

SEPTEMBER 2022

# Chapel Street Transformation **Lighting Return Brief**

ARUP

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# 01 /Introduction



## Introduction

# Vision & objectives

Quality lighting is a key aspect for the successful night time experience of an urban space. With a primary impact on the orientation, safety, use and visual quality, the lighting master plan for Chapel street will help deliver on City of Stonnington strategic objectives by improving the quality and vitality of the night-time environment for the residents and visitors while fulfilling the technical and security requirements facilitating movement and illuminating dark areas.

The lighting plan aims to also serve basic social and aesthetic functions by influencing how assets are used and perceived by people, creating a night-time atmosphere and identity by improving urban and tourist attractiveness; promoting safety and amenity; improving the quality, consistency and efficiency of night lighting in public spaces; enhancing visual comfort and providing better navigation to remain engaging after dark.

There are number of complementary design principles that could shape this experience; although most often they could be contradictory. The aim is to balance these principles by setting priorities and apply a site specific approach.

The following core objectives are considered for the Chapel Street Lighting Masterplan:

**Identity** - a fond night time image that is universally recalled when the precinct is mentioned. Celebrate the unique character of individual precincts.

**Safety and connectivity** - considered and well designed lighting not only provides functional lighting to prevent accidents, it also contributes to an improved sense of place, and improved perceptions of safety and inclusion within a public space.

**Legibility** - a cohesive and clear understanding of the site when walking around each precinct.

**Darkness and mystery** - a considered lighting design has a good balance between darkness and light in order to create an enjoyable and safe experience of the night time.

**Sustainability** – considerate application of lighting to minimise environmental impacts on local ecology and sky glow, and reduced use of energy.





# 02 /Context



## Context

# Existing lighting

An assessment was conducted to enable an understanding of the existing lighting on site.

This assessment grouped the typical light typologies and documented photos (on the right) found on site to the following:

- + Recessed downlights
- + Street lights short arm
- + Street lights long arm
- + Wall mounted street lights
- + Signage
- + Façade floodlights
- + Façade wall lights
- + Traffic signage
- + Gobo flood lights on pole
- + Decorative poles with spotlights
- + Smart poles
- + Decorative poles with digital display
- + Seating integrated lighting
- + Light from shop windows
- + Downlights from shop canopies
- + Fairy lights at hospitality venues





Context

# Community voices

According to the latest safety surveys undertaken by the City of Stonnington and collective online data, residents and visitors of the area reported poor lighting as one of the key elements affecting the urban night-time experience and the perception of safety. Certain areas perceived as dark by users have been identified as eluded during night-time, indicating their misuse and the unsafety perception that relates to dark environments.

Community survey and research have shown that good lighting contributes to the perception of safer environments in a more significant portion than commonly used surveillance methods like the presence of CCTV.

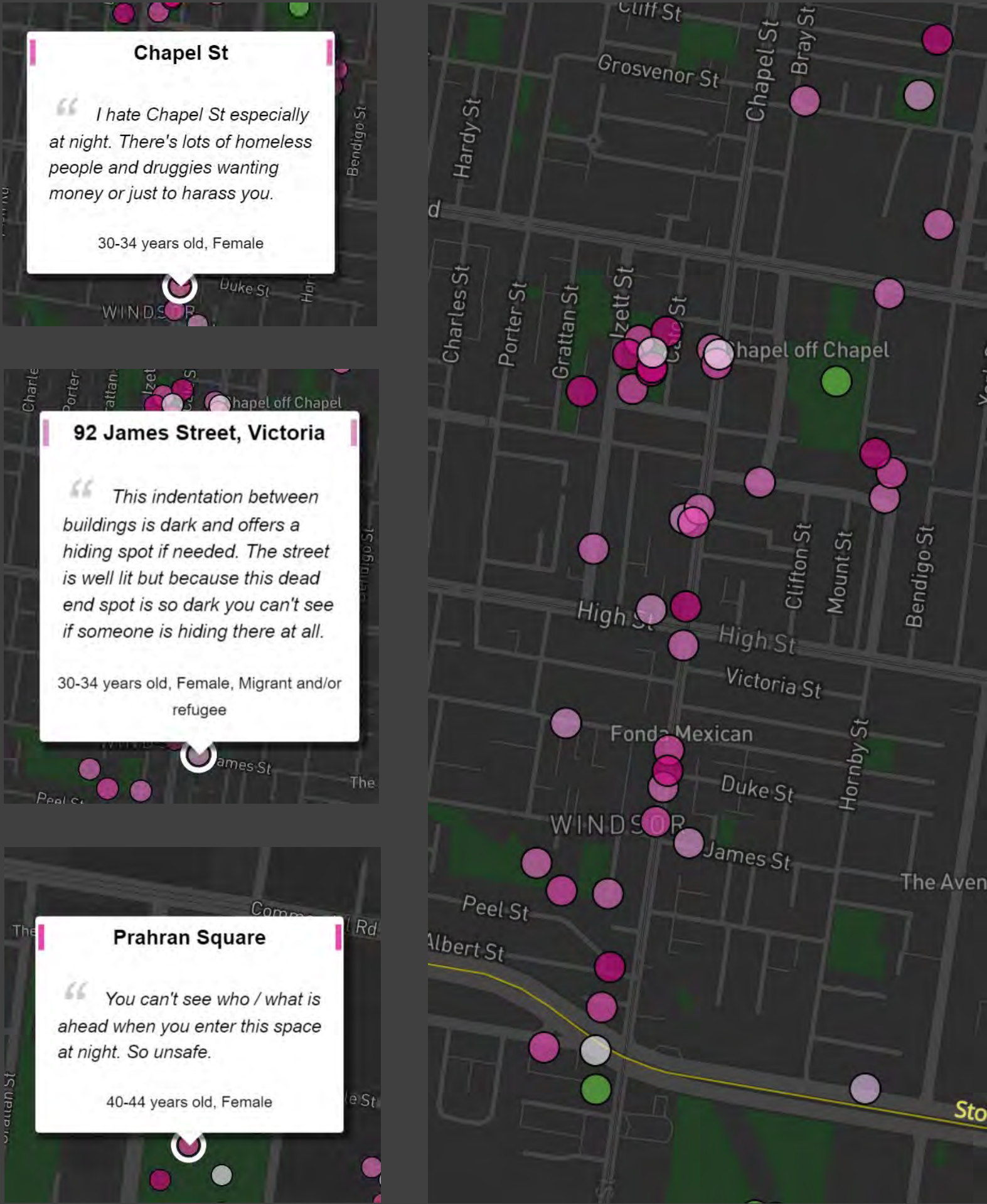
Design criteria that pursues the restoration of confidence and improve the perceptions of safety at night time should be integral part of the master plan. Lighting as a key element in this real, will consider a holistic approach and will support this intend via various strategies.

A general increase of lighting levels across key travel paths and a lighting hierarchy approach that relates to the area categories could reduce the current high degrees of visual contrast along the travel paths and increase the general visibility and surveillance when travelling at night-time, therefore improving the overall amenity in the night time environment.

By listening to local voices, outcome are informed providing a consistent, evidence-based design decision-making rationale to guide the strategy for pilot spaces and night time masterplanning.



Example of inclusive workflow



"More opportunities for local gatherings, events, spontaneous interaction. The parklets/outdoor dining have bene really great, and it makes Chapel St and the local area feel vibrant - and more safe."

"Encouraging shops that attract the public, resulting in interaction with the community."

Example of evidence based, community feedback

# 03 /Night Time Analysis



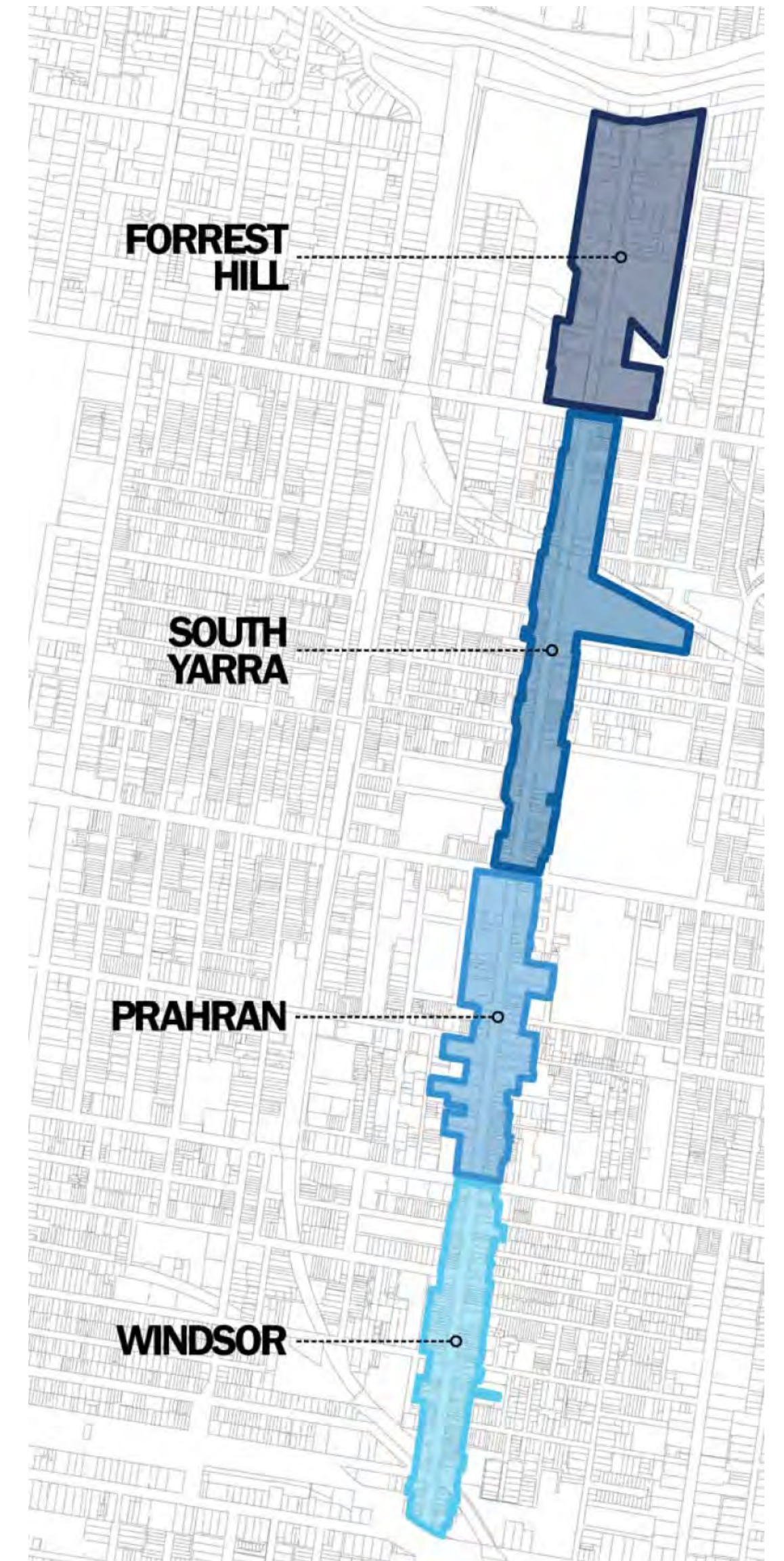
# Urban characteristics Overview

In order to have an overall contextual understanding of the existing environmental and lighting conditions and their contribution to the night-time experience; Arup conducted a site visit on the evening of 16th August 2022.

Characteristics of the main street, side streets, congregation spaces and footpaths were identified along all the four precincts. Some of the main characteristics across all precincts are:

- + Street lighting along Chapel Street is mostly consistent in terms of lighting levels, colour temperature, spacing and type/height of the lighting poles. LED light poles are present on both sides of the road with the exception of Forrest Hill precinct where there are mainly sodium light poles along the west side of the street only.
- + Laneways and side streets (some of which lead to carparks) have lower lighting levels compared to the main street. In some cases the ratio between them could be as drastic as 2/100 in only 5m distance with light readings of 60 lx for Chapel Street against 1.2 lx to side streets.
- + Lighting along the footpaths was identified as more inconsistent than street lighting. As the stores night-time economy varies along all four precincts, footpaths' lighting relies on the stores and therefore varies along the precincts being more intense in the more night-time active precincts, Windsor and Prahran. This condition affects the wayfinding and navigation of the users.
- + Canopies and heritage facades are present in all precincts with the exception of Forrest Hill (especially for the later); however, this two elements that represent opportunities in terms of lighting are not utilised for this purpose.
- + Footpaths vary in width along all the precincts, primarily in the areas where night time economy is more active and business expand their services over the footpaths. This characteristic also modify the navigation of the area.
- + On-street parking seems to be the visitors' preference over garage parking. Most of the corridors leading to the garage buildings show lower illuminance.
- + The cycle path along Chapel Street seems to lack a more effective buffer which provide additional offset space from moving traffic or parked cars along the street for cyclist. Paints with higher surface reflectance could be evaluated to delineate the cyclists areas more effectively.
- + There are some few congregation areas with public seating along the main path and side streets. Most of these areas were identified as dark spaces and none was in use during the time of the visit.
- + Murals and other artwork interventions were present over the main corridor and side paths. Overall they were identified as poorly lit and for the lit cases, the initiative seemed to be business related.

Specific lighting findings are shown in the following pages.





# Lighting characteristics

## Windsor

W1



Square next to the Railway Hotel and train station - place maker. Light installation/artwork offers relatively even lighting levels and creates a precedent in the area.

W2



Path leading to train station perceived as darker. Mixed colour temperatures and high contrast with lower lighting levels and colour rendition.

W3



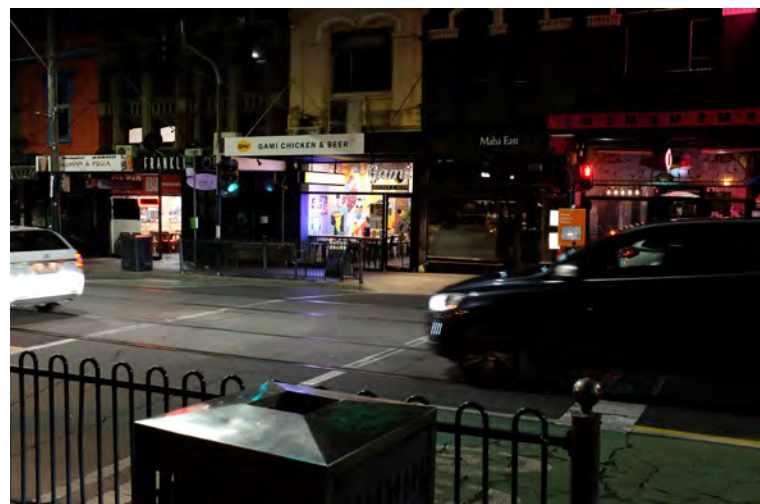
Side street on the North side of the train station shows lower levels of lighting, high contrast compared to main street just a few meters away.

W4



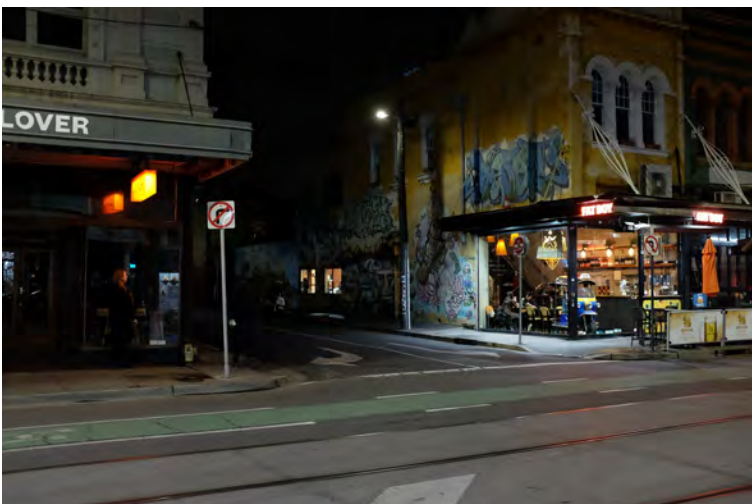
Canopy over the footpath used for lighting just on few occasions. Inconsistent lighting levels and languages along footpaths as each business approach differently.

