneway provides a clear public access function, such as a logical and regularly used shortcut between a Council-owned car park, shopping strip, public transport stop, main road, community facility or other destination with evening activity.
- Lighting should generally be avoided where passive surveillance is poor, particularly where the laneway has limited overlooking from buildings, low pedestrian activity, dead ends or constrained escape options. In activity centres or other precincts with regular evening foot traffic, lighting may be considered where it supports a safer and more legible public route and does not create an isolated lit space.
- Assessment should consider space constraints, vehicle access, protection of lighting infrastructure, power supply, drainage, servicing and maintenance access, conflict with waste collection or deliveries, impacts on adjoining properties, excessive light spill to rear

yards and windows, and whether the laneway can safely accommodate the required poles or fittings.

- Where lighting is supported, the design should use the minimum lighting needed for the intended public function and should prioritise glare control, shielding, appropriate colour temperature, and careful placement to reduce impacts on adjoining residents and businesses.

Controls (e.g. dimming, switching, sensors):

Remote dimming, switching or timers should be considered where usage patterns allow and where reduced lighting will not compromise pedestrian access, passive surveillance, public transport connections, road safety or personal safety outcomes. Controls should be based on local usage patterns and reviewed if activity levels change.

Switch off/dim: from 11:00 pm

Switch on/brighten: 5:00 am

Where laneway lighting is associated with a car park, shopping strip or building, operating hours and dimming schedules should be coordinated with that adjoining use. Switching off should only be applied where an alternative lit route remains available or where continued use of the laneway is not intended after certain hours.

5.2 Control of light pollution

Light pollution can be controlled in the following ways in order of effectiveness:

1. **Switch off or dim lights during periods when lighting is not required**

   Lighting should support positive evening use, and all-night lighting should be provided only where required.

   Where switching lights off is deemed unreasonable, consideration of changes to usage patterns over time should be carried out, with opportunities to dim lighting levels applied wherever viable.

   Smart motion sensors can be considered to override (where applicable) switching and dimming schedules on detection of pedestrian/cyclist movement along paths. The use of motion sensors can make the implementation of switching or dimming more acceptable in areas where safety is of higher concern.

2. **Reduce or eliminate light spill**

   Wherever possible, direct light downwards, not upwards, to illuminate the target area.

Section 5.1 provides guidance on appropriate controls. This section provides guidance on acceptable solutions to further control light pollution.

These solutions should be considered during the design process of any new lighting scheme and are of particular importance to any lighting schemes in or around areas of environmental importance such as biodiversity sites or sites along biodiversity corridors. Further information on light pollution can be found in the National Light Pollution Guidelines for Wildlife.

Luminaires offer a range of optics configurations. LED technology provides the ability to direct lighting where it is needed via adjustments.

5.2.1 Technology solutions to control light spill

5.2.1.1 Employ the use of baffles, shields and louvres

Description/details:

Where unwanted light spill into areas is anticipated to occur despite the use of nuanced optics; shields, baffles and louvres should be used to further reduce light spill. Shields are particularly useful in reducing side-spill into native vegetation at bends in roads and paths.

Examples:

- Optional attachments are available with numerous luminaires on the market.
- On Council controlled lights, the option exists to develop bespoke shields or apply paint if deemed necessary.
- Examples of baffles, shields and louvres are provided below:



Rear shield example

Front & rear shield example

Louvre example

Limitations:

- A limited availability of baffles/shields/louvres are available on the CitiPower/United Energy network.
- The impact of baffles/shields/louvres on compliance with AS/NZS 1158 needs to be considered.
- Availability of baffles/ shields/louvres is supplier specific.

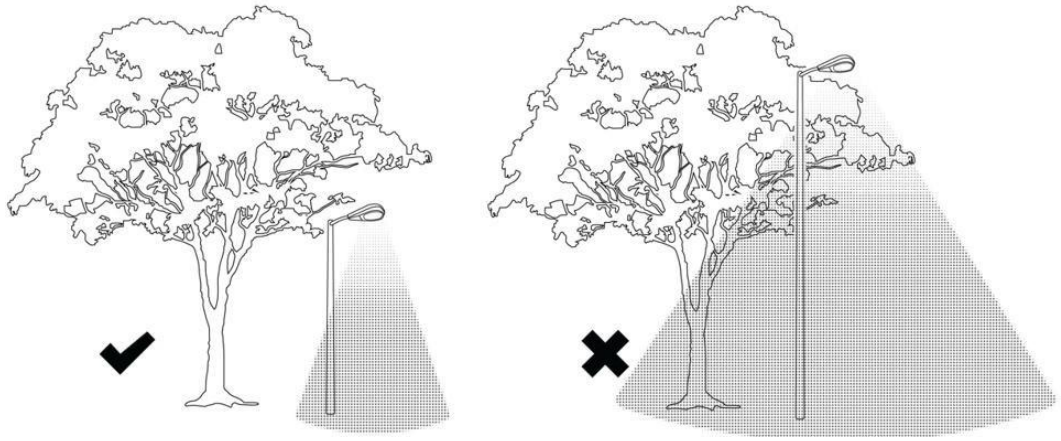
5.2.1.2 Use lower luminaire mounting heights

Description/details:

During the design phase of a new lighting scheme, an emphasis should be placed on lowering mounting heights to a scale that minimizes the spill and scatter of artificial lighting into areas that do not need to be lit.

Examples:

- Pole heights should allow for luminaires to be mounted at heights below current or future tree canopies and fauna movement infrastructure.
- Pole heights should allow for luminaires to be mounted at heights that allow surrounding barriers (buildings, trees etc) to block light spill into areas where it is not needed, see images below.



Limitations:

Lower pole mounting heights will typically result in more poles and luminaires being used and consequently higher install costs and higher energy and maintenance cost.

