

St Aloysius' College – Roof Terrace LIGHTING CONCEPT

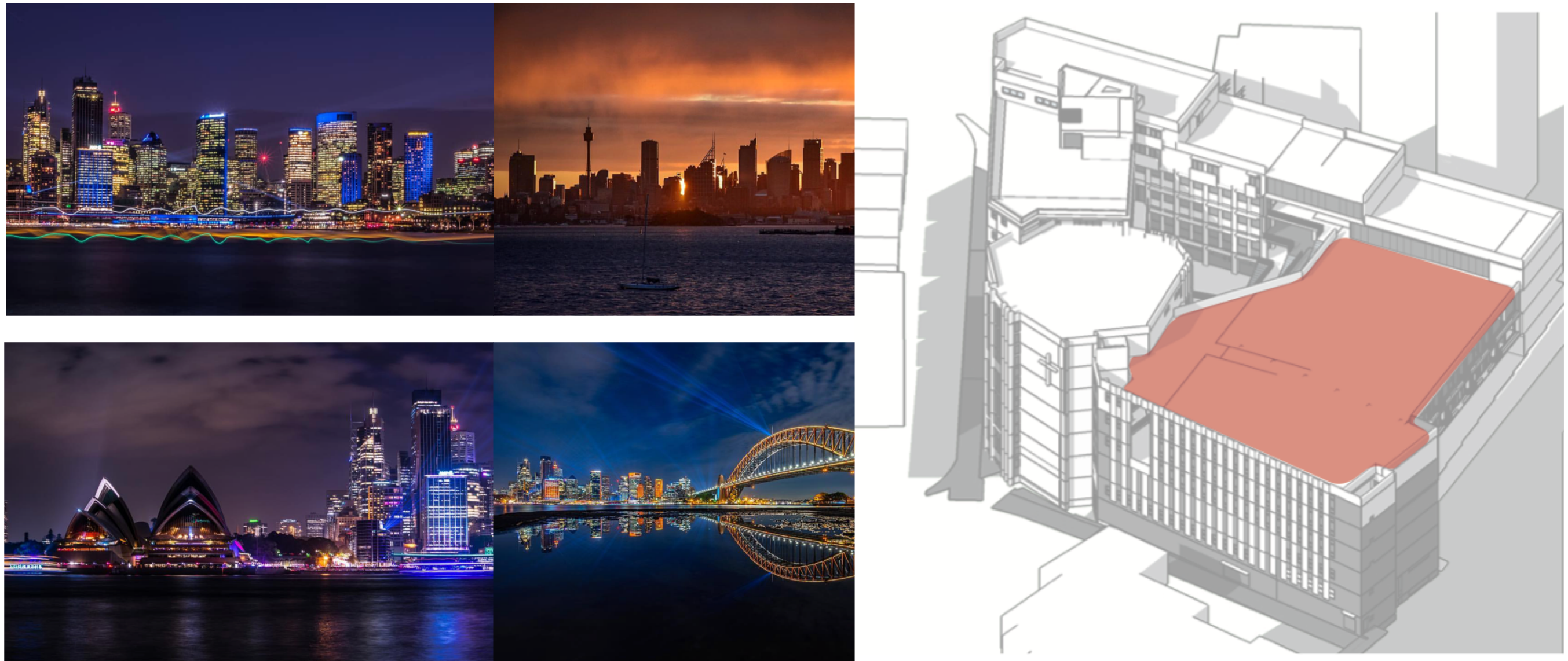


Table of Contents

1. INTRODUCTION & PRINCIPLE	3
2. LIGHTING STRATEGY	4
- Existing Analysis Lighting Conditions - Illumination Levels - Lighting Strategy to Minimise Adverse Impacts of Lights	
3. POLICY CONTEXT - OBTRUSIVE OUTDOOR LIGHTING CONTROL	6
4. LIGHTING DESIGN	
LIGHTING CONCEPT	7
- Lighting Diagram	
LIGHTING LOCATION DIAGRAM	8
- Sections – Skyline Amphitheatre & Harbour Garden	
- Sections - Forecourt and Central Sport Court	
PHOTOMONTAGE – LIGHTING CONCEPT	10
LIGHTING SCENE	11
- Proposed Scene – Security / Curfew Hours	
EMERGENCY AND EXIT LIGHTING	12
- Diagram	
5. SUMMARY	13

1. INTRODUCTION & PRINCIPLE

This Lighting concept design report identifies opportunities for Roof Terrace lighting upgrades in accordance with Landscape Concept Design by Arcadia and based off drawings outlined in the St Aloysius' College Plan Magis by PMDL.

The understanding of the concept behind the architecture and landscape design is crucial in the creation of a special lighting design. A good lighting design should be able to emphasise feature elements and create beautiful lighting with a harmonious balance between light and shadow, space and volume. The role that luminaires play during the day is also a consideration in the design. All luminaires have to be examined for their visual impact during daytime and shall be an integral part of the roof terrace which shall be in line with the architectural and landscape design with a minimal impact on buildings and landscape elements.

The key aim of Roof Terrace Lighting for St Aloysius' is to achieve the following key objectives for the lighting design:

1. Reinforce a sense of open space for recreation, learning areas, school events, functions and annual public events / celebrations.
2. Limit light pollution and minimise viewing obstructions for the nearby Sydney Observatory. Promote a disabling and discomfort glare free environment for users and neighbouring residents
3. Suggest controls and switching that will be flexible and assist in the minimisation of energy consumption.
4. Select appropriate luminaire types with the latest technology to minimise energy consumption, maximise efficiency and minimise maintenance expenses.
5. Provide lighting for the safe movement and creates a feeling of well-being for staff, students and visitors of the school. Functional lighting levels within the context of the lighting hierarchy shall be sufficient to ensure public safety, security monitoring, and the minimisation of crime while night time visual impact shall be also taken into consideration.
6. Lighting levels shall meet relevant code levels and Australian standards.