W5



Main street lighting perceived as brighter than the adjacent footpaths and side streets, consistency along most of the main street. Lighting readings 60 lx at 1m height.

W6



Side streets are mostly perceived as dark and uninviting. Lower lighting levels and high contrast when compared to Chapel Street.

W7

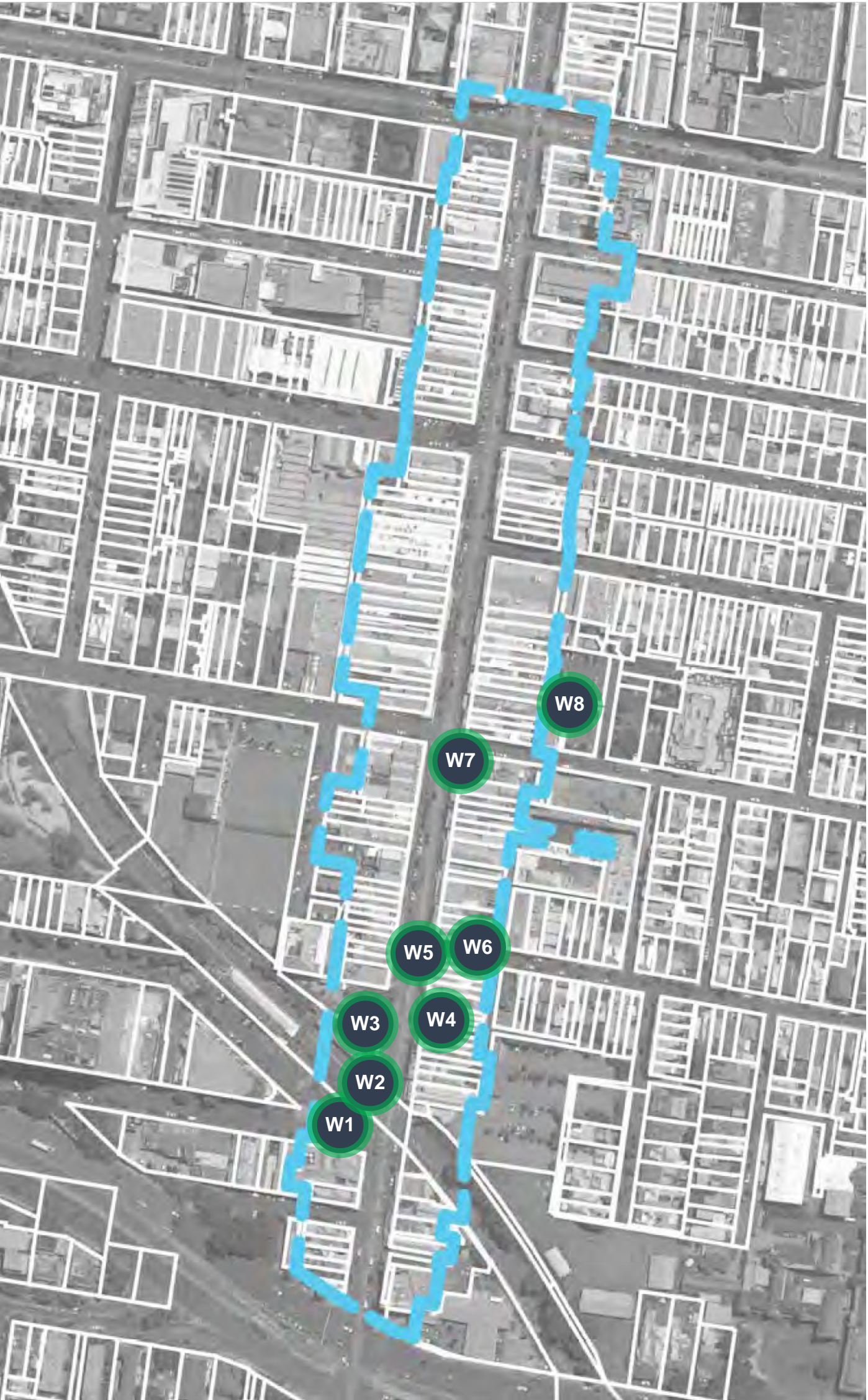


Lighting to upper floor facades of buildings reveals architecture and creates a presence of the middle layer of the street just on few occasions.

W8



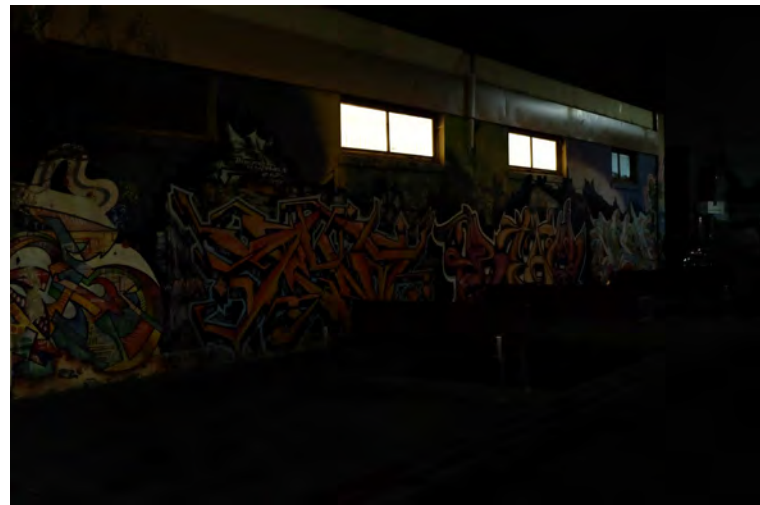
Outdoor parking feels dark and hidden with paths leading to then under similar lighting conditions. On-street parking seems to be the prefer option.





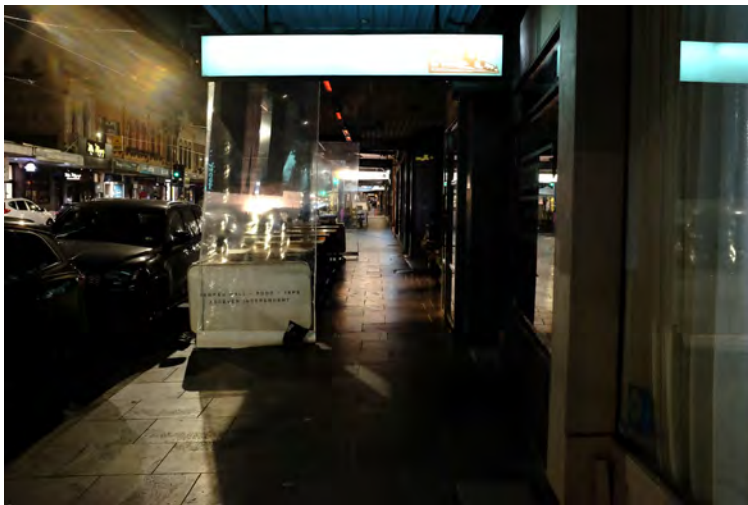
# Lighting characteristics Windsor

W9



Congregation seating spaces are poorly lit and perceived as dark. They don't seem to be used at night-time. 1.2 lx to 2lx lighting readings.

W10



Hospitality venues occupy footpaths and even street space in various cases. Width of the footpaths gets highly affected and its navigation.

W11



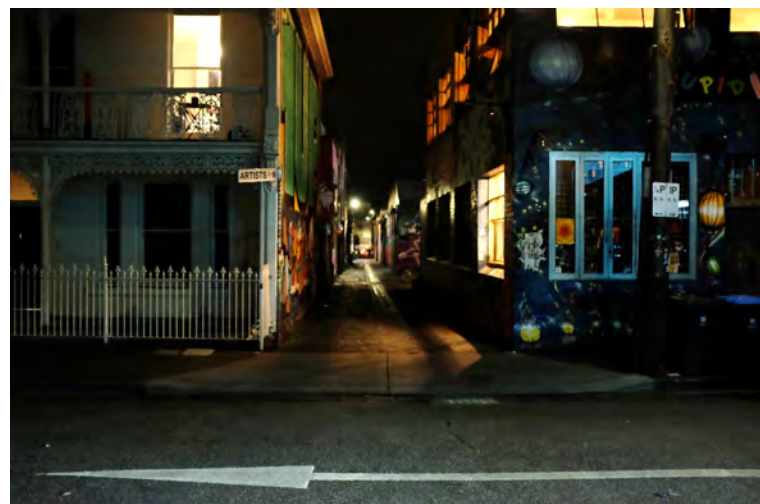
Contemporary street furniture lack its full potential and is poorly utilised even over the main street. No focal glow or ambient lighting. Bins seem to take precedence.

W12



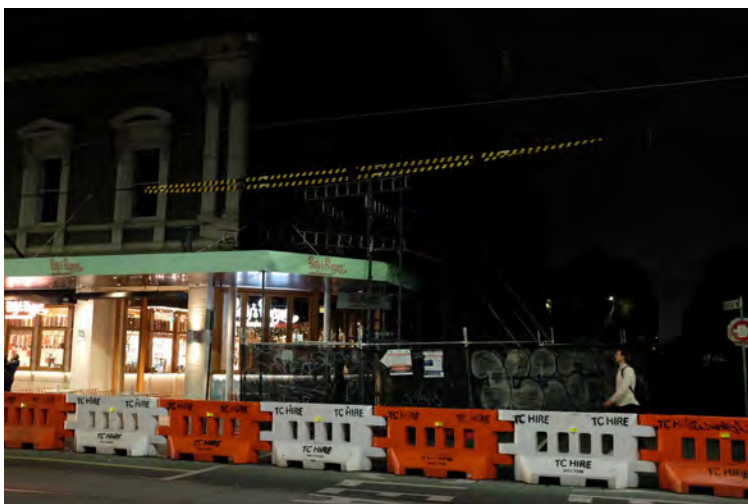
Significant urban artwork elements are not highlighted and get lost at night-time.

W13



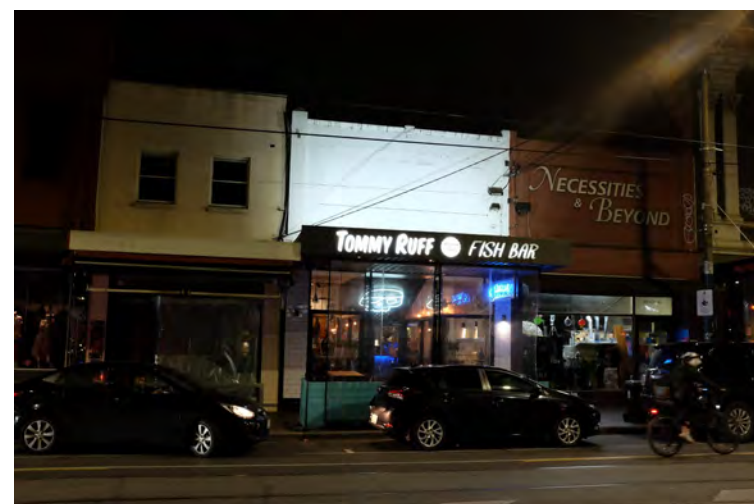
Murals are dark and just occasionally lit (by businesses mostly). Miss opportunity of highlighting and enriching night-time experience.

W14



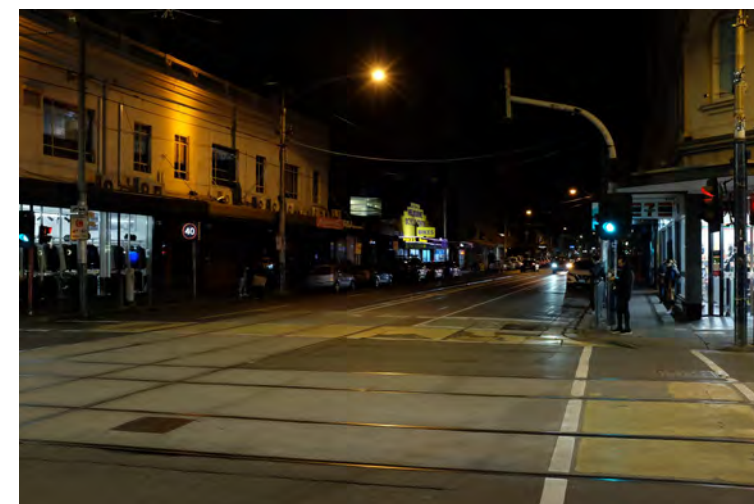
The highest contrast and lower levels of lighting were detected in this area where construction works are being undertaken.

W15



Canopies are not widely use to highlight upper floor of the buildings. Lighting to this layer creates good perception of the space and scale of the street.

W16



Even with it's importance, High Street lighting levels are lower than Chapel Street.





# Lighting characteristics

## Prahran

P1



Even when uplighting from canopy is inconsistent and patchy, it creates a good visual scale of the street and the buildings.

P2



Urban design elements create interest however lack highlight and at times feel lost

P3



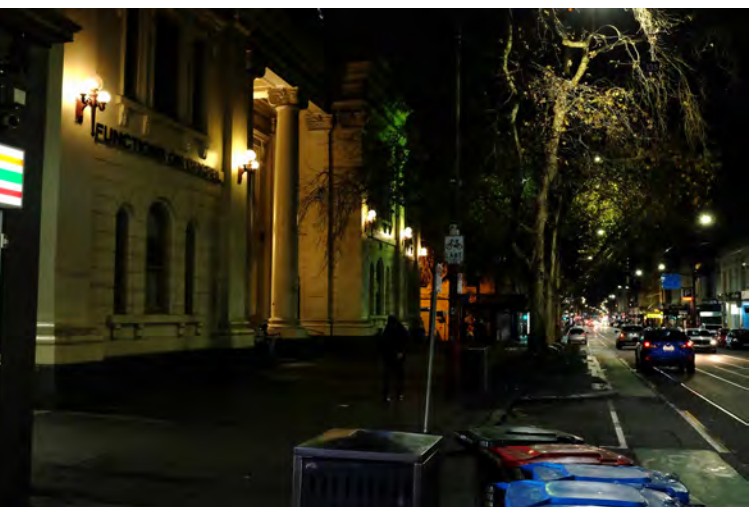
Side streets like Anchor disappear due to its darkness. Safety perception affects its misuse.

P4



Street crossing markers create an icon but result in high contrast compared with the lighting conditions of the environment. 300 lx measured at 0.2m above it.

P5



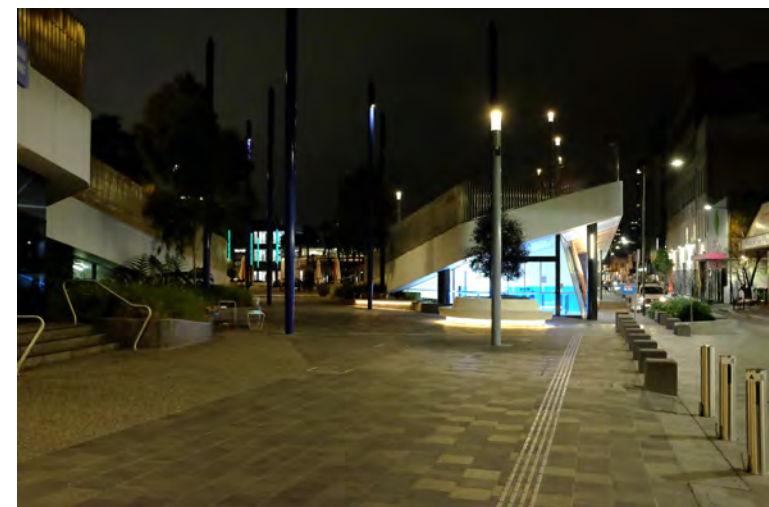
Prahran Town lighting only to the façade creates a darker experience over the footpath.