5.2.1.3 Consider low-output bollard or handrail lighting

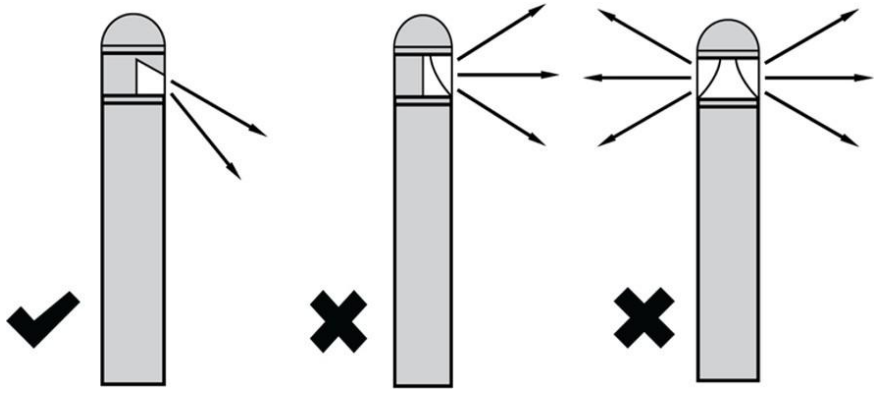
Description/details:

Where it is determined that there is a need for lighting, but the environmental importance/impacts preclude the installation of typical lighting, but some form of delineation is still desired, then the use of handrail lighting or bollards may be considered.

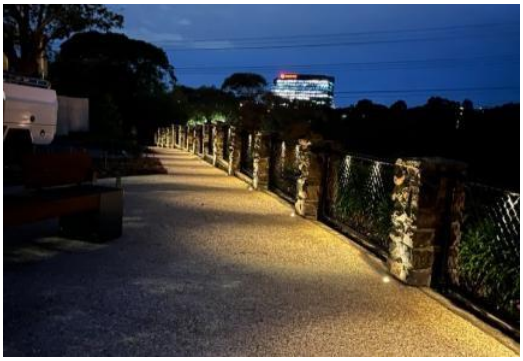
Examples:

Where bollard lighting or handrail lighting is selected, no glare and no upwards light spill should exist, and appropriate optics should be chosen that directs light on to design area with minimal back and/or forward spill.

Bollards with no upwards or backwards light spill and minimal forward spill should be used.



Handrail lights produce a similar outcome to bollard lighting.



Limitations:

- Whilst it is not possible for these lighting types to achieve compliance with Australian Standards (AS/NZS 1158) they are still able to provide a basic illumination of a pathway whilst minimizing light spill into areas of environmental importance.
- Vandalism can be an issue for bollard lighting leading to higher maintenance costs. Refer to section 7.4 for more detail on Council's preference not to install bollard lighting.

5.2.1.4 Configure pole location to direct light onto the design area

Description:

Minimise pole set-back: The setback of a light pole from the design area shall be kept to a minimum (but no less than 1.0m for shared and bicycle paths). This will ensure less back spill and make the shielding of back spill easier if it is required

Increase outreach: Where the pole setback cannot be minimized due to the physical constraints of a site, longer bracket arms should be used to position the luminaires closer to/over the design area.

Examples:

- In most cases, it is desirable for the luminaire to 'overhang' into the area that is intended to be lit. This can be done by placing the pole within, or otherwise as close to, the design area as possible.
- Pole outreach arms can be used to extend the 'overhang' of a luminaire into the area that is intended to be lit.

Limitations:

Torque created by longer outreach arms may limit the achievable overhang for certain poles.

6 Determining lighting level requirements

Once the need to light has been established and site-specific considerations are assessed in accordance with sections 4 and 5, the third step of the decision-making process should determine the required lighting category or lighting level.

6.1 Recommended lighting categories for specific site types

To provide additional guidance to that provided in the Australian Standards, Table 2 below provides examples of sites/applications where Boroondara requires minimum lighting levels to be higher than the minimum levels outlined within the Australian Standards.

Table 2: Lighting requirements for specific types of locations in City of Boroondara

Site/application	Desirable minimum lighting category	Additional information
Arterial roads	V3	No dimming.
Collector roads	PR3	Dim to PR5 after 11pm (where smart controls installed).
Link roads	V5 where the design objectives cater to vehicles PR2 where the design objectives cater to pedestrians (e.g. shopping strip)	Don't dim below V5. Dim from PR2 to PR3 after 11pm (where smart controls installed).
Local access roads	PR5	Don't dim unless there is a legitimate light spill concern due to biodiversity, then considering dimming to PR6.
Laneways	PR5	Use PR5 only where lighting is supported by the laneway assessment in section 5.1.7.3. Glare shields, louvres, careful placement and appropriate dimming should be considered to minimise light spill into adjoining properties. Switching off or dimming should only be applied where an alternative lit route remains available, or continued laneway use is not intended after certain hours.

Site/application	Desirable minimum lighting category	Additional information
Pedestrian crossing (non-flashing lights)	V3 (7.5 lux) across all road categories Where a high level of traffic and pedestrian volume is present, compliance with AS1158.4 can be considered	No dimming. AS1158.4 is hard to comply with and often requires dedicated poles and floodlights - DTP Guidelines to Street Lighting Design sets a requirement of 7.5 lux which can be achieved by standard LEDs.
Off-street shared paths	PP3	Sensor dim to 10% 15 minutes after last use (where smart controls installed) between 10 pm and 5 am.
Car park lighting	PC2 Car parking bays for people with disability must be lit to PCD	Sensor dimming to PC3 may be applied 15 minutes after last detected use, where smart controls are installed, generally between 10 pm and 5 am. Dimming below PC3 or switching off should only be considered on a case-by-case basis where supported by usage data and site assessment, and where safe access, accessible parking bays, pedestrian links, passive surveillance, public transport access and nearby residents have been considered.

6.2 Adaptive lighting

Adaptive lighting is a feature of smart lighting that allows asset managers to program lighting levels based on a change in the need for lighting over the course of an evening, a week or a year.

Adaptive lighting includes:

- **Trimming:** Most lighting schemes that currently achieve compliance with a sub-category of the Australian Standards do so with a certain level of ‘overshoot”. This is because lighting designers are restricted to set wattage increments in luminaires and are often constrained as to where lights can be located due existing infrastructure and landscape features. This means lighting designs are quite crude: using one light may result in being 30% below standard and using another light may result in being 30% over standard. In this case, lighting designers must select the light option that results in an over-design by 30%. Trimming allows lights to be dimmed in small 1% increments which allows lighting designers to trim off any ‘over-design’.