Light plays an important role in the night-time environment. It influences how people perceive a space, how comfortable they feel, and guide them through the area. Therefore, it is important to create a harmonious and coherent lighting design across the whole site that provides a comfortable, inviting, and safe environment with minimal impact on neighbouring properties. This is to be achieved through lighting the order and hierarchy of the architecture, landscape and focal elements which is to be implemented in different lighting layers.

- **Obtrusive Outdoor Lighting Control:** The overall lighting design (Functional, Creative and Emergency Lighting) shall be evaluated and analysed in accordance with the requirements of AS4282 -1997 *Control of the obtrusive effects of outdoor lighting* to the recommendation of Light Technical Parameter at boundary of commercial and residential areas.
- **Functional Lighting:** Provide adequate horizontal and vertical illuminance with a safe and comfortable visual environment for students and school staff to use the space in late evening and at night pending to school's operation time..
- **Creative Lighting:** Enhance and define landscape and architectural elements, outdoor furniture, and vegetation without compromising the view of the harbor and the city and ensure minimal disruption to neighbouring properties.
- **Emergency and Exit Lighting:** Consistent with the requirements under AS2293-2005 Emergency Escape Lighting and Exit Signs and NCC E4.1 Emergency Lighting, provide appropriate and compliant solutions to facilitate the safe direction, guidance and egress of people.

2. LIGHTING STRATEGY

- Existing Analysis Lighting Considerations

Minimise any glare from light source which might disturb residents' visual amenity



Minimise light spill onto neighbouring properties and windows.

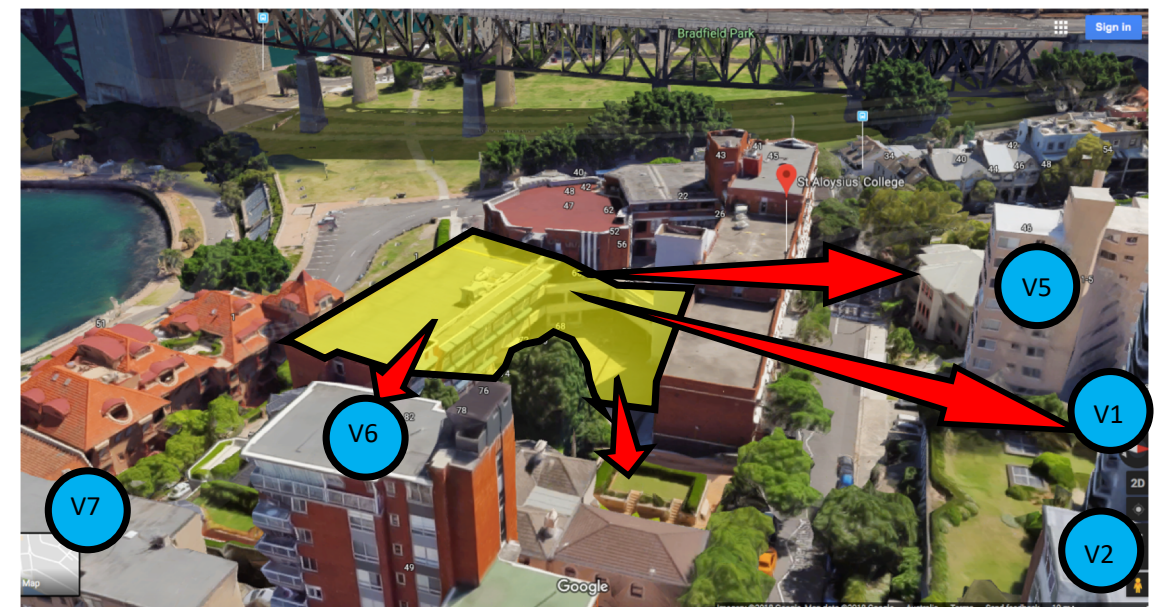
Recommendations:

1. Use low level lighting.
2. Avoid using floodlight.



A desktop review of the neighbouring properties and New Development Site has been undertaken to identify potential light sensitivity receptor.

The design aims to consider the light spill to private residential and public areas from proposed types of light fittings, their orientation and location. Lighting to be designed and installed in accordance with the requirements of AS4282 Control of the Obtrusive Effects of Outdoor Lighting.



Avoid any glare from light source which might disturb neighbours visual amenity

Recommendations:

1. Use low-glare luminaire with glare shield.
2. Introduce dimming control system to reduce intensity of light.

• Illumination Levels Strategy

During the use of space for learning and school activities where might occur in the early morning or late evening, we see that Multipurpose Hall Forecourt, Learning Node and Central Sport Court are areas that will require higher level of illumination for functional lighting and safety. Naturally, high lit area will stimulate the use of space and the low lit areas will discourage the use of space.

It is a suggestion that the lighting levels shall progressively step down from the Forecourt towards the Harbour View edge to allow adaptation to take place and enhance view out over the harbour whilst minimising lighting impact on the harbour skyline & neighbour over looking the roof terrace. See **Figure 2.1**.