P6



King street is the only refurbished laneway. The spaces reads different to the others as comfortable, inviting, and playful. It was perceived as the most used laneway during the visit.

P7



Prahran Square has good and even illumination. A unique space within the four precincts where people was seen using and enjoying the space.





# Lighting characteristics

## South Yarra

SY1



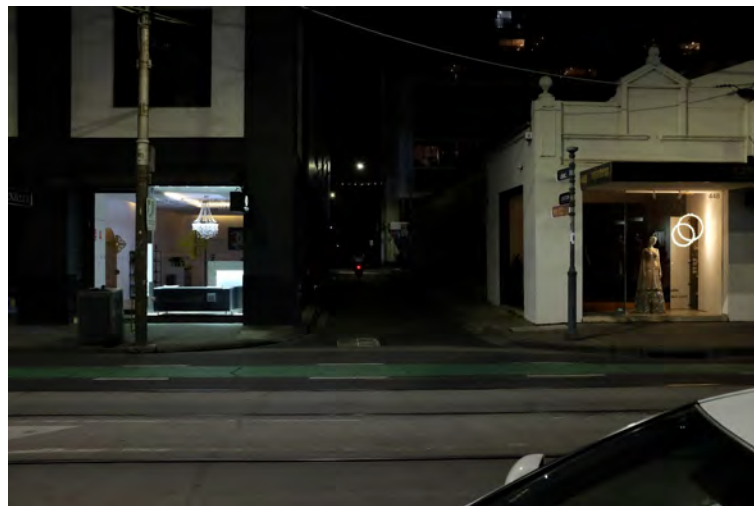
Higher levels of lighting and illuminations to vertical surfaces (mural) increase the brightness perception of the street.

SY2



Lighting to artwork and vertical surfaces especially benefit the navigation of the street while giving hierarchy to art elements.

SY3



Lower lighting levels and high contrast remains as a pattern along laneways in comparison to the main street.

SY4



Retail shop fronts display brightness in contrast with laneway darkness. Under canopy lighting extending along the building create a pleasant visual appearance of the building.

SY5

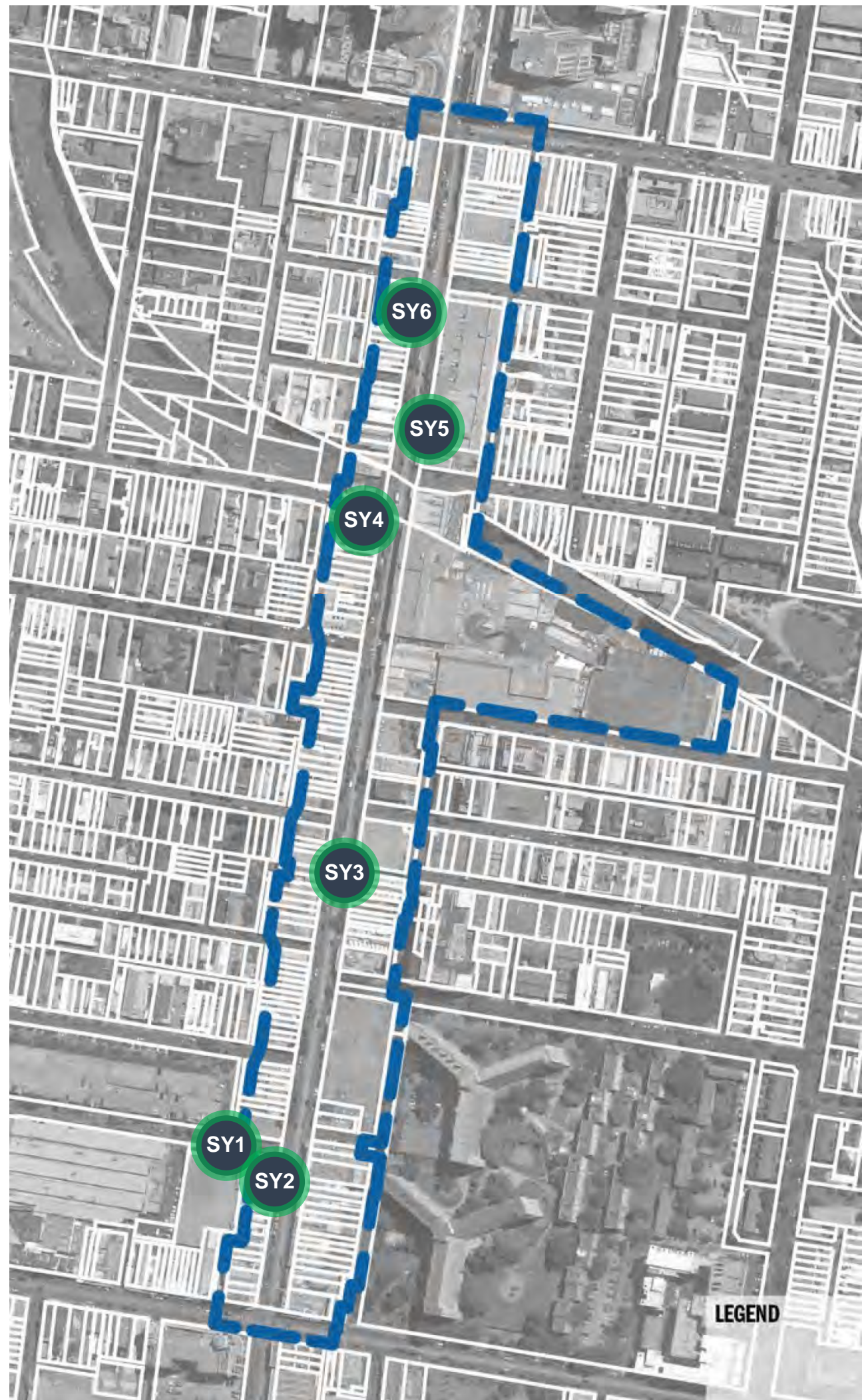


Wider footpaths perception over this area. No canopies in some cases (or higher) and not as many night businesses present or taking over footpath area. Navigation is different.

SY6



Lit retail windows provide lighting to the footpath but inconsistent. Middle layer (upper levels of buildings) disappear and are seen as a missed opportunity when murals are displayed.

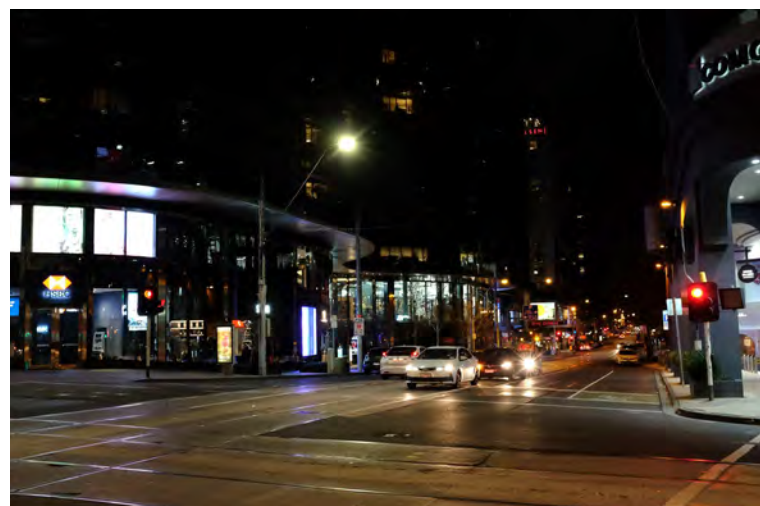




# Lighting characteristics

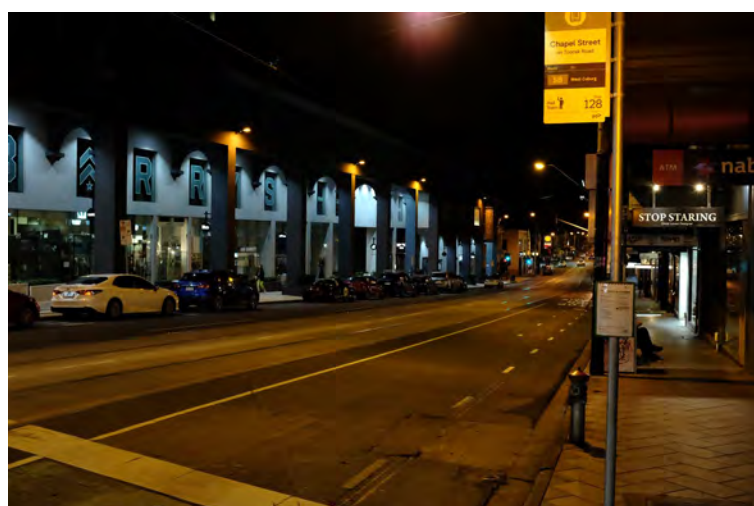
## Forest Hill

FH1



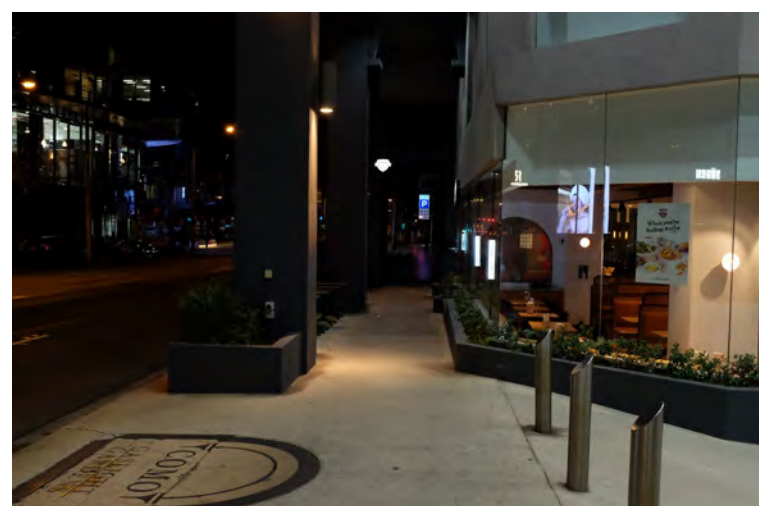
Different urban characteristics and identity along this precinct. Increased urban scale, high-rise buildings with higher canopies (when present), sodium street lighting and billboards.

FH2



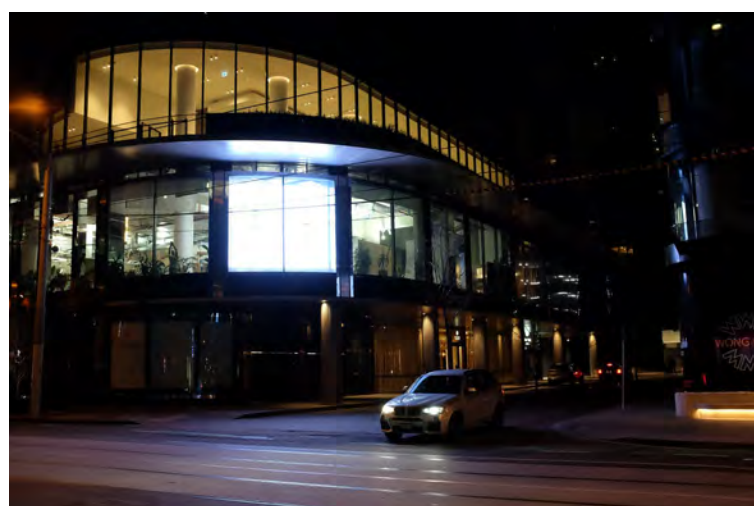
Toorak Street lighting has different colour temperature but overall higher levels, not as contrasting when compared to Chapel Street.

FH3



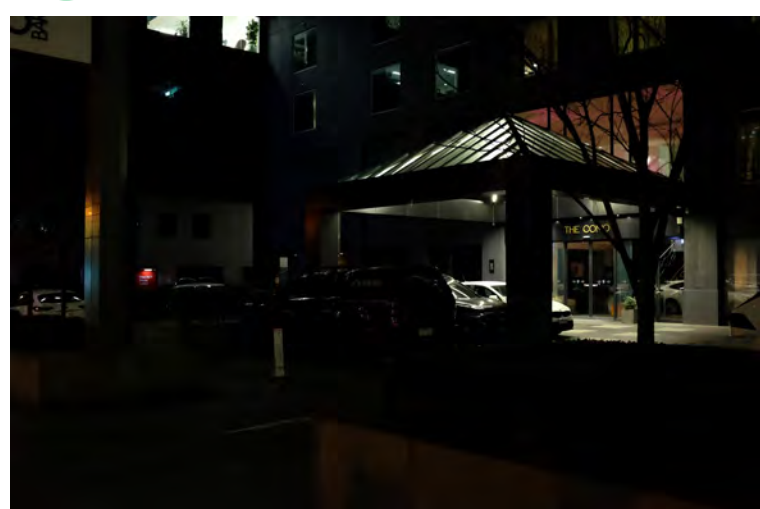
High lighting levels and mixed colour temperature under some canopies create a contrasting sensation with the surroundings.

FH4



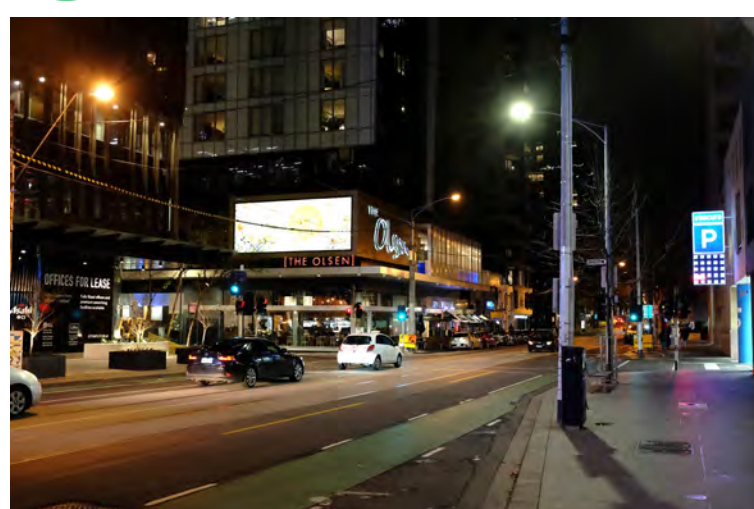
Digital billboards are unproportionally bright in comparison to the surrounding environment creating glare in some cases.

FH5



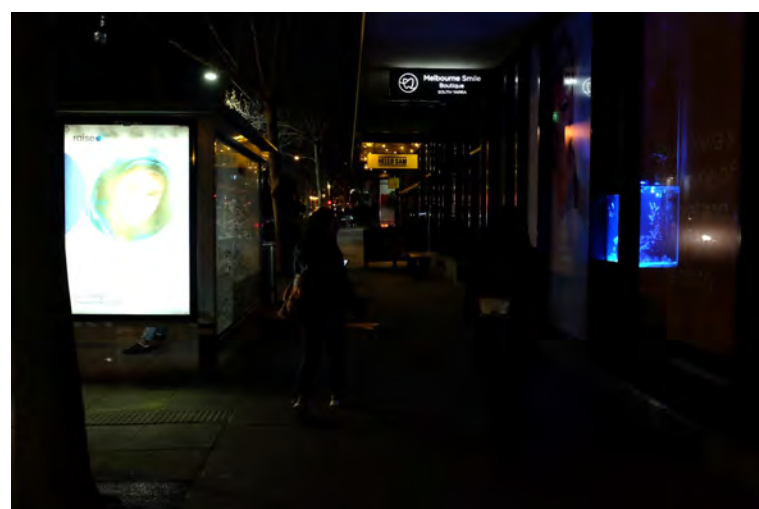
The lowest levels of lighting on the main street were detected here, reduced levels overall in this precinct. Sodium street lighting over one side of the street only.