- **Dimming:** Dimming reduces light output when traffic volumes are reduced. Lighting standards are set for the highest traffic volume use; therefore, the standard required of the road, path or area reduces when traffic reduces. Smart lighting enables lights to be dimmed at these times.
- **Constant Light Output:** All lights reduce in light output over time. To combat this, initial lighting levels must be higher than needed so that at the end of a luminaire's life, lighting levels are still compliant. Smart lighting technology allows you to set lighting levels to remain constant over the 20-year life of a luminaire, meaning that there is never any unnecessary over-lighting. It is estimated that constant light output settings can result in around 9% additional energy savings.

All new lighting schemes, as well as all upgraded lighting schemes, in Boroondara must be designed with adaptive lighting in mind. This means that designers need to provide a clear instruction in their design submission for trimmed lighting levels and dimmed lighting levels for each light.

Council will, at its discretion, then choose if and when to implement adaptive lighting at a certain location once the lighting scheme has been installed.

7 Determining the luminaire and pole type

Once the need for lighting, as well as any site-specific requirements and the lighting category have been established in accordance with sections 4, 5 and 6, the fourth step of the decision-making process should determine the luminaire and pole type. See Figure 1 Components of public lights for components of public lights:

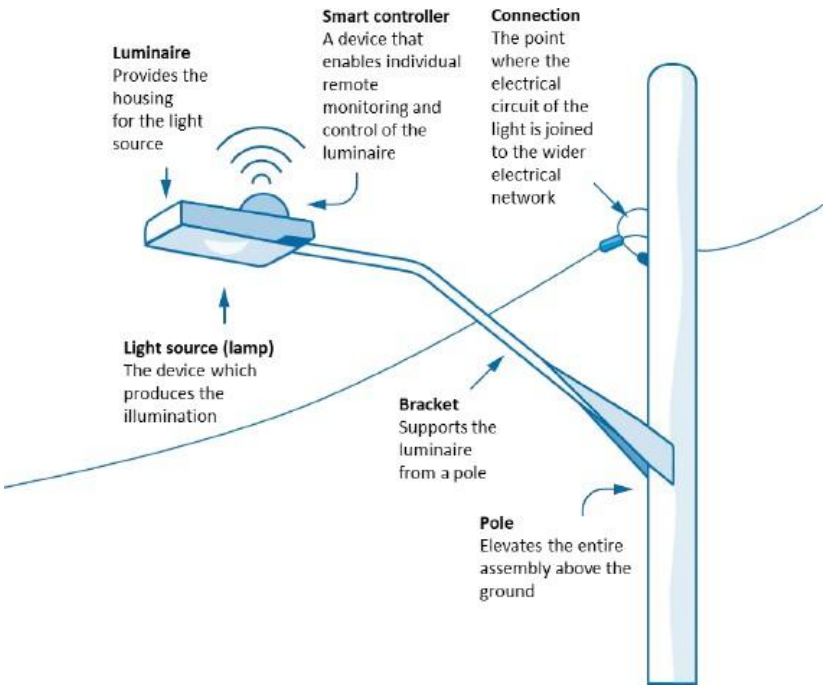


Figure 1 Components of public lights

The number of poles should be rationalised and kept to a minimum (e.g. sharing poles with other function i.e. power lines, signage etc.) to eliminate clutter as well as allowing variation for key sites.

7.1 Requirements for unmetered public lighting assets

Unmetered lighting installations must meet the requirements outlined in Table 3.

Table 3: Requirements for unmetered assets

Feature	Requirement
Luminaires	
DNSP approval	• Must be approved as a standard or non-standard fitting by DNSP. • New lights must be standard. • Replacement of existing non-standard lights are to be considered on a case-by-case basis.
CCT	• Preferred value for Category V or where speed limit is >= 80km/h should be: 4000K nominal (3985±275) • Preferred value for pedestrian crossings should be: 4000K nominal (3985±275) • Preferred value for Category P or where speed limit is <80km/h should be: 3000K nominal (3045±175) • Where nominal 3000K is used, the scotopic/photopic (S/P) ratio of the luminaire must be ≥1. • In general, nominal 4000K luminaires should be used where there are higher levels of vehicular traffic or pedestrian activity where visual discrimination is needed (i.e. where road safety concerns are dominant). Nominal 3000K luminaires should be used in areas of special environmental consideration (such as Dark Skies reserves) or high pedestrian use, preferably where vehicular movements and speeds have been managed to mitigate the potential conflicts between cars/trucks and pedestrians/cyclists. • Lower CCTs (i.e. <3000K) should be considered in areas of particular environmental significance on a case-by-case basis. Use of lower CCTs lower than 4000K will be subject to approval by relevant DNSP.
Lamp technology	Must be LED
“Smart City” compatibility	• Must include a 7-pin NEMA base wired as per the requirements of ANSI C136.41-2013 to a variable output DALI 2.0 control gear (for dimming/brightening).

Feature	Requirement
Luminaires	
	• Category V luminaires must also include a CitiPower/United Energy-approved smart node (or “street light controller”). • Smart nodes may be required on Category P luminaires on a case-by-case basis determined by Council stakeholders (e.g. where dimming, switching or automatic fault reporting is desirable).
Entry type	Must be side entry unless replacing existing non-standard luminaire.
Energy efficiency	Must have a minimum luminaire efficacy rating (LER) of 120 lumens per watt.
Poles	
Mounting height	Must have a mounting height of not less than 5.5m. Where existing tree canopy does not allow mounting at 5.5m, guidance in section 5.2 can be following, noting mounting heights lower than 5.5m will likely impact compliance with AS1158 sub standards.
Surface finish	Must be uncoated galvanised steel unless replacing existing non-standard coloured pole.
Entry type	Must be side entry.
CitiPower/United Energy approval	Must be approved as a standard pole by the relevant DNSP. Council will only approve the installation of a new decorative or non-standard pole by exception. DNSP approved non-standard or “decorative” poles are only to be permitted if replacing existing non-standard pole.

7.2 Requirements for metered pole lighting

Public space, car park and pathway lighting installations must meet the requirements outlined in

Table 4. Note this excludes sports lighting.

Table 4: Requirements for metered assets

Feature	Recommended requirement
Luminaires	
Design	• Luminaire design/style is to be considered on a per-site basis. • Luminaire choice should endeavour to promote consistency of style across the municipality as well as use universal styles/models that are likely to be supported by suppliers’ long term.