• Lighting Strategy to Minimise Adverse Impacts of Lights

- Luminaires should be positioned and directed to illuminate objects and areas as required for specific applications.
- Luminaires should only be turned on when required to avoid unnecessary light spill and shall be dimmed to reduce intensity of light when full illuminance is not required.
- Masking and shrouding techniques are to be used where required to minimise stray light into the sky including baffles and glare shields. Lens selection should also be considered when selecting luminaries.
- Where possible, luminaires are to be full cut off fittings.
- Theatre mask exit signage (a green running man on black background) shall be used throughout the roof terrace as low light area to minimize excessive illuminance.
- Avoid overhead flood-lit emergency light. Recommend low-level emergency lighting.
- Light source shall be concealed to avoid discomfort glare.

Figure 2.1 Diagrammatic image of lighting condition

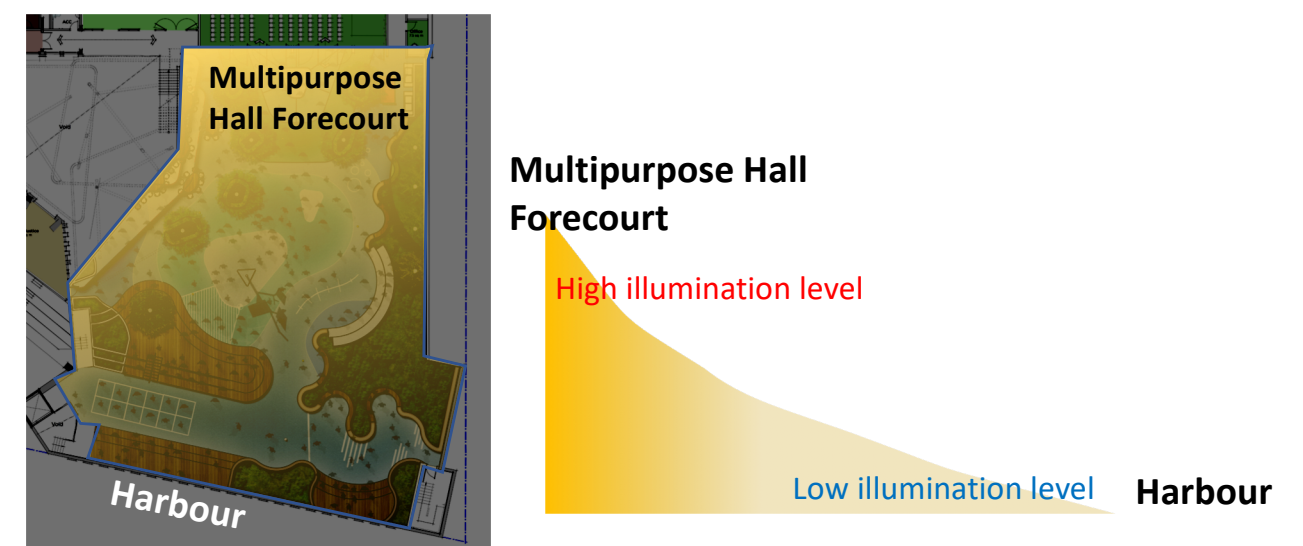
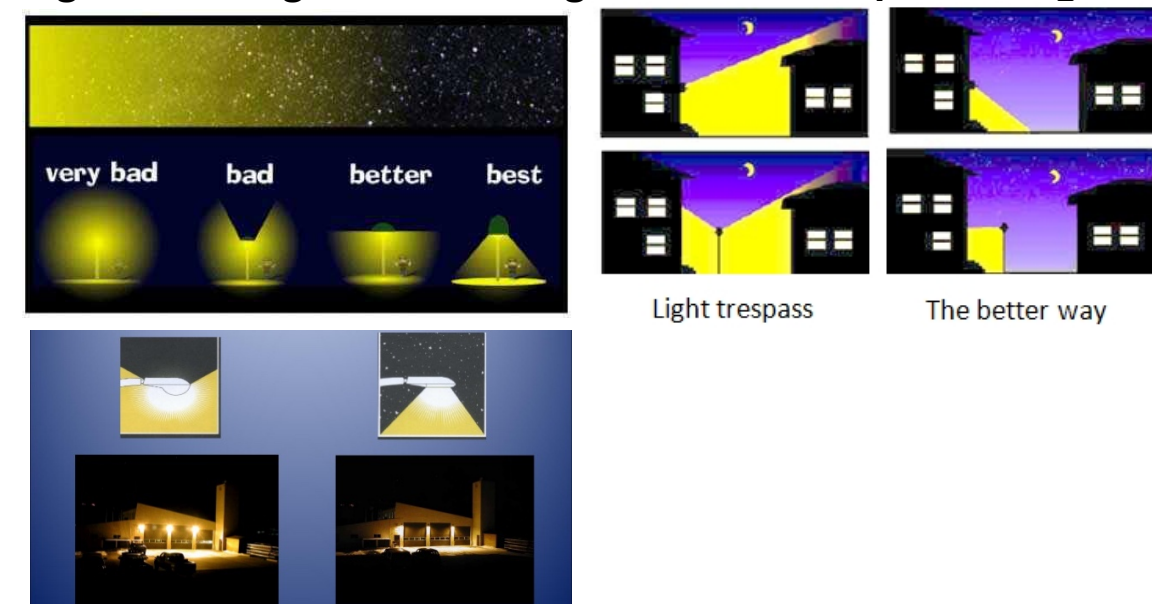


Figure 3.1 Diagrammatic image of adverse impacts of lights



3. POLICY CONEXT – OBTRUSIVE OUTDOOR LIGHTING CONTROL

The policy context relevant to the assessment of obtrusive light is summarised in this section.