FH6



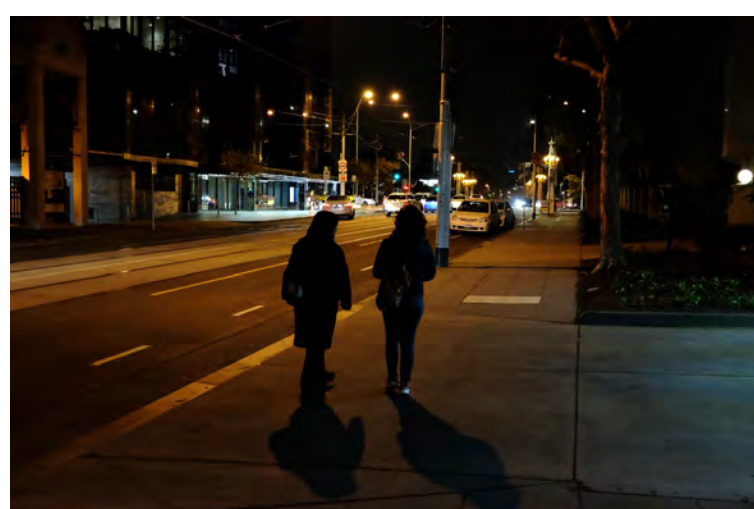
Contrasting lighting conditions between shorter distances in this area. Patchy, contrasting and inconsistent footpath lighting.

FH7

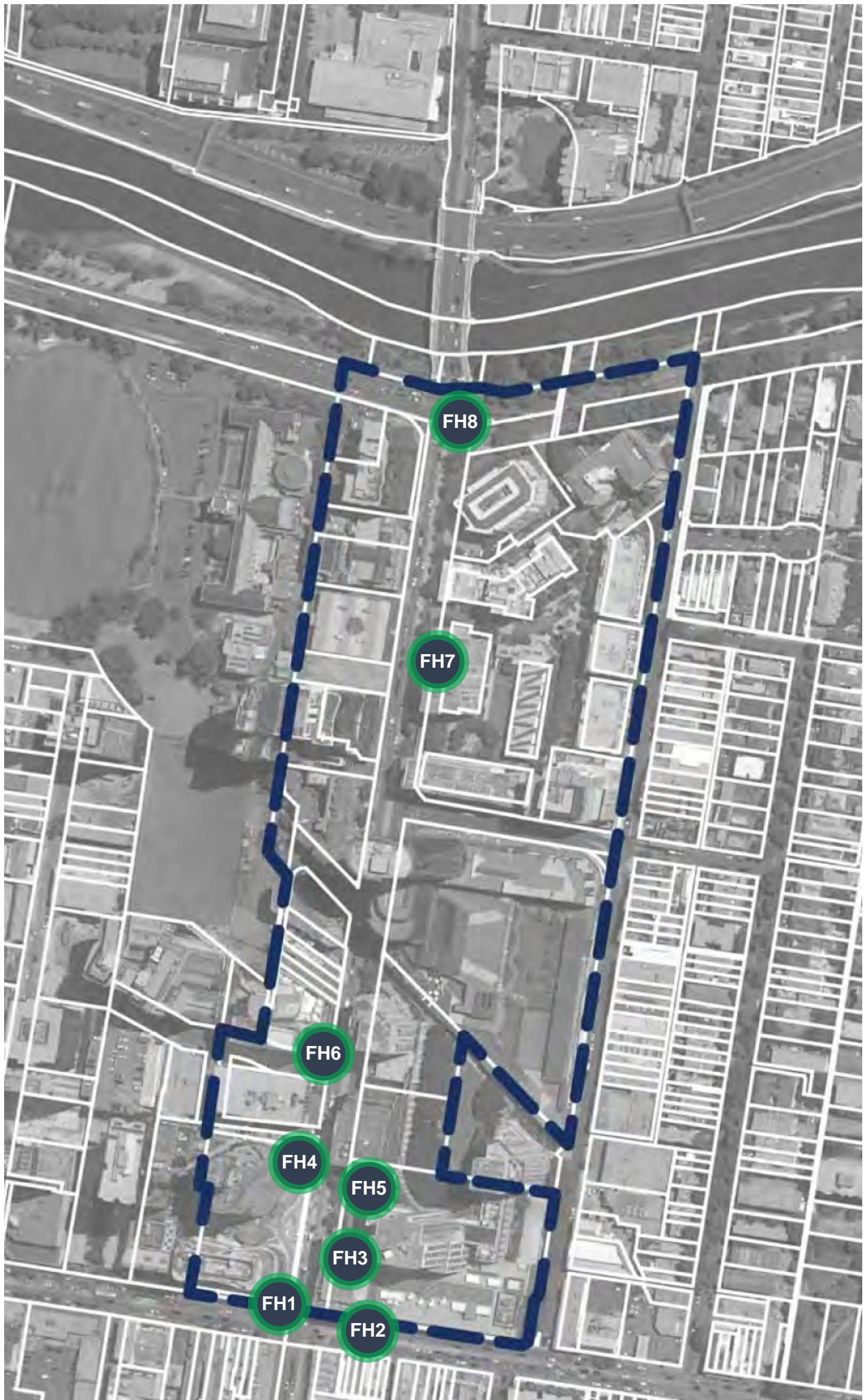


Public transport signage extremely contrasting and bright compared to the footpath illumination. Reduced visibility and difficult navigation.

FH8



Chapel street North side has higher uniformity than the middle area of this precinct. Colour temperature is perceived as a unique characteristic.





# 04 /Design Principles



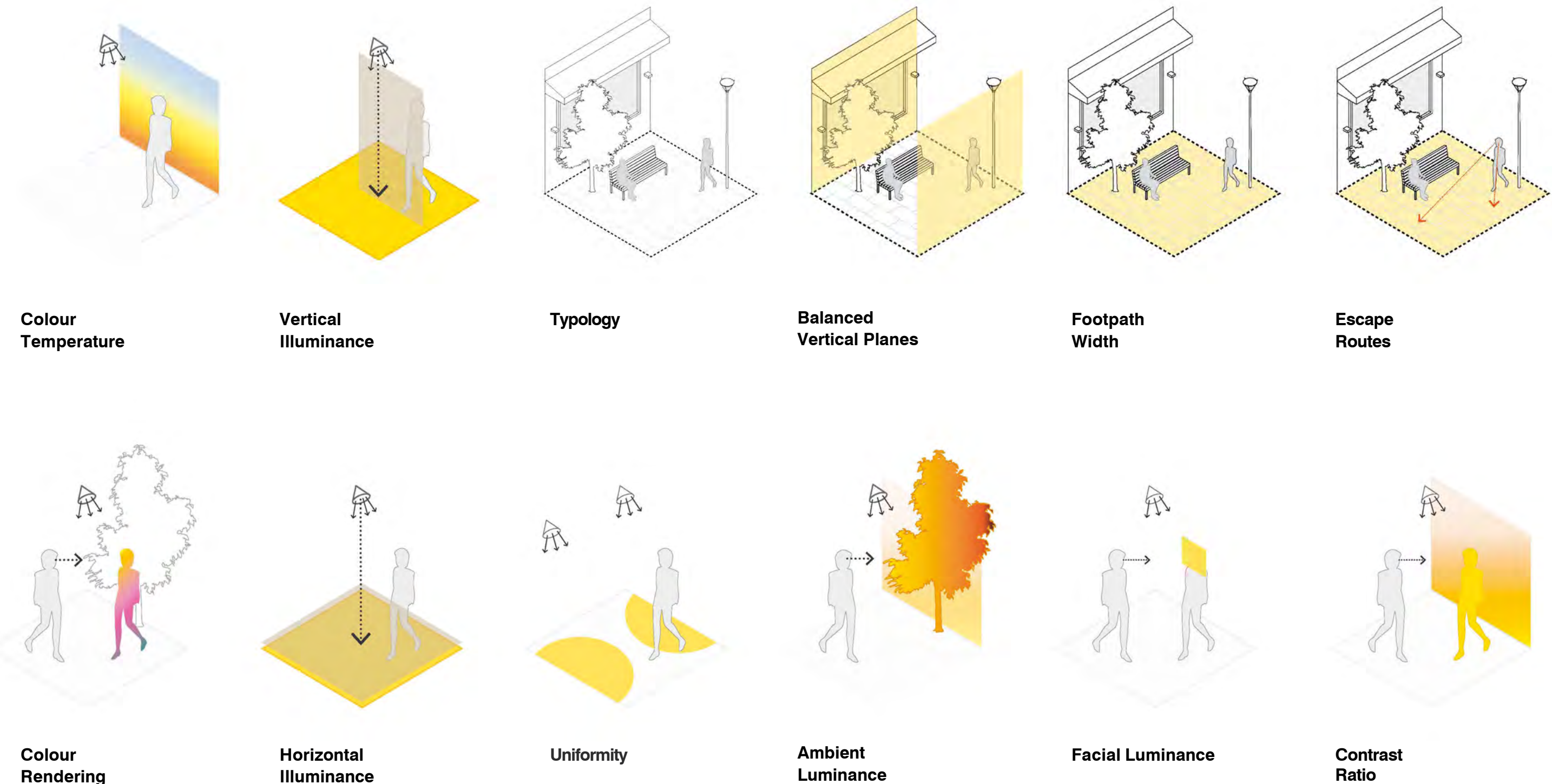
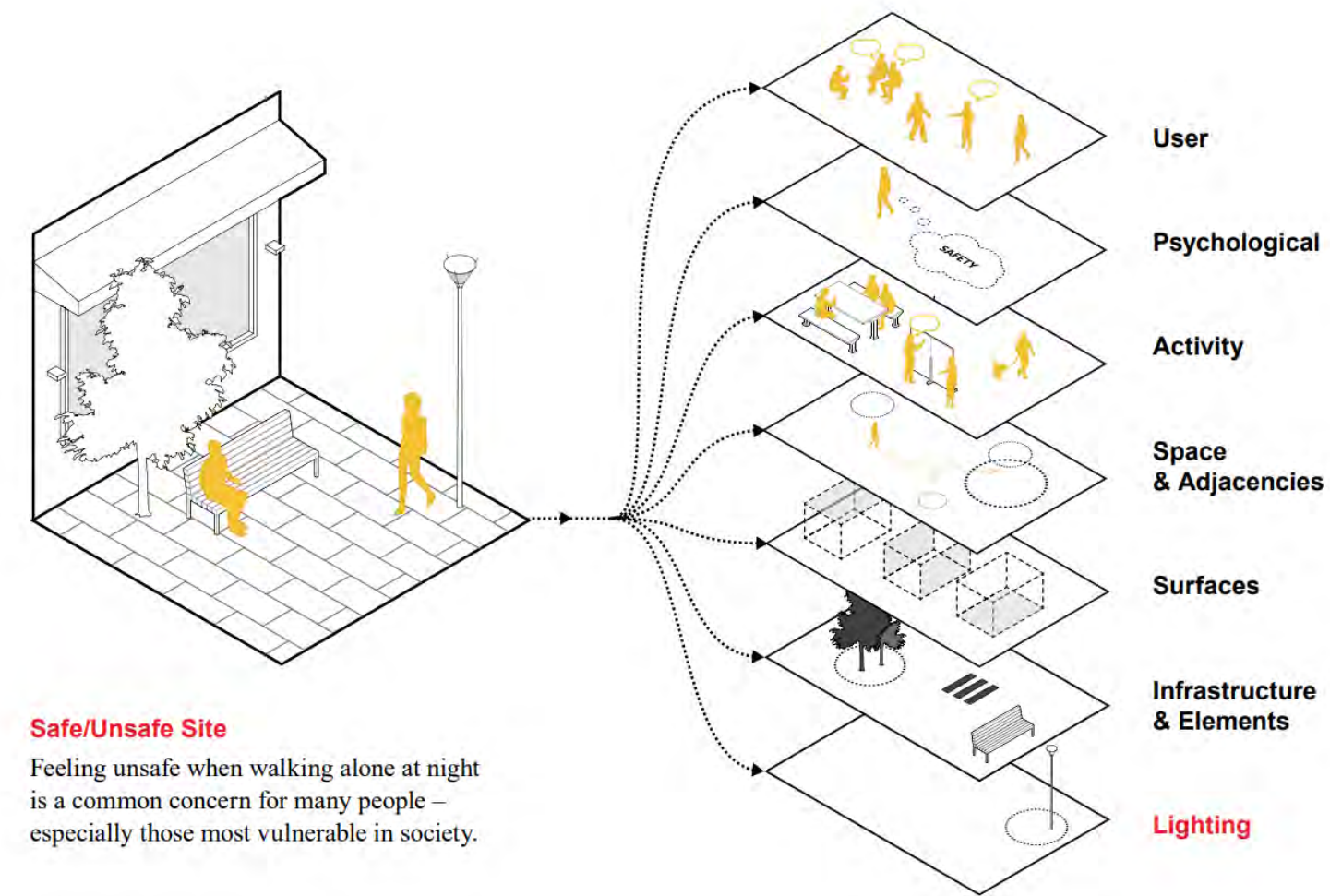
## Design Principles

# Safety and Inclusion

Considered and well designed lighting not only provides functional lighting to prevent accidents, it also contributes to an improved sense of place, and increased perceptions of safety within a public space.

The following lighting design techniques should be adopted to create pleasant night time space and achieve effective wayfinding:

- + Functional lighting in key areas where there are stairs or uneven ground coverage to ensure full visibility of circulation zones
- + Considered and appropriate animation of light
- + Planning of lighting typologies and scheme in accordance to the findings from site
- + Use of modern, efficient LED luminaires with high quality optics and colour rendering
- + Considered approach to lighting application to achieve visual balance and avoid glare and temporary disorientation
- + Implementation of lighting comfort strategies such as integration details, appropriate accessories and customisations
- + Consider use of passive surveillance by activating shop fronts during evening hours
- + Materials with light coloured finishes
- + Consideration given to designing out areas without escape routes





## Design Principles

# Character

The lighting masterplan aims to elevate public passion to the night-time, and enable the site to play a centre role in civic discourse after dark. The lighting design will help activate the wider precinct to:

- + Be a place for community
- + A hub for culture and events
- + Celebrate the unique architecture – new and historic
- + Accentuate use of materials
- + Support vibrancy and character of retail, hospitality, entertainment and residential living
- + Capture the differences of all 4 precincts across the area

The strategy will encompass the celebration of shadow, darkness and mystery. A considered lighting design has a good balance between darkness and light in order to affect an enjoyable and safe experience of the night time.

The following techniques will be used in the strategy to enhance the experience of the lit environment:

- + A comfortable balance between light and darkness to ensure perceptions of safety with a sense of excitement and mystery
- + Focal points facilitated by shadow and darkness to make urban elements pop and engage with intuitive wayfinding
- + The celebration of materiality and texture on vertical and horizontal surfaces to promote heritage and sense of identity
- + A balanced visual approach to field of view, to ensure visibility of the ground whilst maintaining an appreciation for the vertical surfaces of the architecture





## Design Principles

# Activation

Temporary activities and events are vital to the cultural life of Chapel Street. Night time vision that focuses on enhancing these cultural assets can make a significant contribution to the night time economy.

Build upon existing night time art and event program and the feedback from those activities. Glow winter light festival, Green Screen outdoor cinema, Sunset sounds, So Soiree Fringe Garden.

Implementation of supporting infrastructure and flexibility in lighting control will allow to create numerous scenes responding to event theme and its artistic aspirations.