Feature	Recommended requirement
Surface finish	• A galvanised finish, green or black colour paint is required. • If a paint finish is used, then this must be matte black and must use a durable method of coating (e.g. a heavy-duty zinc protective powder coating).
Protection against dust/water ingress and mechanical impact	Must have minimum IP65 (ingress) and IK06 (mechanical impact) ratings.
Energy efficiency	Must have minimum LER of 120 lm/w.
Upward Waste Light Ratio (UWLR)	Must have maximum UWLR of less than 1%. **Note**: Any site-specific requirements outlined in section 5 take precedence over these general requirements.
Minimisation of glare	Must comply with glare requirements of AS/NZS 1158.
CCT	• Preference is for 3000K nominal (3045±175) (must not exceed 3000K unless for pedestrian crossings where the preferred value is 4000K (3985±275)). • The scotopic/photopic (S/P) ratio of the luminaire must be ≥1. • Lower CCTs (i.e. <3000K) should be considered in areas of particular environmental significance on a case-by-case basis. **Note**: Any site-specific requirements outlined in section 5 takes precedence over these general requirements.
Lamp technology	Must be LED
Colour rendering index (CRI)	• Must have minimum CRI = 70 • A minimum CRI of 80 is encouraged in areas where improving perceptions of safety is a priority.
Entry type	Preference is for side entry.
Surge protection	Must include Surge Protection Device rated to minimum In = 5kA (Imax = 10kA).
Glare shielding options available	The luminaire shall have optional glare shielding accessories.
Compliance with relevant standards	Must comply with requirements of AS 1158.6.

Feature	Recommended requirement
"Smart City" compatibility	Must include: • a 7-pin NEMA receptacle wired as per the requirements of ANSI C136.41-2013 to a variable output DALI 2.0 control gear (for dimming/brightening); and • a Zhaga Book 18 Edition 2.0 receptacle (bottom-mounted is preferred, supplied with sealing cap); and • a DiiA D4i compliant power supply (with auxiliary power supply for connected devices of 24V DC 4W maximum) **Note:** Central time clocks and/or PE cells are not permitted moving forward due to their inability to supply 24-hour power to smart lighting assets.
Smart Nodes (Light Point Controllers) – if applicable	Must include GPS technology and be compatible with 7-pin NEMA base.
Design life	Must have minimum design life of 20 years.
Poles	
Design	Pole design should be contemporary, with clean, minimalist lines and no decorative detailing.
Surface finish	• A galvanised finish, green or black colour paint is required. • If a paint finish is used, then this must be matte black and must use a durable method of coating (e.g. a heavy-duty zinc protective powder coating).
Compliance with relevant standards	Must comply with AS 4100.
Entry type	Must accommodate side entry luminaires.
Mounting height	Luminaire mounting height of any pole should be of an appropriate scale for the space it is in, with a focus on achieving suitable spacing and avoiding existing or future tree canopies where possible.
Offset from pathways	Where the purpose of lighting is to illuminate a pathway, the minimum offset of the pole from the pathway shall be 0.5m for pedestrian paths and 1.0m for bike paths.
Design life	Must have minimum design life of 35 years.
Pole base	• Wherever practical, base-plate mounted poles are preferred over in-ground poles. • Where poles are installed in grass areas, they should be baseplate mounted with mounting points raised above ground level sufficiently to minimise the incidence of paint chipping and corrosion caused by impact with mowing equipment.

Feature	Recommended requirement
Other non-lighting assets	Multi-use poles can be used to accommodate non-lighting smart city infrastructure.

7.3 Solar lighting

In general, grid-connected public lighting using renewable energy resources is considered preferable to solar lighting. This is due to a range of factors relating to solar lighting, including maintenance requirements and the use of rare-earth minerals.

The installation of solar lighting may be considered in circumstances where:

- connection to the grid is not considered viable.
- tree roots systems or terrain constrains the implementation of deep trenching.
- whole of life cost benefits exists compared to grid connected system.

In circumstances where solar lighting is deemed appropriate, the following requirements apply:

- reputable, long-standing suppliers must be used to ensure quality of product and ongoing support for spare parts and trouble shooting.
- solar lighting systems must be designed to allow for stand-alone autonomy for 3-4 days minimum (3-4 days of no sun).
- "all in one" solar lighting systems where the panel is integrated into the luminaire body are not to be used. The luminaire and panel should be separate to maximise panel orientation and minimise upward waste light to ensure compliance to AS4282:2019.
- solar lighting must also comply with the relevant requirements outlined in sections 7.2 through 7.8.
- compatibility with Councils existing smart lighting platform.

7.4 Bollard lighting

Generally, bollard lighting is not preferred due to its susceptibility to vandalism and constraints in achieving compliance with Australian Standards (AS 1158.3). The installation of bollard lighting will only be considered on pathways where light spill risk is of major concern, and the low mounting height of bollards is able to mitigate this risk (see section 6.1 for further details). Where viable, handrail lighting (see section 7.5) is preferred over bollard lighting. Bollard lighting will not be considered for roadways.

7.5 Handrail lighting

Where present, handrails can be leveraged as a feature upon which to integrate lighting. This eliminates the need for more expensive bollard lighting whilst providing the same benefits related to reduce/minimised light spill.

7.6 Integrated street furniture lighting

Similar to handrail lighting, street furniture such as seats, can be leveraged as a feature upon which to integrate lighting. This eliminates the need for more expensive bollard lighting whilst providing the same benefits related to reduce/minimised light spill.

7.7 In-ground and uplighters

In-ground path or uplighters are generally not preferred due to its susceptibility to water ingress, short lifespan and in-ability in achieving compliance with Australian Standards (AS/NZS 1158.3). Other options should be considered prior to in-ground lighting.

7.8 Suspended lighting (Catenary)

Catenary lighting is generally not preferred and should only be considered in high profile locations. Due to the often-bespoke nature of catenary lighting, maintenance practices can differ greatly from other light types or even other catenary lighting installations. Where catenary lighting is installed, only reputable suppliers who have a history of after-market support should be considered.

Where catenary lighting is installed, a detailed operational document must be prepared for each site and should cover the following aspects:

- Description of primary functions and anticipated results.
- Operational instructions illustrated with diagrams and if deemed necessary supplemented by a brief instructional video.
- List of essential components, including any necessary backup software.
- Guidance for maintenance procedures, along with schedules and recordkeeping requirements.