1. AUSTRALIAN STANDARD

1. Australian Standard AS4282 – 1997: Control of the obtrusive effects of outdoor lighting.
2. We have classified the area type in accordance with AS 4282 - 1997 as at boundary of commercial and residential residential areas. (See **Table 2-1**)
3. According to Clause 2.6 from AS 4282-1997, effects on residents generally involve a perceived change in amenity arising from the illumination from Spill Light being obtrusive and the direct view of bright luminaires from normal viewing directions causing annoyance, distraction or even discomfort. The tolerable levels of each of these light technical parameters will be influenced by the ambient lighting existing in that environment. This will be determined largely by the degree and type of the development of the area.
4. AS 4282 applies to lighting installations operating from dusk to an 11.00pm curfew and within curfew hours from 11pm to 6.00am unless specified otherwise by Council.

2. NORH SYDNEY DEVELOPMENT CONTROL PLAN

1. According to clause 1.3.5 – Visual Impact – Access, the objective of Environmental Criteria is to minimize adverse visual effects as viewed from the harbor.

- All the proposed illumination levels shall be detailed designed to comply with the National Construction Code, local council lighting requirements, and relevant Australian Standards.
- The lighting control shall satisfy BCA Section J6 requirements.
- The lighting design shall provide the visual conditions required for the task with minimal energy usage and without excessive maintenance.

TABLE 2.1
RECOMMENDED MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS
FOR THE CONTROL OF OBTRUSIVE LIGHT
(See Clause 2.7)

1	2	3	4	5
Light technical parameter	Application or calculation conditions (see also Figure 2.1 and Section 5)	Recommended maximum values		
		In commercial areas or at boundary of commercial and residential areas*	Residential areas	
			Light surrounds†	Dark surrounds‡
Illuminance in vertical plane (E _v)	<i>Pre-curfew:</i> Limits apply at relevant boundaries of nearby residential properties, in a vertical plane parallel to the relevant boundary, to a height commensurate with the height of the potentially affected dwellings. Values given are for the direct component of illuminance	25 lx	10 lx	10 lx
	<i>Curfewed hours:</i> Limits apply in the plane of the windows of habitable rooms of dwellings on nearby residential properties. In the absence of development (i.e. vacant allotment), the limits apply on the potentially affected property, in a vertical plane parallel to the relevant boundary, at the minimum setback permitted for a dwelling, to a height commensurate with land use zoning provisions. Values given are for the direct component of illuminance	4 lx	2 lx	1 lx
Luminous intensity emitted by luminaires (I)	<i>Pre-curfew:</i> Limits apply to each luminaire (irrespective of the number on a head frame) in the principal plane, for all angles at and above the control direction, when aimed in accordance with the installation design	Limits as determined from Table 2.2. Alternatively, the limits and method of assessment associated with curfewed hours may be applied, at the discretion of the designer (see Clauses 2.7.1 and 2.7.2)		
	<i>Curfewed hours:</i> Limits apply in directions where views of bright surfaces of luminaires are likely to be troublesome to residents, from positions where such views are likely to be maintained, i.e. not where momentary or short-term viewing is involved	2 500 cd	1 000 cd	500 cd
Threshold increment (T)	Limits apply at all times where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and viewing directions in the path of travel	20% based on adaptation luminance ($\bar{L}$) of 10 cd/m ²	20% based on adaptation luminance ($\bar{L}$) of 1 cd/m ²	20% based on adaptation luminance ($\bar{L}$) of 0.1 cd/m ²

* Applies to residential accommodation in commercial areas or at the boundary between commercial and residential areas. The term 'commercial' is used as a generic description for zoning which provides for urban uses other than residential.

† Where the affected property abuts roads that are lit to Category V5 or higher in accordance with AS/NZS 1158.1.1.

‡ Where the affected property abuts roads that are lit to Category B1 or lower in accordance with AS 1158.1, or where there is no lighting.

4. LIGHTING DESIGN

LIGHTING CONCEPT

- Lighting Diagram (Functional & Creative Lighting)



1



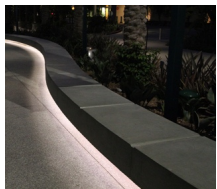
Recessed low glare downlight along the awning provide gentle illuminance on benches and floor

2



Lighting integrated into handrails illuminates the steps and stairs.

3



Low-level lights to steps and planter creates soft glow space, and sense of safety and maintain unobstructed views along the edge of the building

4



Low-level lights to illuminate floor and play area

5



Provide vertical illumination without using a light pole by Lighting off the trees to create gentle dappled light and moonlight shadow on the ground.

6



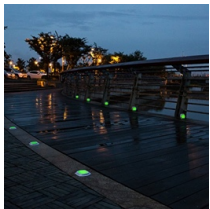
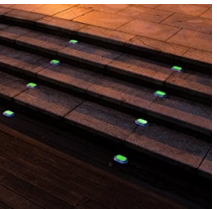
Integrated puck light to landscape element as a downlight for general lighting during the school hours in the evening.