Studies of similar precedent spaces and art interventions provide the following guidance:

- + Ground activation with light and colour installations allow to reimagine the space and create reasons to explore
- + Interactive and engaging installations for visitors create a sense of attachment and joy of play
- + Using projection and colour can help with wayfinding
- + Quality artistic content for installations can be linked to cultural tenant programme and create a link with their audience
- + Limited use of coloured light can provide focus on the concept of installation
- + Well integrated installations consider the use of the existing space and surrounding materials, surfaces and shapes
- + A combination of various scales for installations can help to diversify the experience and create either very large and impressive effect or more intimate experience





Design Principles

# Sustainability

The Lighting Masterplan will have a light and dark strategy with a conscious approach to the different open space typologies and the most suitable lighting strategies to minimise its adverse effects in the natural environment. The various types of light pollution taking place in modern cities that will need to be addressed include:

- + Spill Light
- + Over-Illumination
- + Glare
- + Sky glow
- + Light Clutter

The lighting strategy will prioritise sustainability, energy efficiency, and minimising sky glow. It sets out to minimise its environmental impact and provide a design response that is sensitive to the environment, local flora and fauna and natural habitats.

The following principles form the basis of design of lighting with respect to the environment:

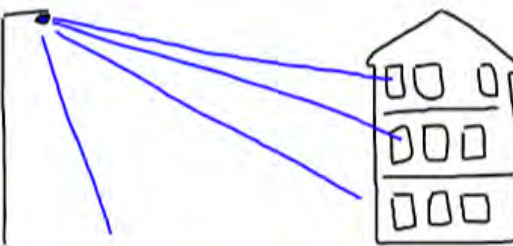
- + Preventing excess, mitigating, light spill and light pollution to the sky. No over-lighting
- + Minimising energy consumptions in both design and operation of lighting
- + Providing responsive control of lighting and reduced light levels after active hours
- + Providing luminaires and lighting infrastructure with high standards of pre and post life recycling processes, as well as extended life cycles and warranty periods.

The essential components to achieving this vision, without compromising the quality and visual consistency of the night time experience, will consider:

- + The location and typologies of lighting equipment
- + Use of LED light source, luminaires and lighting infrastructure with high efficiency light sources and high quality optics, optical accessories, materials and finishes to resist the environmental conditions appropriately for a long life cycle
- + The colour temperature and spectral composition of the light source
- + Use of a future proof, configurable lighting controls system

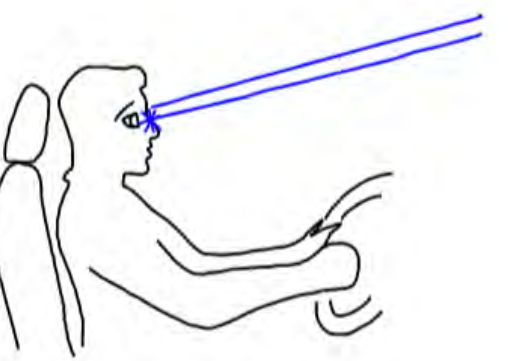
SPILL LIGHT

Light Spill occurs when light strays beyond the task area into adjacent properties or wildlife habitats, potentially affecting sleeping patterns, reproduction process or causing the animal to desert its habitat.



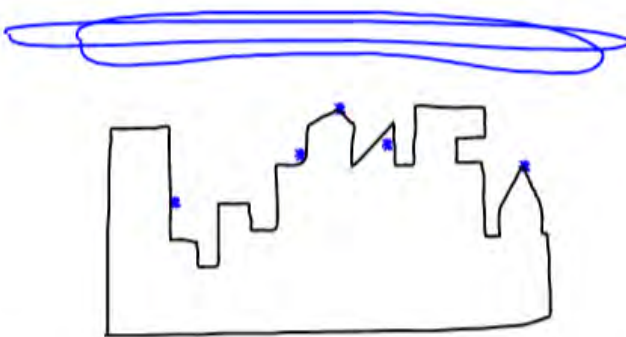
GLARE

Excessive brightness or a direct view of an intense light source that causes visual discomfort and disrupts the vision. Glare is further categorized into blinding glare, disability glare, and discomfort glare.



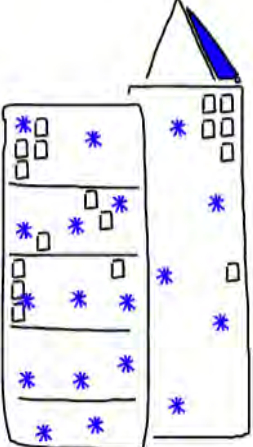
SKY GLOW

Man made sky glow is the result of artificial direct or reflected skyward light scattered in the atmosphere and causing brightening of the night sky. Typically observed above major conurbations, it reduces our observation of celestial objects and affects our ecosystems.



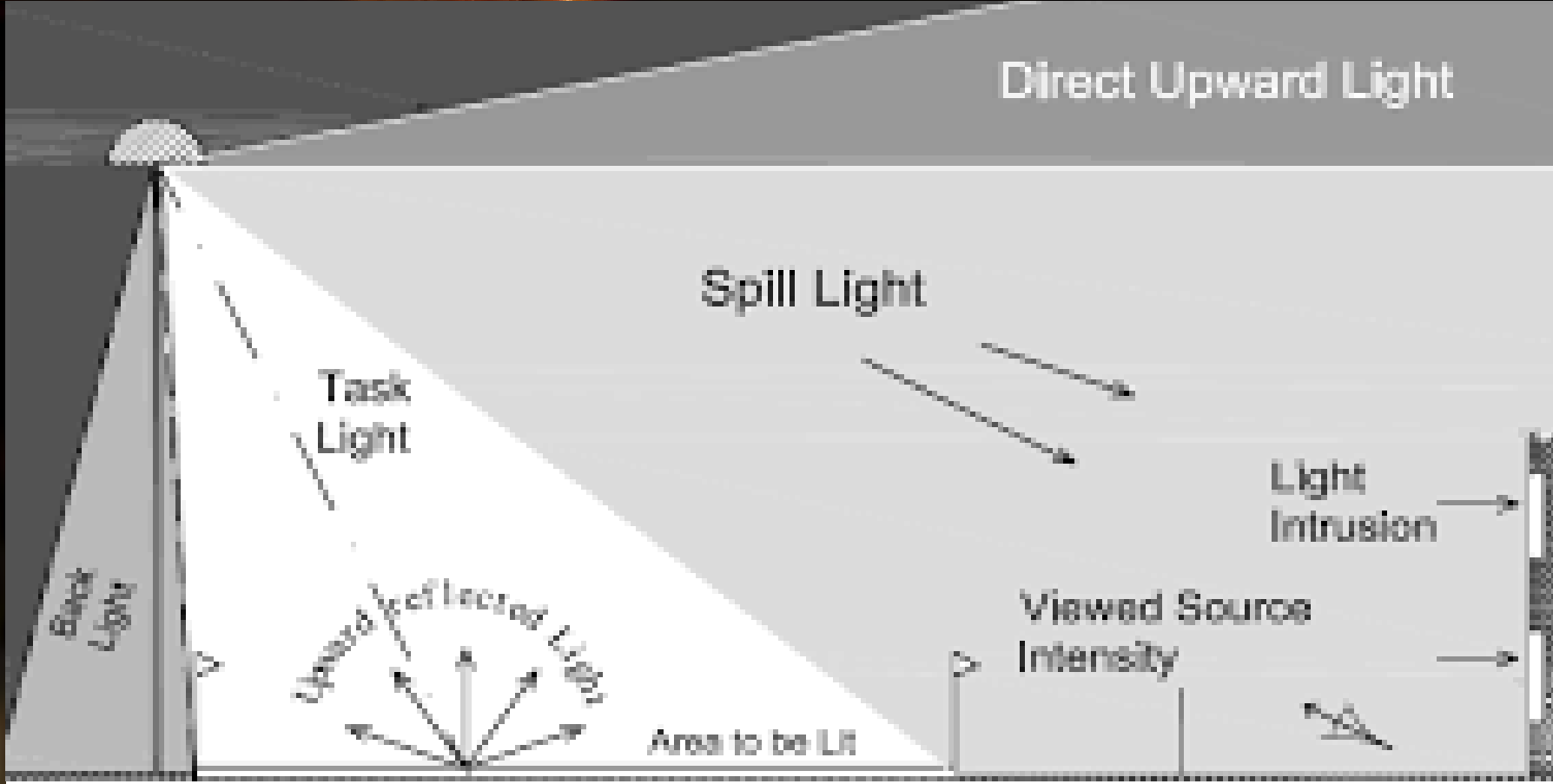
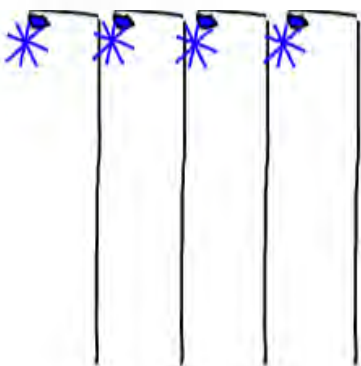
OVER-ILLUMINATION

Over-illumination is the excessive use of light and may be the result of different lighting schemes competing for presence in the nocturnal scene, or be the consequence of poor design and



LIGHT CLUTTER

Light clutter refers to excessive groupings of lights. Groupings of lights may generate confusion, distract from obstacles (including those that they may be intended to illuminate), and potentially cause accidents.



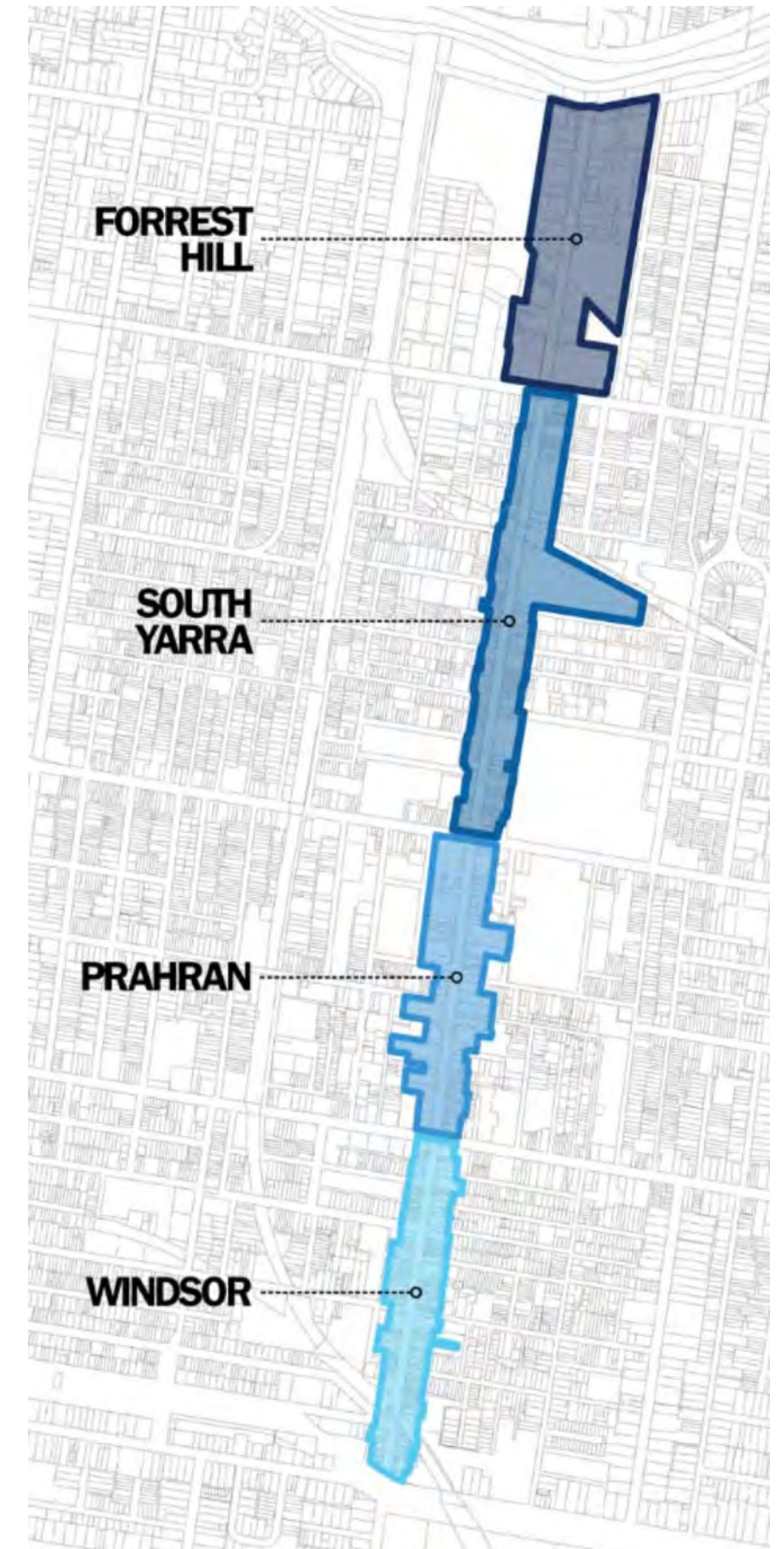
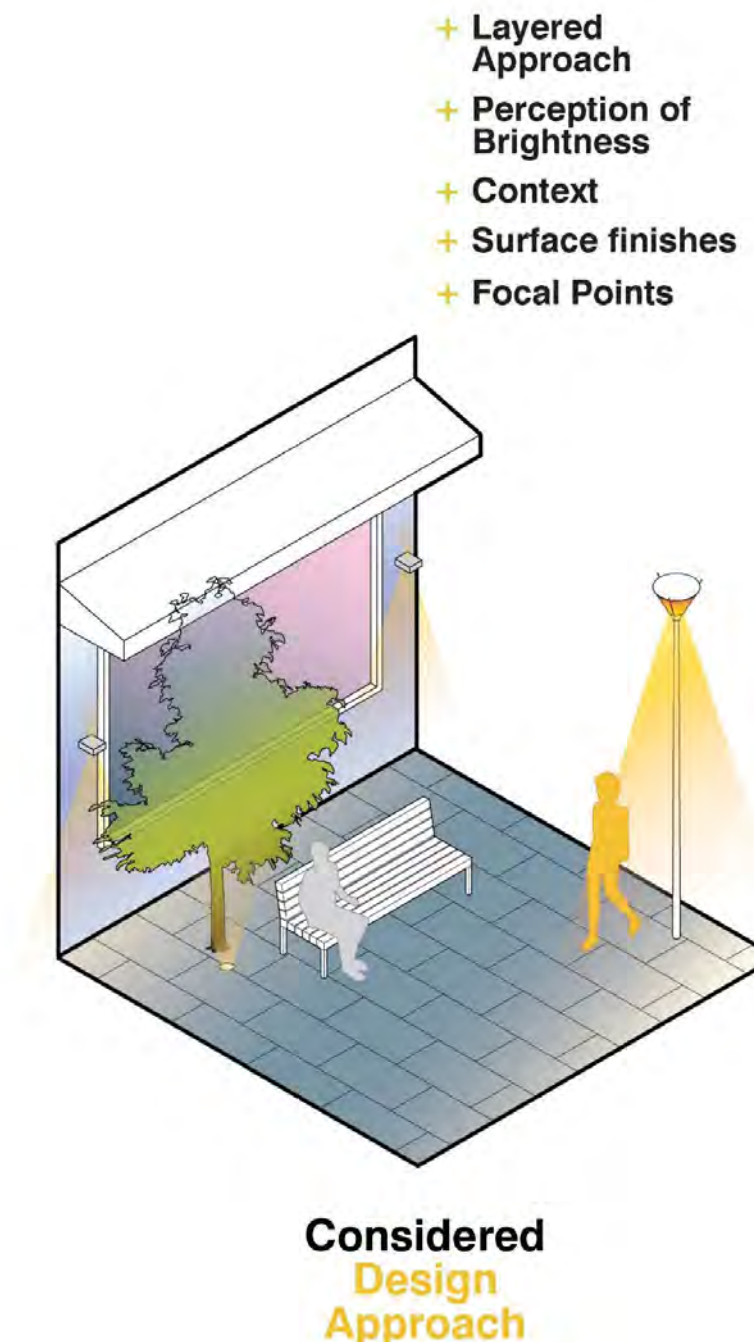
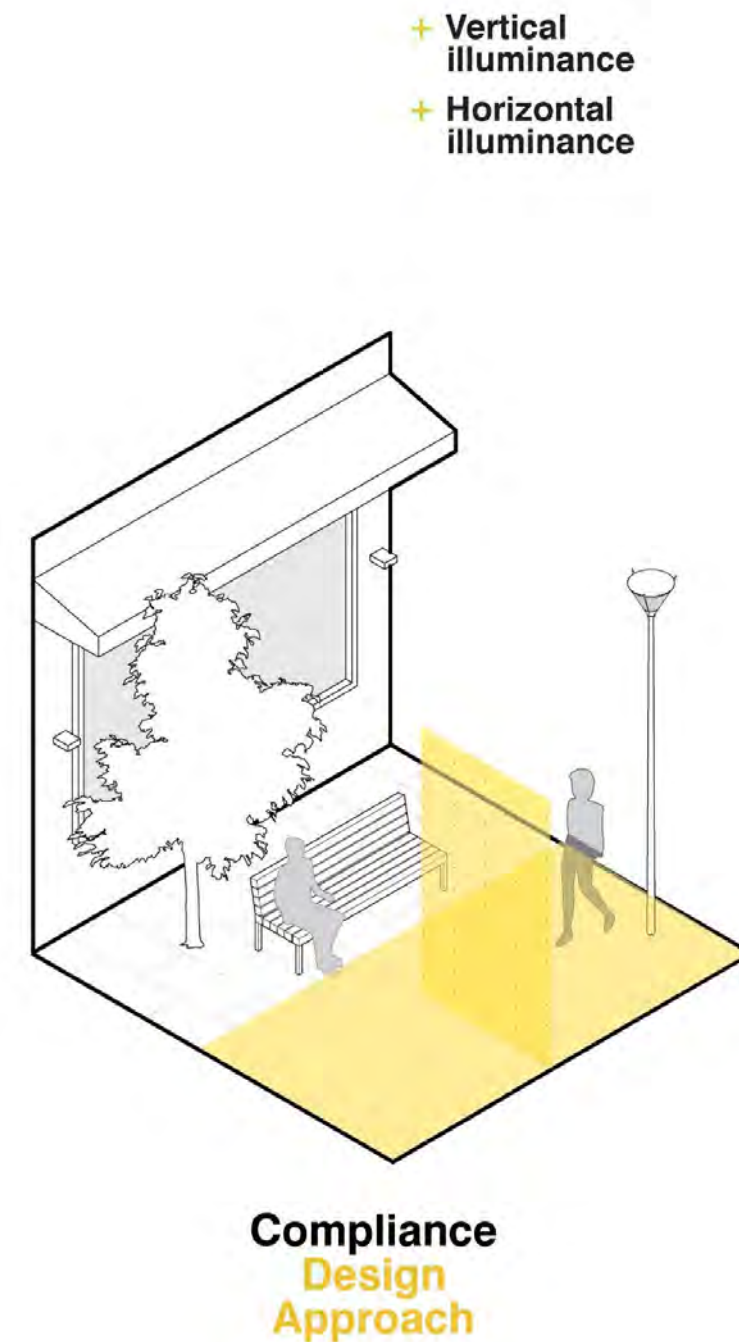