8 Smart lighting

Smart lighting enables Council and the relevant DNSPs to monitor, manage and optimise lighting assets. It supports safety, sustainability, operational efficiency, asset management and the control of light pollution by allowing lighting levels to be adjusted to suit location, time and use.

- remote monitoring and fault reporting.
- adaptive lighting through trimming, dimming, switching and constant light output.
- integration with Council and DNSP central management systems.
- future integration with other smart city devices where a clear community or operational benefit exists.

All new lighting in Boroondara must be designed and installed so that it can integrate with the smart lighting central management system relevant to its asset group. Designers must consider adaptive lighting requirements during design and provide clear instructions for

trimming, dimming, switching and constant light output where these functions are applicable.

8.1 Smart lighting principles

Smart lighting should be applied in a way that supports fit-for-purpose lighting, minimises unnecessary energy use, reduces over-lighting, improves maintenance responsiveness and enables data-driven asset management.

Smart lighting decisions must be coordinated with the design guidance in section 6 and the asset requirements in section 7. The technical requirements below distinguish between Council-owned metered lighting and DNSP-managed unmetered street lighting.

8.2 Adaptive lighting and controls

Adaptive lighting includes trimming, dimming, switching, constant light output and sensor-based overrides. These controls should be considered during design so that lighting levels can be matched to actual use patterns and adjusted over time where operational requirements change.

Controls should not be applied in a way that compromises pedestrian routes, public transport access, passive surveillance or road safety. Where dimming or switching is proposed, designers should clearly identify the intended lighting levels, operating hours and any sensor override arrangements.

8.3 Council-owned metered lighting requirements

Where metered public lighting is concerned, Council intends to assess the value of establishing a smart lighting system through the completion of a business case and/or trial within the next 2-5 years. It is envisaged that the overarching smart lighting system will have the basic elements outlined in Figure 2: Smart lighting system basic architecture and functionality.

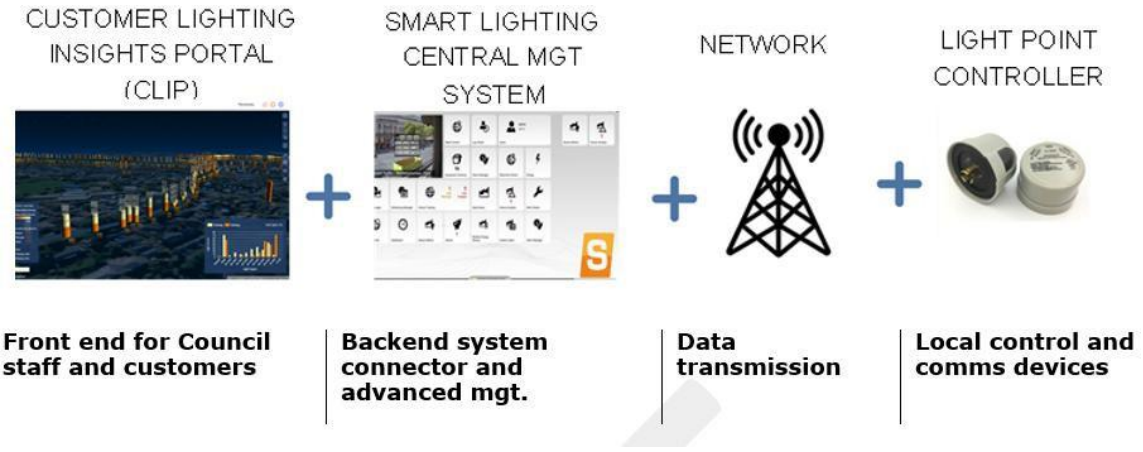


Figure 2: Smart lighting system basic architecture and functionality

For each of these elements, the following basic requirements/features shall apply (while not being limited to these requirements).

Customer Lighting Insights Portal (CLIP):

- Integrate multiple backend systems
- Deliver simple visualisations and asset mapping
- Handle customer requests
- Provide project initiation, design and smart programming tools
- Expected usage by Council officers, customer service

Central Management System (CMS):

- Provide secure connection to Light Point Controllers (LPC) to CLIP
- Provide fault reporting
- Provide real-time data monitoring
- Accessible to authorised users only (i.e. restricted access)
- Secure, open APIs for access by other third-party applications (inc. the CLIP)
- Fully interoperable (e.g. TALQ v2.0 compliant)
- Allow individual (or batch) scheduling of constant light output, dimming and switching
- Locally hosted (i.e. in Australia)
- Expected usage by Council officer, third-party service providers

Network:

- Facilitate secure, encrypted comms between LPCs and SLCMS

Light Point Controller (LPC):

- Transmit public light specific data
- Suitable for local conditions (e.g. temperature)
- Rated to minimum IP65
- Securely communicate using open, standards-based communications protocols and technologies

Importantly, each of the elements should be modular and seamlessly interoperable with the other elements of the system meaning Council can replace and/or upgrade individual elements over time as technology and needs change.

8.4 Multi-function poles and smart city integration

The adoption of smart multi-function or smart poles is supported for use on metered installations where they can provide integrated community benefits beyond illumination, such as telecommunications, environmental sensing, or electric vehicle charging. While these integrated assets can perform multiple high-value functions, the lighting element must remain compatible with Council's existing or planned smart lighting systems.

As multi-function poles represent an emerging infrastructure class within the local streetscape and landscape, these guidelines remain non-prescriptive regarding specific hardware models. Instead, the focus is on supporting innovative trials and pilot programs. These pilots are to be designed to ensure alignment with broader Council "Smart City" objectives.

8.5 Unmetered street lighting requirements

CitiPower and United Energy use a single smart lighting central management system. To function as a smart light, all new unmetered street lights must include a 7-pin NEMA base wired as per the requirements of ANSI C136.41-2013 to a variable output DALI 2.0 control gear (for dimming/brightening). All approved LED standard fittings by CitiPower or United Energy will meet this requirement.

Category V luminaires will be installed with a CitiPower/United Energy-approved smart node, or street light controller, as is now standard practice by CitiPower and United Energy.

Council is currently considering its preferences for smart nodes on Category P luminaires, and these guidelines will be updated to reflect the final decision. Until such time, smart nodes on Category P lighting will be determined by Council stakeholders on a case-by-case basis (e.g. where dimming or switching is desirable).