7



Integrated lighting into low level of the seating bench will provide a gentle lighting to the ground at low level

8



Soft glow marker light to indicate the change of level

LIGHTING LOCATION DIAGRAM

- Sections – Skyline Amphitheatre & Harbour Garden

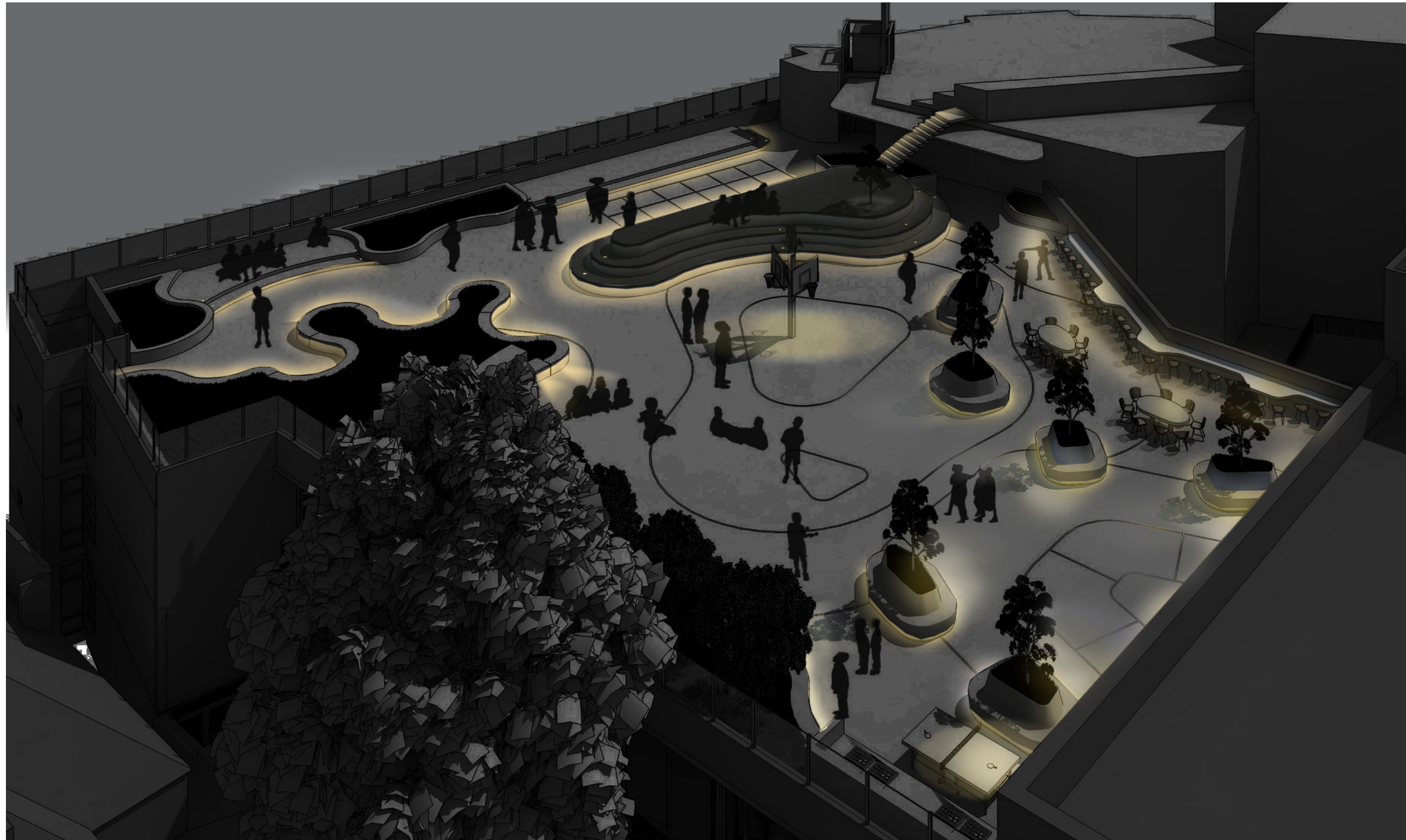


LIGHTING LOCATION DIAGRAM