## Design Principles

# Design Criteria

The following design criteria will be considered throughout the development of the Masterplan:

- + Lighting strategy aims to provide safe and inclusive experiences after dark.
- + The lighting masterplan will make an appropriate balance between the social and economic benefits provided through the illumination of the site and the potential resulting environmental impacts. Sustainability, the reduction of light spill, intrusive lighting and sky pollution will be considered.
- + Working closely with urban design development to support the broader vision for the Chapel street
- + Recognise and support the 4 different precincts of the area: Forest Hill, South Yarra, Prahran and Windsor
- + An in-depth study and analysis of existing material, rich architectural and heritage character of the space to be respected and complemented within the new design strategy.
- + Innovative approach to enable the development of future technology and techniques to help provide greater flexibility for the future.
- + The lighting will be designed in accordance with relevant codes, Australian Standards including, but not limited to:
  - National Construction Code of Australia
  - AS/NZS 1158 – Exterior Lighting
  - AS/NZS 4282 – Control of the obtrusive effects of outdoor lighting
  - AS/NZS 3000 – Electrical Installations
- + Lighting strategy will also consider the most recent version of relevant guidelines and studies like, but not limited to: City of Stonnington Urban lighting guidelines, Wildlife Sensitive Lighting and Gardiners Creek Light and Dark Strategy and Solar PV Vs AC.
- + Ongoing discussion and stakeholder workshops will be conducted to collaborate and develop a coherent vision to future night experiences at Chapel Street





# Standards and Guidelines

Lighting strategy presented in this document is to be based upon the following locals standards and guidelines.

AS1158 Lighting for roads and public spaces. The categories are to be selected once detailed consultation has taken place with the client team. The range of illumination levels will be used to respond to different spaces and functions and to create brightness hierarchy.

AS/NZS4282 Control of the obtrusive effects of outdoor lighting. Limitation of exterior lighting installation with regards to potential ‘light spill’ and its impact on adjacent residential properties and road users.

AS/NZS3000 Electrical Installations. The electrical installation, wiring, containment and associated components will be in accordance with the wiring rules.

City of Stonnington Urban Lighting Guidelines - The purpose of these guidelines is to ensure a consistent and coordinated approach to planning, designing and installing lighting in the City of Stonnington. The guidelines will help to ensure that lighting is best practice, fit-for-purpose, and supports a vibrant and safe city for users and wildlife while meeting Council’s sustainability objectives.

TABLE 2.3 LIGHTING CATEGORIES FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)					
1	2	3	4	5	6
Type of area or activity		Selection criteria <sup>a,b)</sup>			Applicable lighting subcategory
General description	Basic operating characteristics	Night time vehicle movements	Risk of crime <sup>c)</sup>	Need to enhance prestige	
Areas primarily for pedestrian use, e.g. city, town, suburban centres, including outdoor shopping precincts, malls, open arcades, town squares, civic centres	Generally pedestrian movement only	N/A	High	High	P6
		Medium	Medium	Medium	P7
		Low	Low	N/A	P8
Transport terminals and interchanges, service areas	Mixed pedestrian and vehicle movement	High	High	High	P6
		Medium	Medium	Medium	P7
		Low	Low	N/A	P8

TABLE 2.7 VALUES OF LIGHT TECHNICAL PARAMETERS AND PERMISSIBLE LUMINAIRE TYPES FOR PUBLIC ACTIVITY AREAS (EXCLUDING CAR PARKS)					
1	2	3	4	5	6
Lighting subcategory	Light technical parameters				Permissible luminaire type (see Table 2.10)
	Average horizontal illuminance <sup>a,b)</sup> ( $\bar{E}_h$ ) lux	Point horizontal illuminance <sup>a,b)</sup> ( $E_{ph}$ ) lux	Illuminance (horizontal) uniformity <sup>c)</sup> Cat. P ( $U_{E2}$ )	Point vertical illuminance <sup>a,b)</sup> ( $E_{pv}$ ) lux	
P6	21	7	10	7	Types 2, 3, 4, 5 or 6
P7	14	4	10	4	
P8	7	2	10	2	

LIGHTING SUBCATEGORIES FOR ROAD RESERVES IN LOCAL AREAS

1	2	3	4	5	6
Type of road or pathway		Selection criteria <sup>a,b</sup>			Applicable lighting subcategory <sup>c,d</sup>
General description	Basic operating characteristics	Pedestrian/cycle activity	Fear of crime	Need to enhance amenity	
Collector roads or non-arterial roads which collect and distribute traffic in an area, as well as serving abutting properties	Mixed vehicle and pedestrian traffic	N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3 <sup>f</sup> or PR4 <sup>f</sup>
		Low	Low	Low	PR5
Local roads or streets used primarily for access to abutting properties, including residential, commercial and industrial precincts		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3 <sup>f</sup> or PR4 <sup>f</sup>
		Low	Low	Low	PR5
Common area, forecourts of cluster housing		N/A	N/A	N/A	PR6 <sup>e</sup>
		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3 <sup>f</sup> or PR4 <sup>f</sup>
			Low	Low	Low

City of Stonnington urban guideline key objectives and outcomes:

+ Ensure a consistent and coordinated approach to lighting in public open spaces

+ Ensure lighting in the city is appropriate and fit-for-purpose

+ Enhance community use of space

+ Support community health and safety - Create a safe environment at all times

+ Support a vibrant night time environment - Define city’s character and highlight its many features

+ Minimise the environmental impacts of lighting. Despite being a heavily urbanised environment, there are many green spaces throughout Stonnington that provide habitat for wildlife.

+ Reduced energy use and greenhouse gas emissions - Council continues to explore options to develop a more energy-efficient public lighting network, seeking to future proof the city through smart lighting technology including options for monitoring and control.



# Site specific considerations

Below are the proposed lighting hierarchy and levels for the typical section of Chapel street precinct:

1. Chapel Street road and footpaths – recommend maintaining existing street lighting for the road illumination and additional lights to building walls and canopy to provide lighting on pedestrian pathways and meet minimum level requirements for pedestrian pathways of PP1 category.
2. Large crossing street – recommend keeping same or level below lighting category to Chapel Street to provide minimum lighting level requirements for road lighting category. Keep façades lit where possible to define the crossing and create landmark
3. Large side street – recommend providing one to two categories lower light level as at Chapel street to meet minimum lighting level requirements of PR1 category with 50m of joining section to be one category below chapel street and design approach that creates visual link
4. Small side street - recommend providing two categories lower light level as at Chapel street to meet minimum lighting level requirements of PR2 category
5. Laneway – recommend providing minimum lighting level requirements for PR3 and relevant design element highlights if the lane has any artistic items
6. Park – for main connecting pathways through the park recommend providing minimum lighting level requirements for PP4-PP5 category. Park lighting to have also vegetation and vertical illumination to have balanced visual appearance and perception of safety.
7. Small Square – recommend providing minimum lighting level requirements for PA2 category
8. Large Square – recommend providing minimum lighting level requirements for PA2 or PA1 category if the square is of considerable importance with high level of activity
9. Parking – recommend providing minimum lighting level requirements for PC2 category





## Design Principles

# Lighting Control

An automated lighting control system would provide numerous benefits to Council including the following:

**PROGRAMMABILITY:** Easy to adjust lighting design to include new lighting and lighting control requirements to adapt to varying environments, situations and scenarios. This can be done remotely without needing to attend site.

**ENERGY EFFICIENCY:** By incorporating various control devices such as timeclock, motion sensors and PE cell, the lighting can be controlled to turn on / off / dim up / dim down when required.

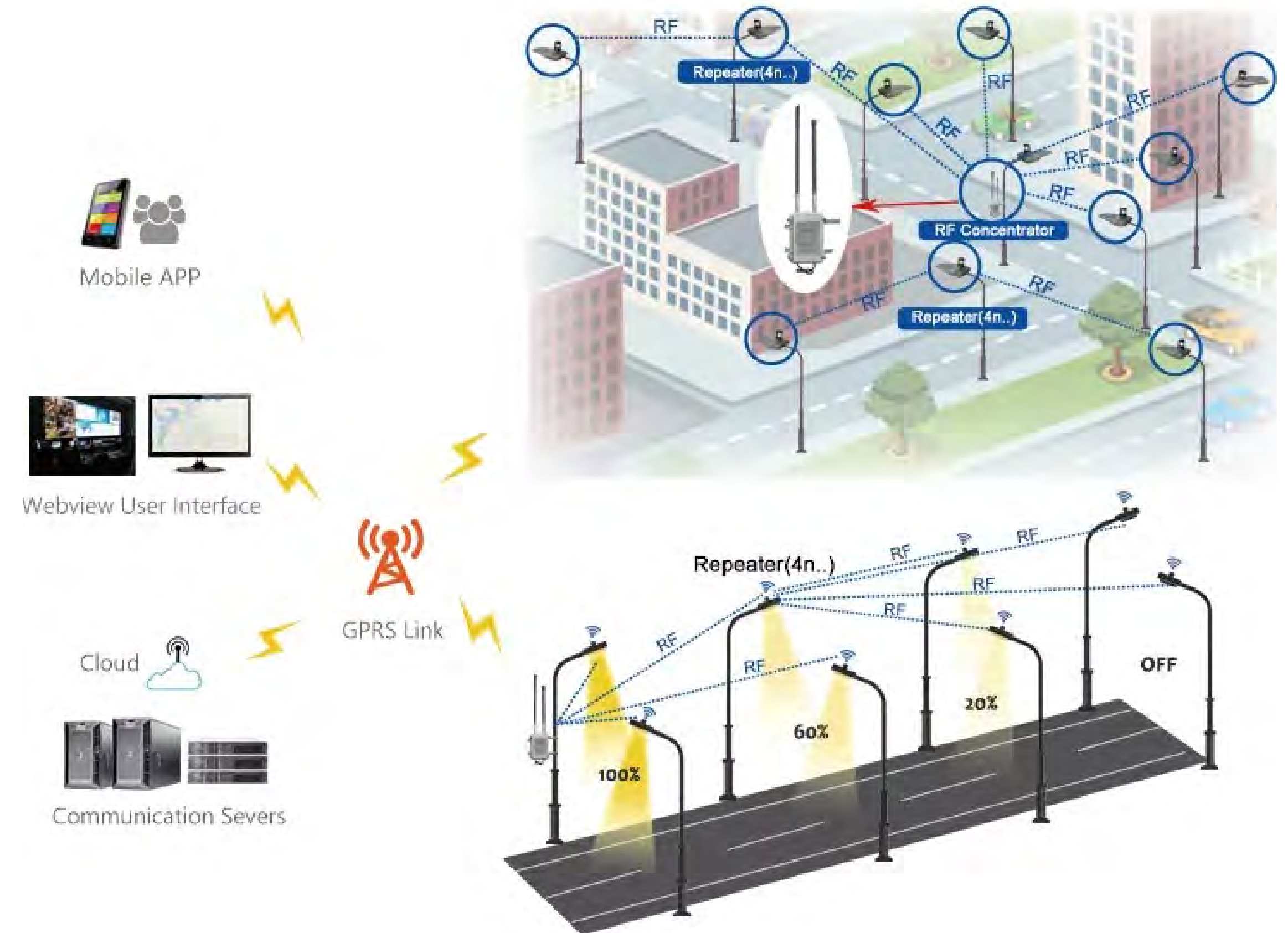
In addition, wireless lighting control systems provide additional benefits to the design:

**LABOUR AND MATERIAL COST SAVINGS:** By eliminating the need for control cabling and associated containment, the costs and time of installation can be significantly reduced.

**SCALABILITY:** Wireless devices can be located without limitations imposed by traditional wired lighting control systems

Below is the proposed lighting control philosophy for the typical lighting types proposed to illuminate the Chapel street precinct:

1. Public Lighting (street, laneway, park etc.) – recommend maintaining existing and new public lighting on time clock and PE cell. New lighting would be programmed to turn on and off with any existing lighting to ensure consistency.
2. Additional lights to building walls and canopies – This lighting can be set to the existing street lighting time schedule with PE cell control to maintain seamless integration across existing and new lighting.
3. Façade lighting - can be set to turn off after 10:30pm on weekdays, and after midnight on weekends.
4. Event Lighting – recommend to provide flexibility in the design for various types of lighting connections and control to suit the functionality and uniqueness of each event
5. Feature lighting & illuminated signage – recommend turning off lighting after hours i.e. after 10:30pm on weekdays, and after midnight on weekends to save energy.