Unlike metered lighting where Council maintains full end-to-end responsibility for the infrastructure (see Figure 2: Smart lighting system basic architecture and functionality), for unmetered lighting the responsibility is shared between the DNSP and Council. The DNSP provides the CMS, network and smart lighting controller and Council is responsible for the CLIP and all decisions relating to lighting levels (dimming, trimming and constant light output).

9 Approval process for new lighting

Public lighting in City of Boroondara is generally owned and managed by Council and/or the DNSPs that operate in the municipality – CitiPower and United Energy. There are two different management structures for the approval of new public lighting, which are discussed in sections 9.1 and 9.29.2.

Council may also consider creative or feature lighting under special circumstances. The approval and management of such lighting is discussed in section 5.1.2.

9.1 Unmetered lighting (DNSP)

Most street lighting in City of Boroondara is standard unmetered lighting. Unmetered standard lighting is owned and managed by CitiPower and United Energy. Council pays a service charge to CitiPower and United Energy to maintain the light and pole over its life.

Figure 3: Approval process for standard unmetered lighting installations describes the process whereby Council has oversight of the design/preparation phase. CitiPower and United Energy has control of the installation, commissioning and ongoing management of the asset.

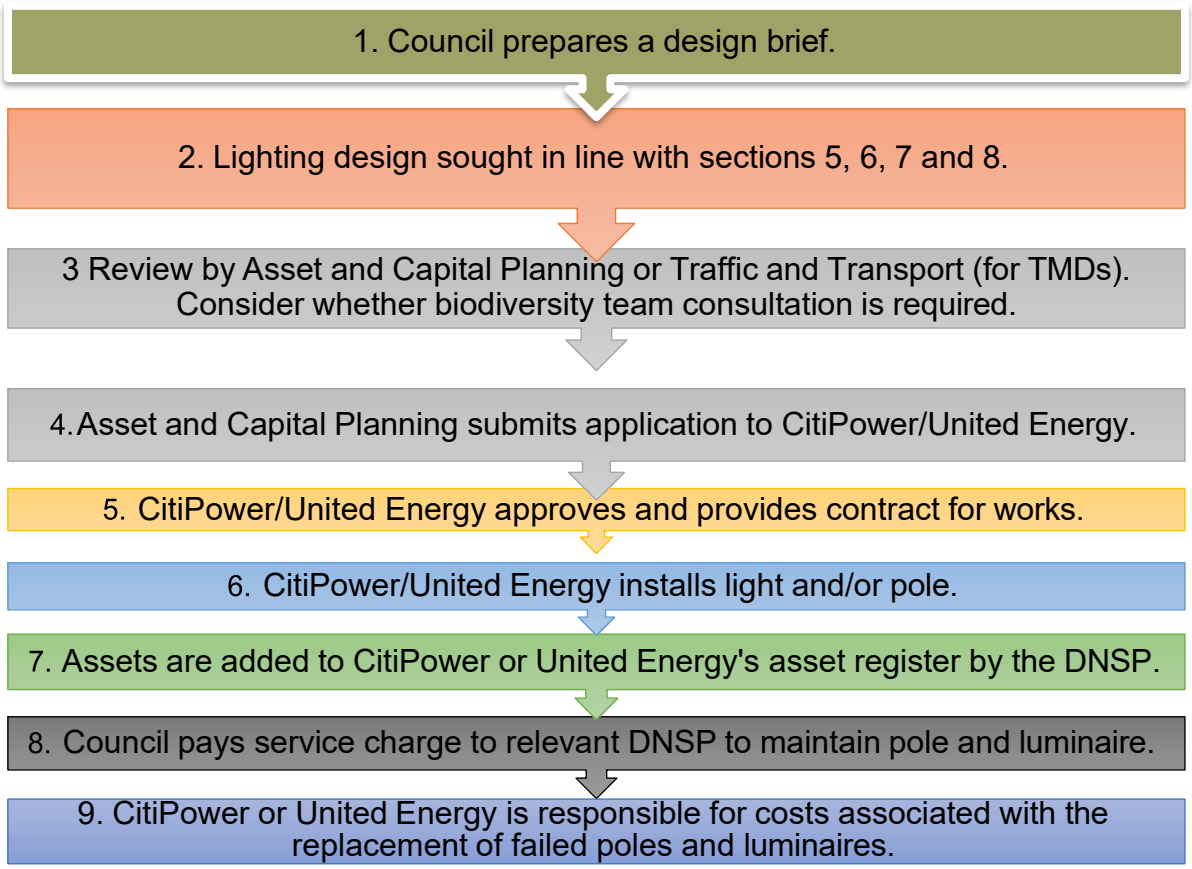


Figure 3: Approval process for standard unmetered lighting installations

9.2 Metered or solar lighting (Council)

Metered lighting is owned and managed by Council. Commonly sports facilities, car parks and open space reserves are connected to a meter to measure energy taken from the electricity network. These lights can have their own meter or be connected to a building, BBQ or other electrical load (which has its own meter).

Figure 4: Approval process for metered lighting installations describes the process whereby Council has oversight of the design/preparation phase as well as the installation, commissioning and ongoing management of the asset.

Where a third-party requests to tap into Councils metered supply, application must be made to Council for approval.