- Sections – Forecourt & Central Sport Court



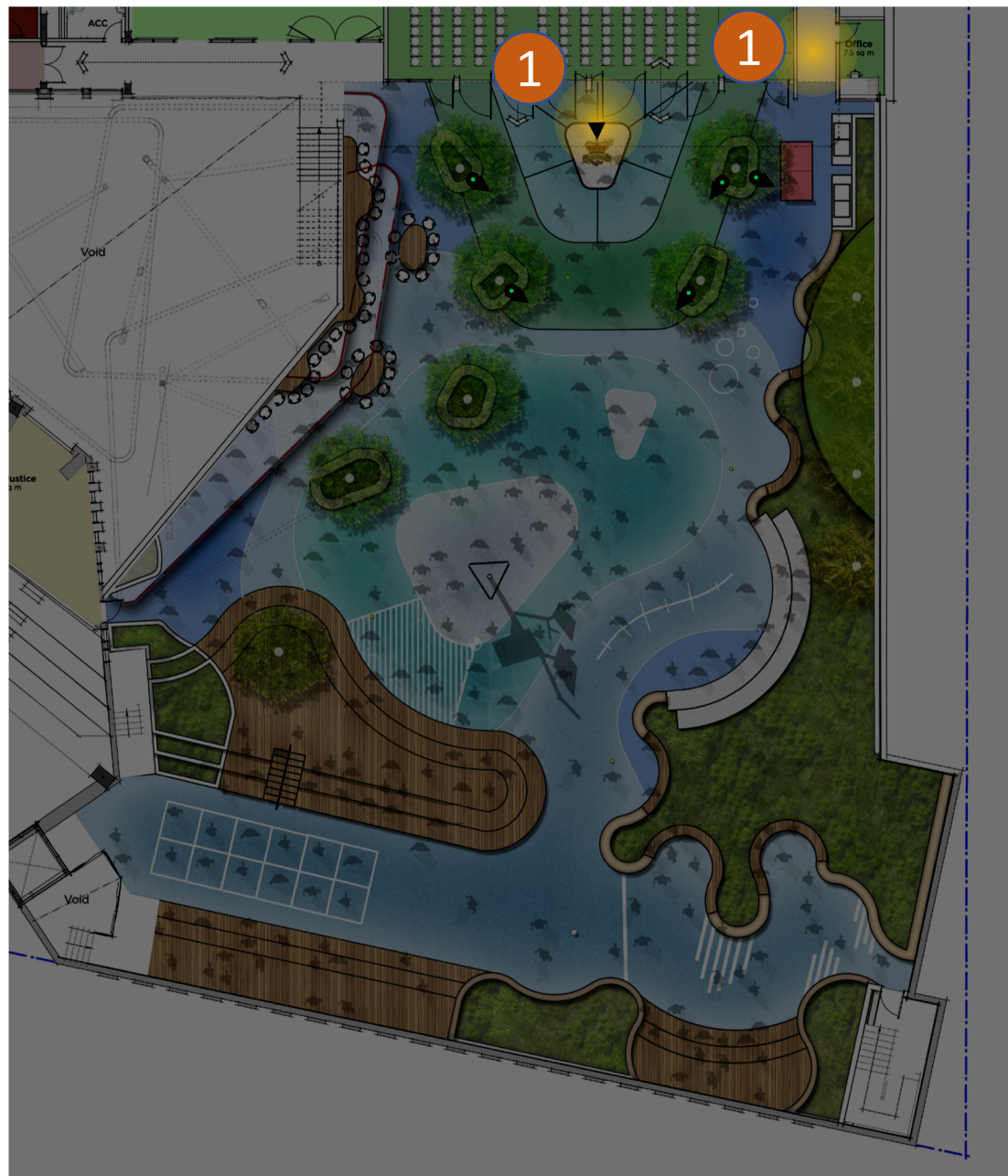
PHOTOMONTAGE – LIGHTING CONCEPT



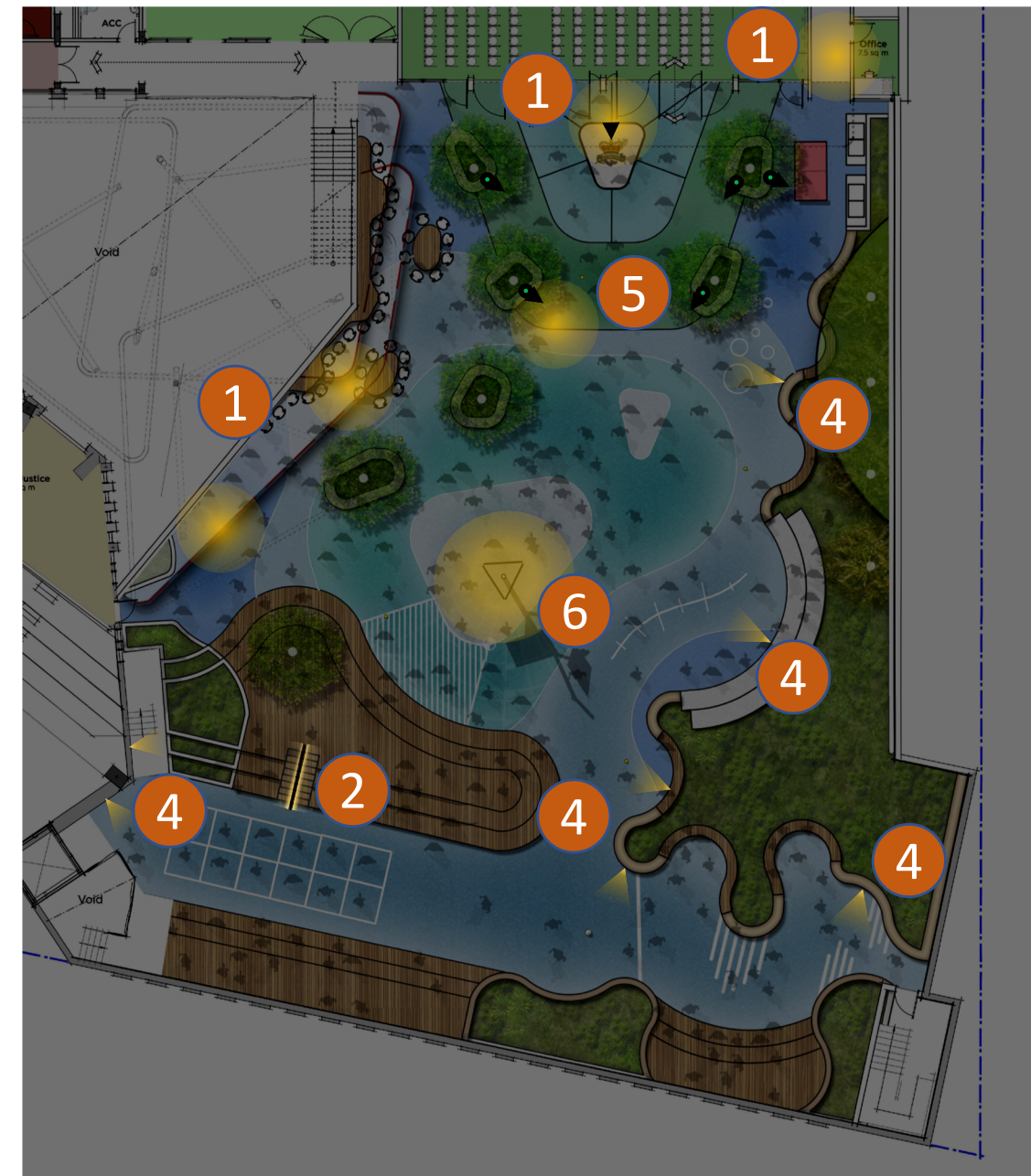
LIGHTING SCENE

- Proposed Scene – Security / Curfew Hours

Minimal lighting (in addition to exit signage) will generally be employed on typical night (after