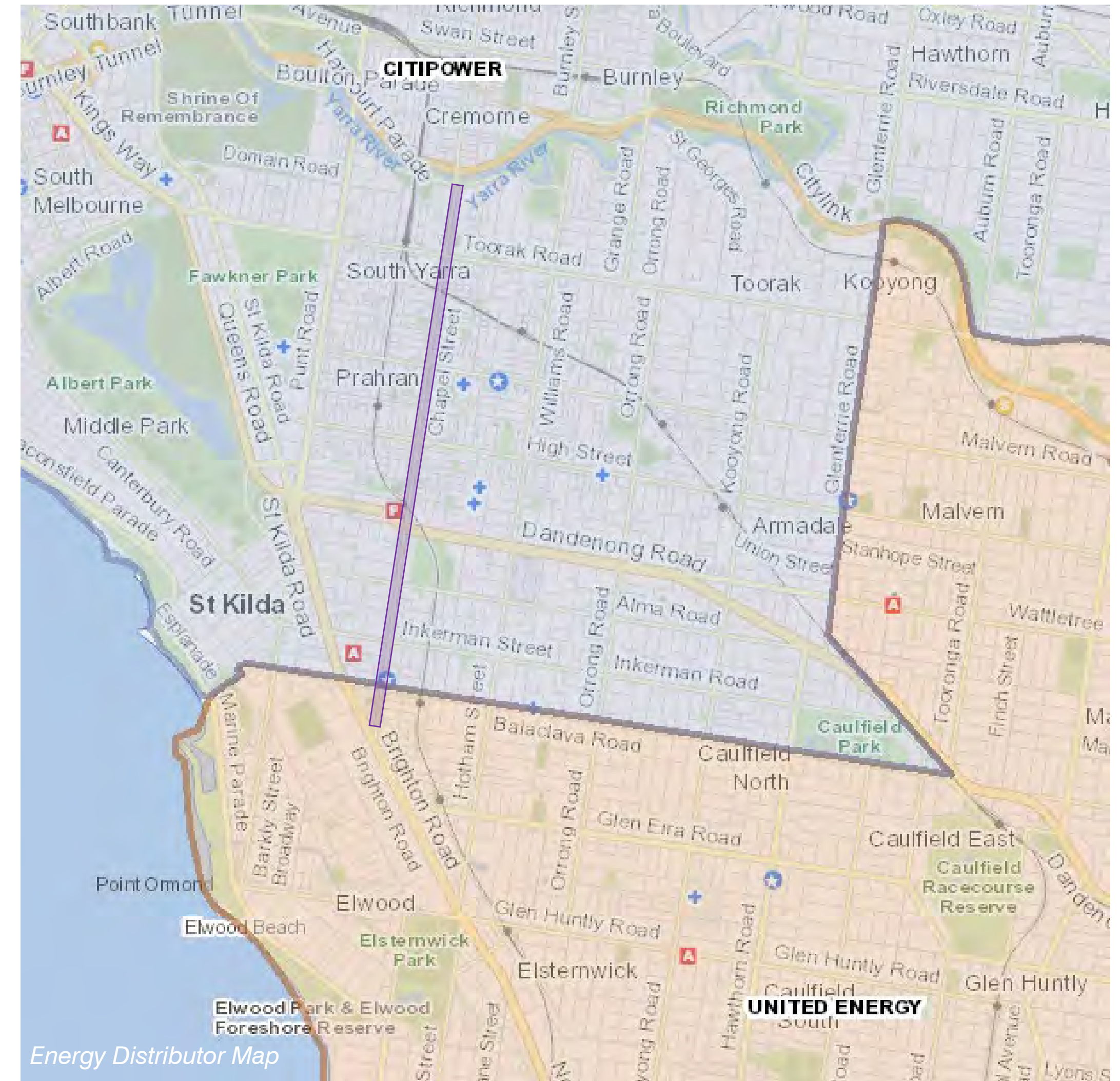
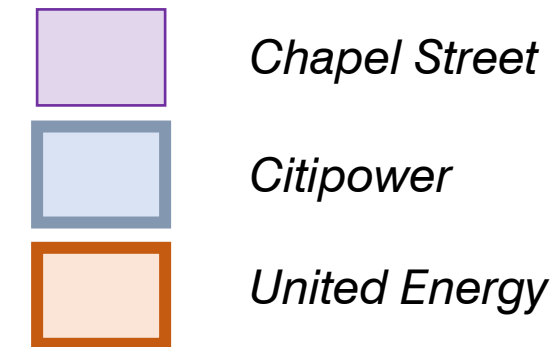
*Wireless Smart Lighting Control System*



# Other considerations

Below are other design considerations and implications of the proposed lighting design strategy:

1. Street lighting is generally owned by the energy distributor or other authorities in the area (Citipower, United Energy, VicRoads etc.). Coordination and agreements will be needed with authorities for any proposed lighting schemes and amendments to street lighting.
2. Maintenance of public lighting is generally the responsibility of Council, however, sometimes shared with the relevant energy distributor. Agreements will need to be in place between stakeholders for maintenance of all proposed lighting.
3. Billing for operational running costs of public lighting is to Council of Stonnington. Energy efficient LED lighting will reduce the running costs and will be provided as part of the design.
4. Where lighting is proposed to be mounted within tenant spaces i.e. on canopies, agreements will need to be in place for the supply, installation, maintenance, operation and end-of-life replacement of assets. Consideration will also need to be given to safety such as, if wiring and supply to assets installed on canopies is supplied from council switchboard, local point of isolation and clear signage should be provided to deter risks of electric shocks to shop tenants and their maintainers.
5. Existing lighting and electrical services are typically wired at high level on poles. There are several reasons for doing this, including costs of undergrounding cabling, congestion of existing services and accessibility for maintenance. Wiring to new luminaires, poles and ancillary equipment will consider existing services. Preference will be given, where feasible, to underground new cabling, however this will need to be investigated during detailed design.



Refer next page for continuation



# Other considerations

6. A smart lighting control system can be provided with the ability to remotely control and reprogram the lighting without having to attend site or re-wire. This can include changing the level of brightness at varying times of the day / year and varying the control functionality during specific events.
7. Solar PV systems including solar-integrated lighting has been significantly developed and improved in recent years. Solar mounted lighting typically includes solar panels mounted to the poles and battery systems integrated within the column. The batteries charge during the daytime, and discharge at night by powering the light attached to the pole. Solar lighting provides the benefit in that it eliminates requirement for cabling between poles. However, there are also challenges associated with solar lighting, including the battery systems requiring regular maintenance / replacement. Priority will be given to hard-wired lighting where feasible. Where hard-wired lighting will pose challenges, the provision of solar lighting will be investigated, in particular for open areas such as parks. Furthermore, where canopies are provided, solar arrays can be provided to offset lighting energy usage.
8. Poles can provide opportunity to share the column with other services and assets such as CCTV cameras and signage. The proposed design will be coordinated with other disciplines such as civil and security to ensure the most efficient and clutter-free outcome is provided.
9. Poles can pose risks such as working from heights. Consideration will be given to provide hinged light poles. These poles can be lowered to allow maintenance of the luminaire, without requiring use of an elevated work platform. It is noted that hinged poles are more costly to supply, however they do provide cost-savings over the life of the installation due to reduced maintenance requirements.
10. Consideration will be needed for integration of any electrical services and lighting proposed for heritage architecture and structures.



*Solar Lighting Example (Knox City Council)*



*Multi-function light poles*



*Hinged Light pole*



# 05 / Opportunities



# Opportunities

The Lighting Masterplan seeks to identify opportunities for improving the lighting throughout the Chapel Street. The following are the opportunities identified through this return brief stage:

- + Identity - considered night time design will assist with visual identity and activation of the space, and will improve the night time economy
- + Facades - opportunity to reveal characteristic features of the heritage buildings that will represent image of the precinct
- + Shop fronts – support cohesive usage and visual appearance of existing and new shop fronts to add to identity and supplement to illumination levels
- + Legibility – careful selection of illuminated surfaces and balanced light levels can help improve intuitive orientation at night
- + Human scale lighting - integrated lighting into urban furniture and planting can create pleasant ambience for visitors to stay and use these spaces to dwell
- + Stories of the past - through light and movement there is an opportunity to tell the stories of the land and celebrate the culture of the Indigenous people
- + Culture and Events – added value of richness and diversity to the night time during special occasions can contribute to the night time economy
- + Innovation – use of smarter technologies to create future opportunities from monitoring of assets and individual control for events and artistic interventions

+ Gateways – clear definition of entries to the site will support the pedestrian experience and improve connectivity

- + Management - management of capital and running costs and enhancing assets can have a significant economic benefit to the precinct
- +Sustainability - reduced energy use and assistance with reducing adverse impacts on local ecology while maintaining balance between social and economic benefits of night-time design.

To capitalise and tease out these opportunities, the team will need to consult with representatives from the below areas as an example:

- Social
  - + Indigenous groups
  - + Community groups
  - + Police
  - + Gender groups
  - + Art groups
  - + Other groups
- Heritage
  - + Building heritage
  - + Social heritage
- Economy
  - + Local business groups
  - + Retail Traders
  - + Hospitality Traders
  - + Other Traders
- Council
  - + Infrastructure group
  - + Sustainability group
  - + Community group
  - + Operations and Maintenance group
- Infrastructure
  - + Metro Trains
  - + Yarra Trams
  - + PTV
  - + Taxi & Rideshare
  - + Active transport groups



## Opportunities

# Global Precedents

Stories and themes significantly strengthen architectural lighting design and provide a clear point for reference of intent throughout a project. The images adjacent are a selection of the research completed to gain a greater understanding of the project at a macro and micro level. It is the intention that these key lighting themes reoccur through the design process, ensuring that the project is lit rhythmically, sympathetically and functionally. The following key lighting opportunities have been identified as part of this process:

- + Considered, holistic and co-ordinated vertical lighting layers to be achieved with façade front, back, and interior.
- + Intentionally using darkness as much as light and carefully balancing low light levels with ambient illumination.
- + Respect the site heritage, context and landscape.
- + Accentuate the architectural design and its origins.
- + Use of control to enable different light quality throughout the course of the day and season.
- + Using lighting as a layer of design to enhance the experience of visitors and the community.
- + Enable opportunity for extended hours of tourism and economic stimulation to revitalise the experience and perception of both locals and visitors alike.
- + Enable the lighting to be used as a mechanism to amplify celebrations of significant events and culture for the city.
- + Revitalise the place on a state and national level.
- + Create meeting places, destinations and moments of the journey to encourage the public to take a sense of ownership and pride.



University Of Sheffield Concourse, UK



The Louvre, France



Gasholders Park, London



Green Square Library, Australia



Leicester Square, UK



Gardens By The Bay, Singapore



Bradford City Plaza, UK



Kings Cross, UK



Dongdaemun Plaza, South Korea



Hull Regeneration, UK

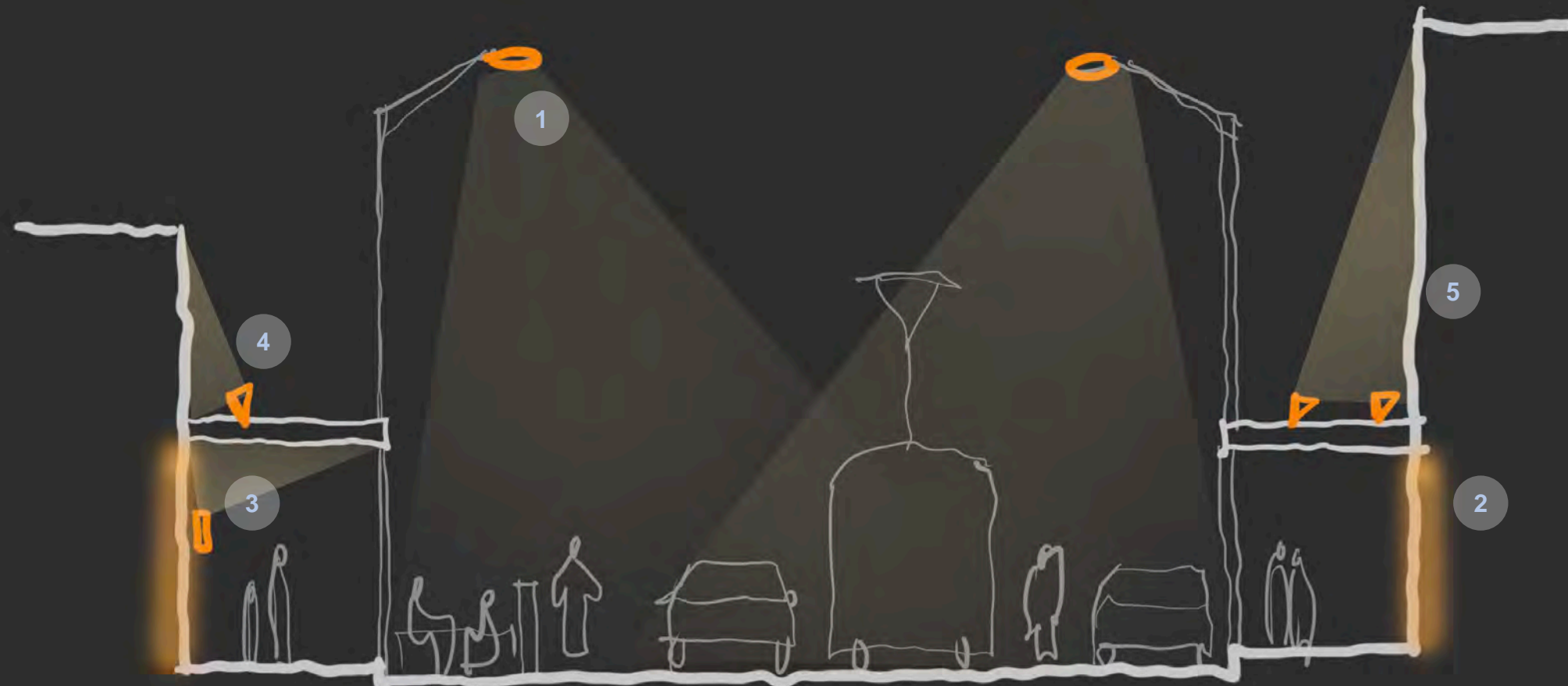


Quartier Des Spectacles, Canada



# Possibilities

Idea One



Idea Two



## Layers of light:

1. Existing Street light poles with current lamps or upgraded fixtures – provide illumination of the street lighting
2. Soft glow from shop fronts – existing and new with applied similar principles to create a consistency
3. Wall lights to facades for uplighting canopy – to ensure sufficient lighting for pedestrian pathways where no shop fronts are left on during night
4. Façade lighting from canopies – applied in consistent manner and to reveal the scale of the street and beauty of heritage buildings
5. Façade lighting from canopies and from lights on the façade for more prominent buildings to create additional level of light

6. Layer of banners, art and design objects applied to poles and contributing to identity of the street
7. Low level street furniture integrated light to support ambient light for dwelling