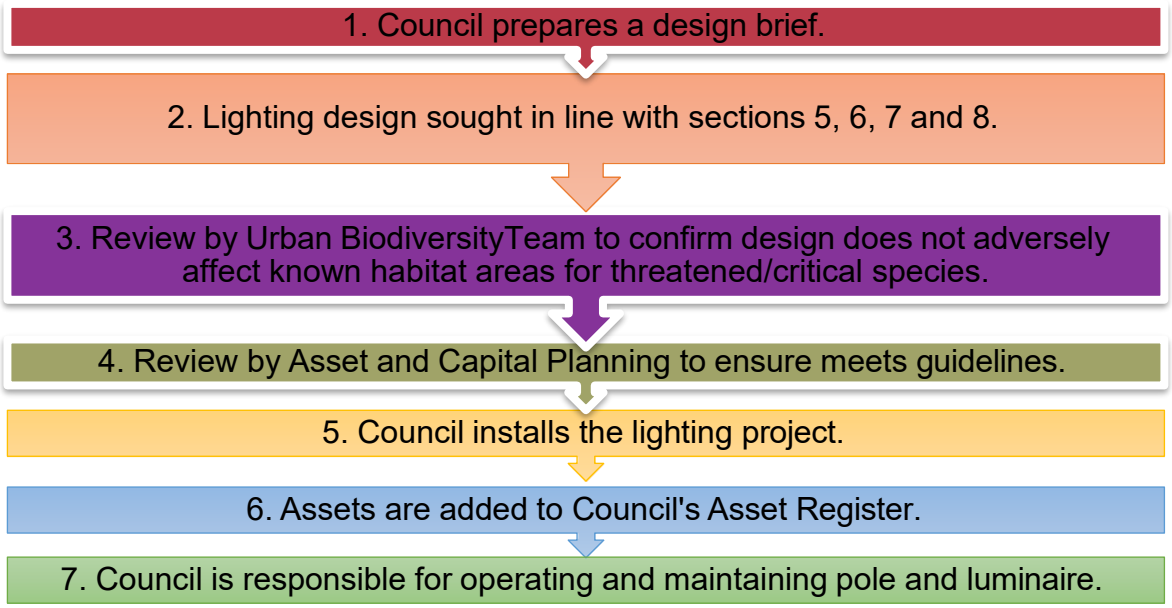


Figure 4: Approval process for metered lighting installations

9.3 Transition of lighting from unmetered to metered

Where unmetered lighting is being transferred to Council, the following steps apply:

- Determine whether lighting is required at the site.
- If yes, determine whether existing lighting is appropriate for the location and usage.
- If yes, ensure all poles and lights are wired to AS/NZS 3000 standard and all existing non-LED lights are replaced with LED.

If no, re-design to meet the relevant standard.

10 Complaints/requests procedures

The following procedures will be applied to the assessment of complaints and/or requests received by Council in relation to public lighting.

All complaints and/or requests received by Council in relation to public lighting need to be considered in conjunction with Boroondara's Complaints Handling Policy (2025) and Engagement Policy (2025).

10.1 Requests for improved unmetered street lighting (where existing lighting is present)

Where Council receives requests for the installation of additional lighting in areas where lighting already exists, the street will be assessed against Council's Priority Lighting Program.

The priority program aims to provide a more transparent and strategic program rather than reactive.

- Each street in Boroondara has been assessed against 4 criteria:
  - Road category (local access, link, secondary etc.)
  - Are there any high activity paths (near schools, aged care etc.)
  - Is it along a public transport route (bus or tram)
  - Current level of lighting against the Australian Standards.

Before any upgrades are carried out, a detailed street lighting design will be undertaken to ensure:

1. Upgrades will meet the desired relevant Australian Standard and/or the desired lighting levels listed in section 6.1 of these Guidelines for lighting in the given location, and
2. There is a minimal chance of spill.

The priority program is a multiyear program with street lighting upgrades to be carried out based on the priority ranking.

Exceptions include where a new pole is required to meet the Australian Standards. In these instances, lighting levels will be improved to be as close to the required standard as possible using existing infrastructure.

10.2 Requests for improved carpark or open space lighting (where existing lighting is present)

Where Council receives requests for the installation of additional lighting in areas where lighting already exists, the request will be assessed using the following process, which seeks to determine the legitimacy of the complaint against relevant Australian Standards before taking any action to improve lighting levels. Improved lighting levels may be delivered by upgraded existing luminaires or by installing additional in-fill lighting.

1. Where required, clarify the reason for the request e.g. perceptions of safety, crime deterrence, changes to usage patterns.
2. If deemed necessary, engage a lighting expert to conduct an on-site light level audit using a high-quality light meter to determine whether the existing lighting meets the requirements of the relevant Australian Standard and/or the desired lighting levels listed in section 6.1 of these Guidelines for lighting in the given location.
3. Subject to the outcome of the audit, budget availability and competing priorities, the lighting will be scheduled for an upgrade as recommended.

10.3 Requests for new lighting (no existing lighting)

Where Council receives requests for the installation of lighting in locations where there is currently no lighting (sports, open space, etc.), such requests will be assessed on a case-by-case basis.

Assessment of requests will consider (but are not limited to) the existence of a legitimate need/demand for lighting and the viability of installing lighting from a cost and infrastructure perspective (refer to sections 4 and 5) and the outcomes of community consultation.

Where a genuine need is identified and provision of lighting is considered viable, lighting will be provided subject to budget availability and in accordance with these Guidelines (refer to sections 5 to 9).

10.4 Requests for removal or relocation of lighting

Where Council receives requests for the removal of existing lighting, including temporary, such requests will be assessed on a case-by-case basis.

Assessment of requests will consider (but are not limited to) the legitimate need for lighting (refer to sections 4 and 5). Depending on the age and condition of the removed lighting, it should be retained and re-used.

For developers requesting to relocate a streetlight, temporarily or permanently, for a development, the developer must:

- engage a suitably qualified lighting designer to develop a lighting solution for the site. The solution should comply with AS/NZS 1158 Lighting for roads and public spaces and AS/NZS 4282 Control of the obtrusive effects of outdoor lighting, with particular attention to:
    - The temporary lighting levels should match the existing lighting levels on-site or the relevant sub-category criteria according to AS/NZS 1158 Lighting for roads in local areas.
    - Proposed temporary lighting solutions will not cause any obtrusive light spill effects on the neighbouring properties. Any light spill should be below the limits specified in AS/NZS 4282.
    - Any other relevant performance criteria identified in AS/NZS 1158 or AS/NZS 4282 or information deemed required by officers.
    - Any temporary lighting infrastructure should also not adversely impact existing access to properties or pedestrian footpath access.

Once all required information is provided, Asset and Capital Planning will review to determine if a letter of consent is provided.

It will be the responsibility of those making the request to fund the removal or relocation of the lighting if the request is supported by Council.

10.5 Complaints about over-lighting or light spill

Street lighting is exempt from the requirements of the AS/NZS 4282.

Consideration will be given to the spill risk assigned in Council's light management system, the existing compliance with AS/NZS1158, how long the light is on during the night and whether the complaint has emerged as a result a change to the existing lighting scheme.

Based on the above, a decision will be made as to what action if any, will be taken.

The issue may be resolved in several ways including:

- dimming the luminaire using smart lighting technology, where installed, for a portion or all of the evening (costs to be paid by Council)
- property specific treatments (e.g. recommending a new window treatment such as block out blinds to be installed by resident)
- installing shielding on or within the luminaire (costs to be paid by residents)

10.6 Complaints about shading of lighting by trees

Where Council receives complaints about shading of lighting by trees, the complaint will be referred to the tree pruning team for assessment and action where appropriate.