school's operation time) to be able to traverse the space safely (e.g. security staff). This lighting shall be on time clock and motion sensors at very low lighting levels.



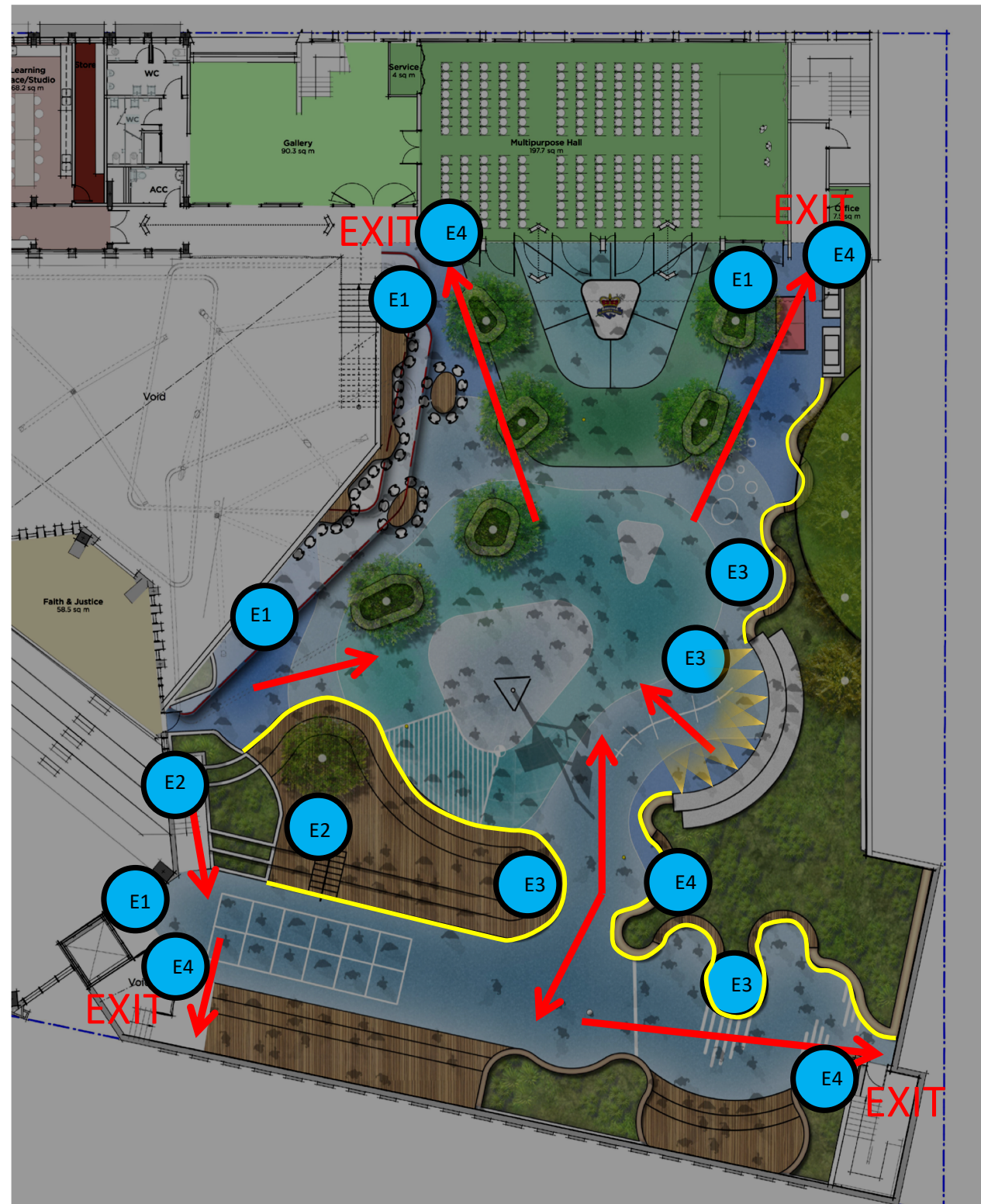
- Typical Security scene



- Other lights are on when a motion sensor detects a movement on roof terrace.