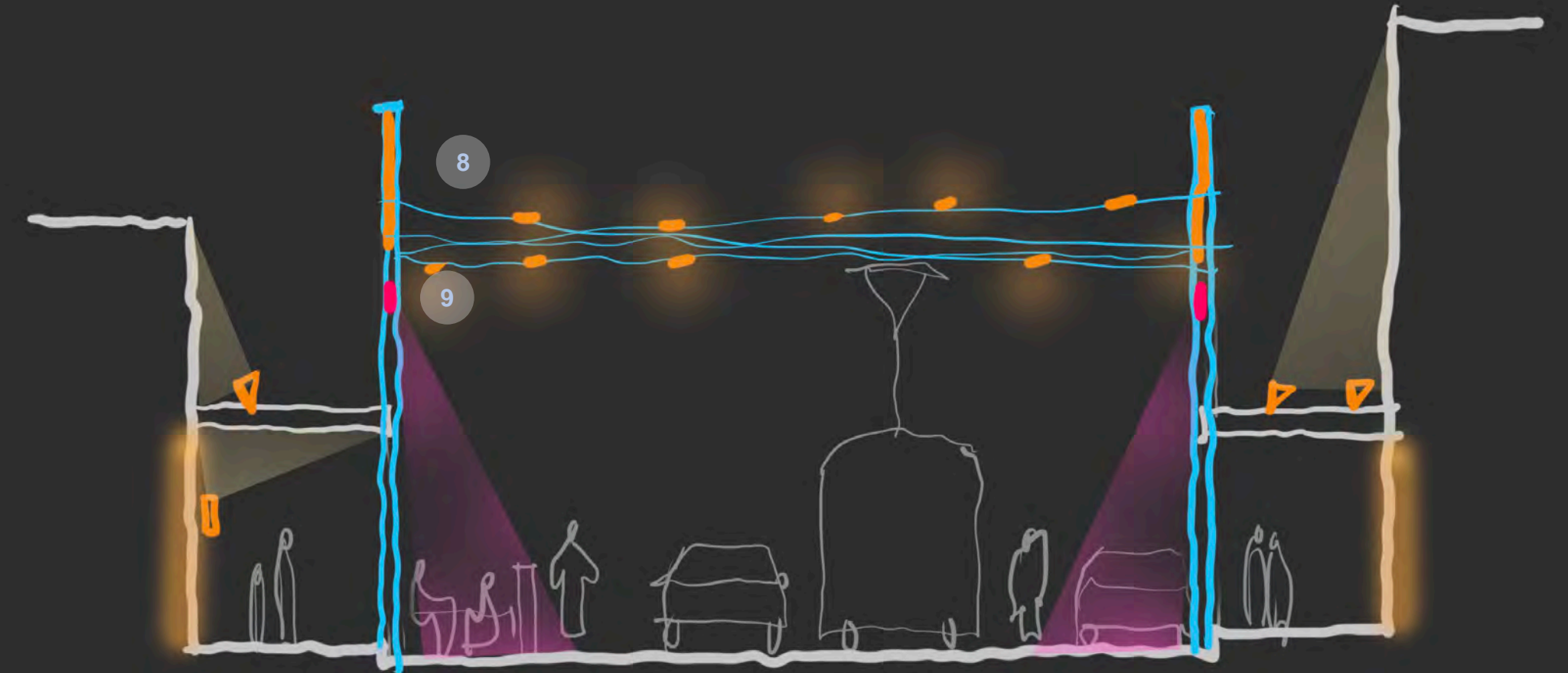


# Possibilities

Idea Three



Idea Four



## Layers of light:

1. Multi-functional street poles with options of glowing base pole and top of the pole, integrated street lights, accents, gobo projectors
2. Soft glow from shop fronts – existing and new with applied similar principles to create a consistency
3. Wall lights to facades for uplighting canopy – to ensure sufficient lighting for pedestrian pathways where no shop fronts are left on during night
4. Façade lighting from canopies – applied in consistent manner and to reveal the scale of the street and beauty of heritage buildings

5. Façade lighting from canopies and from lights on the façade for more prominent buildings to create additional level of light

8. Option of catenary light to enhance specific areas and contribute to identity and legibility

9. Integrated gobo projections with option to involve local artist for developing content



## 06 /Next Steps



## Next Steps

# For Consideration

### Night-time Vulnerability Assessment (NVA)

Arup has developed this unique process – an evidence based methodology to measure the social, physical and atmospheric qualities that work together to affect perceptions of safety after dark.

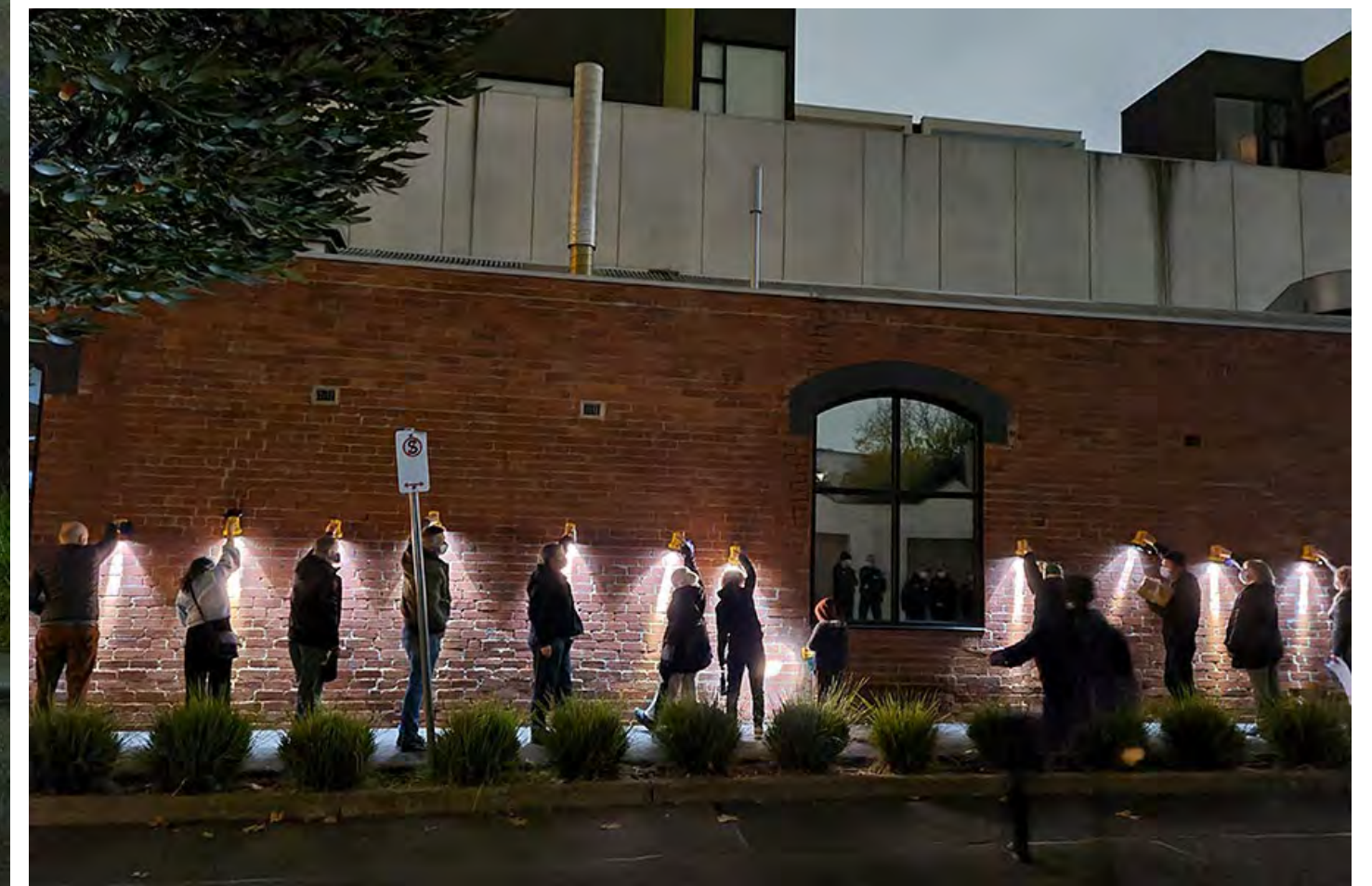
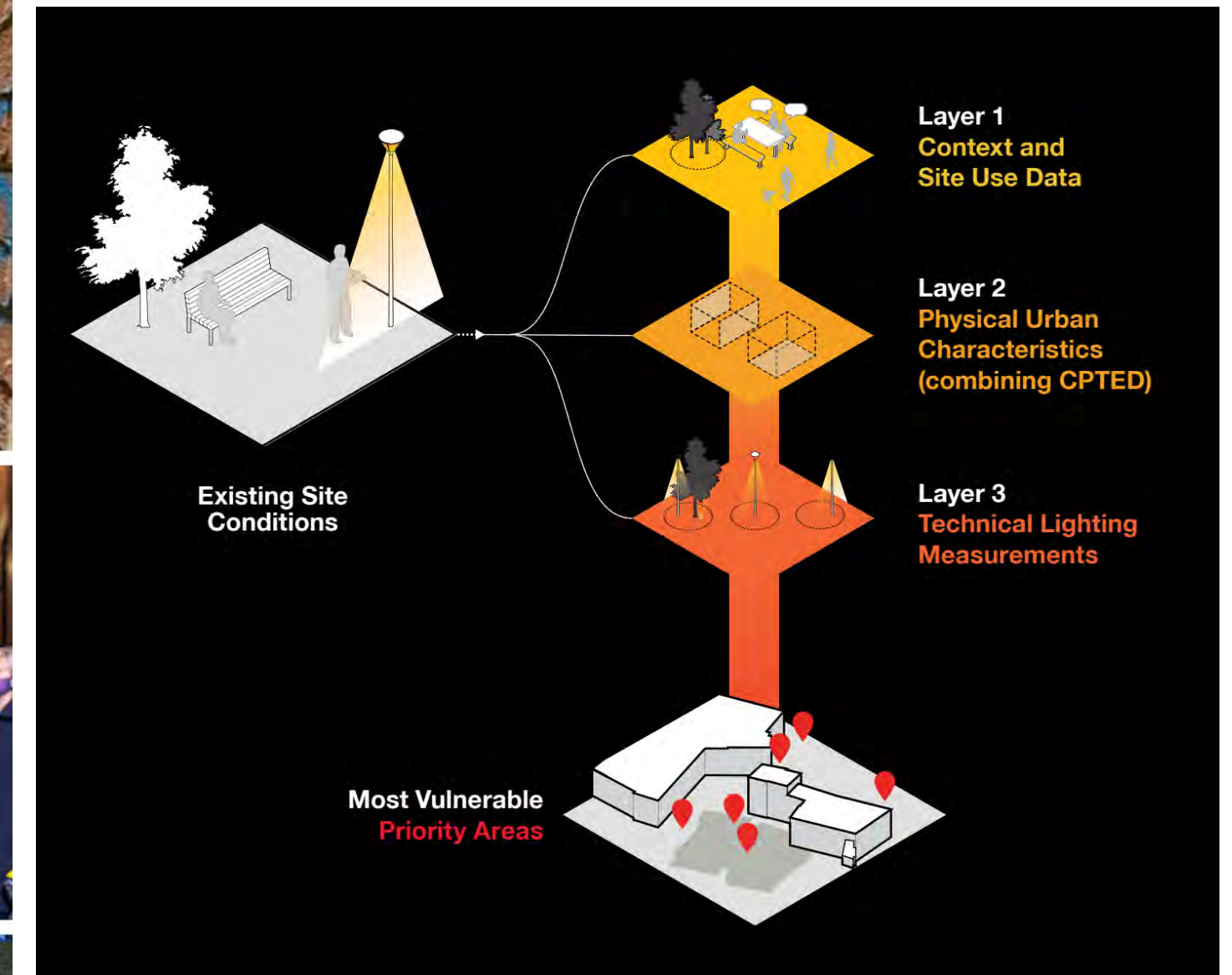
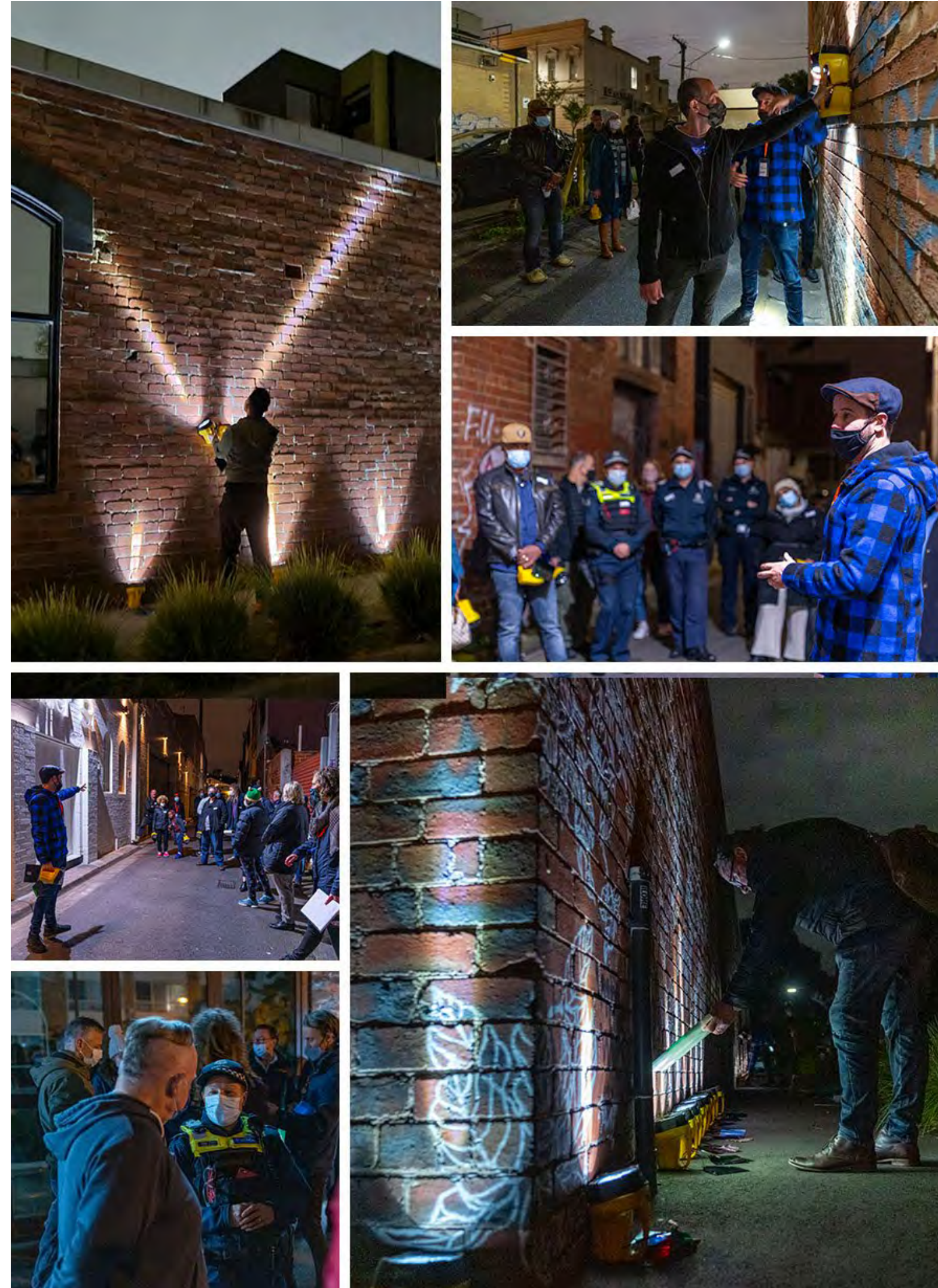
Developed from Arup's research with XYX Lab, the NVA brings together criminology, risk and resilience, urban design, architecture, lighting, advanced digital data collection and analysis of existing site conditions. This unique methodology identifies and recommends practical design changes to urban spaces where people are predicted to feel least safe by assessing how people perceive safety in night time spaces at three levels – contextual, social and individual.

<https://www.arup.com/expertise/services/technical-consulting/lighting-design/night-time-vulnerability-assessment>

### Night-time community engagement

- Community engagement programs to better inform how light and the urban environment shapes perceptions of safety, embedding evidence based technical design solutions to meet community needs.
- Identify key problematic areas and organise an evening site walk and workshop to hear direct feedback and engage with potential lighting interventions to see the potential of lighting on night time use of the space.
- During the event participants engage in hands on activities to learn how lighting impacts perceptions of safety and explore different lighting sources including smart technologies.
- Use this information and then implement using evidence-based design.
- Refer to the following video for reference to the process

<https://www.yarracity.vic.gov.au/the-area/smart-technology-and-innovation/community-lighting-workshop>





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