11 Maintenance procedures

11.1 Unmetered assets

Unmetered public lighting assets in Boroondara are maintained and repaired by United Energy and CitiPower. This is covered by an annual operation, maintenance and replacement (OMR) cost charged to Council by the DNSP. The Electricity Distribution Code of Practice (version 3) 2026 can be referred to for further details on United Energy and CitiPower maintenance and fault repair obligations.

Different unmetered asset types fall under different processes for maintenance and repair. The most notable difference is that Council is required to source, pay for and supply replacement non-standard street lights and poles whereas the DNSP's OMR costs cover replacement standard street lights and poles.

Once United Energy or CitiPower has informed Council of a failure of a decorative (non-standard) poles and luminaires, Council will review the location and determine whether a new decorative pole or luminaire is justified or whether to replace with a standard pole and luminaire.

Table 5: Overview of repair and maintenance processes for unmetered asset types

	Minor Road Light (P-Category)	Major Road Light (V-Category)
Standard	• Faults are identified passively via reports from the public or Council • Faulty lamps or PE cells are replaced under OMR costs • Replacement luminaires and poles (due to fault or end-of-life) are replaced under OMR costs • Lamps and PE cells upgraded at pre-defined cycles	• Faults are identified proactively via regular night time patrols • Faulty lamps or PE cells are replaced under OMR costs • Replacement luminaires and poles (due to fault or end-of-life) are replaced under OMR costs • Lamps and PE cells are replaced only on failure.
Non-Standard	• Faults are identified passively via reports from the public or Council • Faulty lamps or PE cells are replaced under OMR costs • Replacement luminaires and poles must be paid for and supplied by Council if not replacing with a standard asset • Lamps and PE cells upgraded at pre-defined cycles	• Faults are identified proactively via regular night time patrols • Faulty lamps or PE cells are replaced under OMR costs • Replacement luminaires and poles must be paid for and supplied by Council with the street lighting reserve fund if not replacing with a standard asset • Lamps and PE cells are replaced only on failure.

11.2 Metered assets

Metered public lighting assets in City of Boroondara are maintained and repaired by Council. This includes the following maintenance and asset management activities:

- Annually prior to the commencement of the winter season (1 April to 31 August) audits to test for the operation, including timers, of sports lighting assets followed by repairs to fix any assets that are not working.
- Regular (every 5 years) audits to assess the condition of lighting assets to identify structural faults (rust, pole lean etc.). Condition audits will also occur in response to resident complaints.
- Recording of all maintenance and repair work carried out to identify assets/sites with reoccurring issues to inform asset renewal.
- The upkeep of an asset register to record the location, characteristics, condition and maintenance history of each metered public lighting asset.

Where lighting is located on non-council assets (e.g. telecommunication towers), the maintenance practices and access arrangements of the asset owner will be followed.

12 Data management procedures

12.1 General principles

Council aims to continuously improve the availability, value and ease of access to public lighting data. Better data that is more freely available to stakeholders leads to improved decision making, planning and responses to queries.

At a high level, Council maintains and/or makes available the following data sets:

- Metered lighting location, characteristic and condition data
- Unmetered lighting location and characteristic data
- Compliance data (lighting levels) for all unmetered lights and priority metered lights

12.2 Updating asset registers

12.2.1 Unmetered lighting

For unmetered street lighting assets, CitiPower and United Energy maintains an asset register that includes a range of information such as location, lamp wattage, lamp type, pole ID and commission date.

Council is provided with access to an online portal through which it can download up to date asset registers at any time. Data is accessed on an as needs basis to ensure only the latest data is used.

When new lighting is installed or existing lighting is upgraded, CitiPower and United Energy will arrange for the assets register to be updated.

12.2.1.1 Compliance data

All compliance data must be hosted and updated within the Council light management system. This platform serves as a key source of street lighting data to assist with the on-going management of unmetered Street lighting. Data is to be updated yearly at a minimum or more frequently if large street lighting projects are delivered though the year.

12.2.2 Metered lighting

For metered assets, Council maintains an asset register of its public lighting. This includes, where available, the following pieces of data:

- ID number
- Lamp type
- Lamp wattage
- Light intent
- Location
- Luminaire colour
- Luminaire condition rating
- Luminaire type and manufacturer
- Mounting Height
- Overview photo
- Pole base condition rating
- Pole base faults
- Pole base type
- Pole condition rating
- Pole material
- Pole type and manufacturer
- Site Name
- Switching (PE cell, timer etc)
- Timer settings

To maintain an up-to-date asset register, all new or recently upgraded lighting assets are entered into the asset register using the following procedure:

- Council's Project Manager will at the commencement of works have Asset IDs created for all new lighting assets to ensure a Work Order can be created for the works.
- Upon the completion of the works the Project Manager will obtain and record all relevant design and as-built documentation and save in Objective. After the documentation and completion is endorsed, the Project Manager will complete an asset handover that will document all key asset information and finance data for the project and assets.
- Completed asset handover form will be sent to the Asset and Capital Planning department for processing and updating of the asset system.
- Cyclic asset condition audits will be captured within the asset system by the Asset and Capital Planning department.

13 Implementation and monitoring

13.1 Evaluation

These guidelines will be reviewed every 5 years or as identified with changing regulations, standards or practices.

13.2 Accountabilities

For all queries or feedback regarding these guidelines, please use the contact details for the responsible department below.

Position title	Contact number	Contact department email
Coordinator City Assets	9278 4444	Strategicassetmanagement@boroondara.vic.gov.au

14 References

14.1 Related documents

These Guidelines have been designed to comply with all relevant Australian laws and legislation, and to comply with and complement the following standards, policies, codes and strategies.

- AS/NZS 1158 Series - Lighting for Roads and Public Spaces

- AS/NZS 3000 Electrical installations
- AS/NZS 4282 - Control of the Obtrusive Effects of Outdoor Lighting
- Electricity Distribution Code of Practice
- National Light Pollution Guidelines for Wildlife
- Asset Plan Guidance 2022 – Local Government Victoria
- Traffic Engineering Manual Volume 1– Department of Transport and Planning (DTP)