EMERGENCY & EXIT LIGHTING

- Diagram



E1



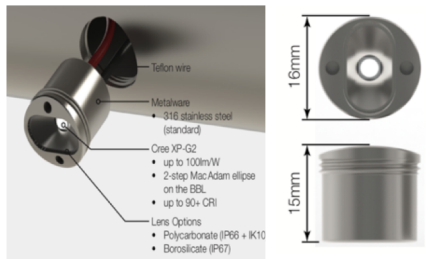
Recessed weatherproof
emergency light in the soffit

E2



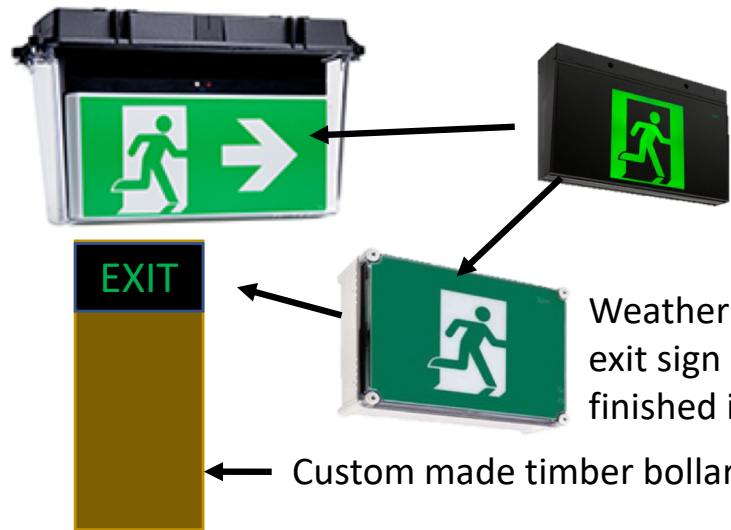
Recessed handrail lights
with remote emergency
battery pack

E3



LED neon or LED Puck
light at low level as
way-finding light
along paths to
emergency exits.

E4



Exit signage above the door

Use theatre mask
exit sign on
Weatherproof exit
light box

Weatherproof
exit sign shall be
finished in black

Custom made timber bollard or similar

5. SUMMARY

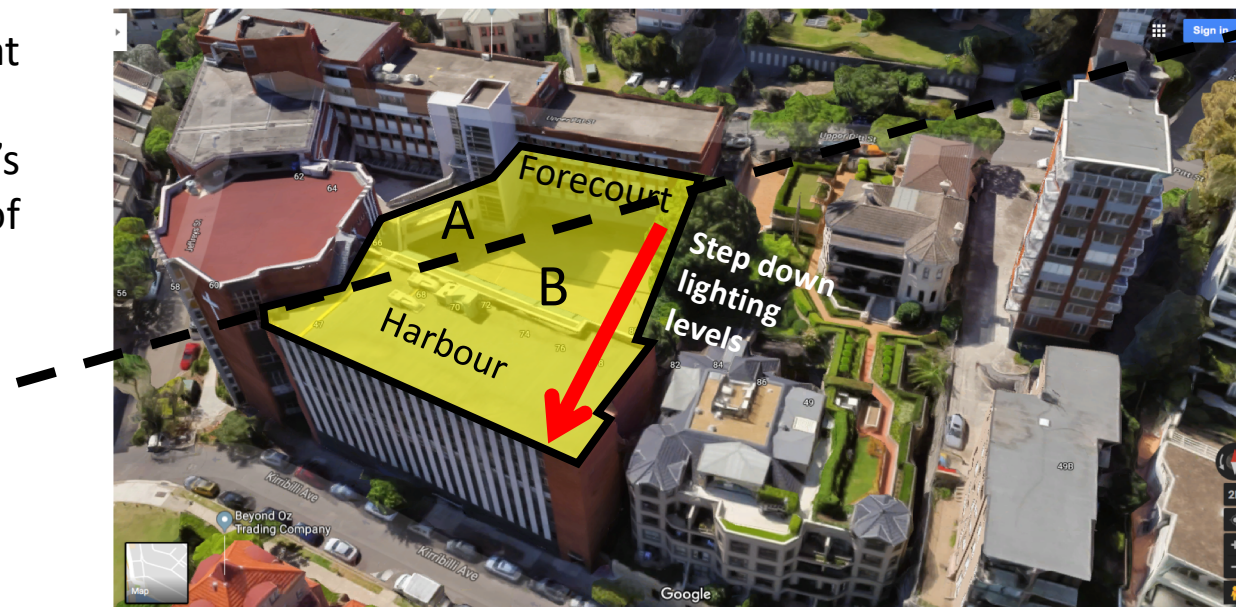
There are many ways in which the roof terrace can be illuminated to provide sufficient light over the space during the school's operation time ; however, as the site is located near the harbour and among residential area these will require special care and consideration given to the following matters:

- Light spill to neighbouring properties
- Light pollution (glow sky)
- Discomfort glare
- The visibility of lighting from harbour view

From lighting strategy and analysis on page 4 &5, a desktop review of the Roof Terrace (Development Site) has been undertaken to identify potential light sensitivity receptor and the sources of publicly available information such as Google Street View and Arial Photography were reviewed for assessment as well as a site walkover has been undertaken to inform and ground truth the baseline lighting conditions.

Careful thoughts have been put together to create lighting concept in order to avoid unnecessary light spill and to serve main purposes of lighting design for Roof Terrace. Design methodology is to set the hierarchy of lighting levels which shall progressively step down from the Forecourt towards the Harbour View edge to allow adaptation to take place and enhance view out over the harbour whilst minimising lighting impact on the harbour skyline & neighbour over looking the roof terrace. The low level lighting is a main element introduced to illuminate the space as it provides subtle light and create glare free environment. Overhead lighting with low glare luminaire will be used inside zone A where is out of neighbour's view. See below diagram.

In summary, good lighting design that embraces light and shade will enhance aesthetic of roof terrace during school's operation and minimise adverse impacts of light on neighbours and environment.



A line was drawn to divide zone A and B