Blackwattle Bay

State Significant Precinct

Attachment 37:
Lighting Strategy

June 2021

NSW GOVERNMENT

BLACKWATTLE BAY LIGHTING STRATEGY

A report to support the Blackwattle Bay State Significant Precinct Proposal

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SLR Consulting Australia Pty Ltd

Contents

List of Figures

List of Tables

Executive Summary

Objectives

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Infrastructure NSW to prepare a Light Pollution Assessment for the proposed Blackwattle Bay development (formerly known as Bays Market District). The report will be submitted as part of the State Significant Precinct Study for the proposed renewal of the precinct.

The purpose of this study is as follows:

- Review policies and guidelines relevant to the Blackwattle Bay and any future planned development within the precinct
- Identify all future and existing sensitive receivers that may be impacted upon
- Carry out a qualitative (desktop) light impact assessment of the proposed precinct plan

Methodology

A baseline survey was conducted on the 13 June 2019 to establish current night-time lighting levels. SLR has analysed the precinct plan and identified areas that are likely to have lighting added to enhance the safety and use of a part of the precinct.

This analysis is based on our engineering expertise from past projects. It takes into account the current illuminance of an area, the possible future use of an area, the distances and terrain in the surrounding area and any shielding elements that may be present. The following drawings, cad model and information were used:

- Drawing SK-81 dated the 13th December 2020
- Precinct Plan 3D model
- Aerial and site inspection photos

Findings

The following conclusions can be deducted from the qualitative assessment:

- Most areas have reasonable shielding due to factors ranging from the terrain of the surrounding area to existing noise walls (Refer Section 5).
- Without any mitigation some areas along Pyrmont Bridge Road may experience light spill on residential properties to the south and southeast.
- At times there may be an increase in light from public events. These should be assessed at the time of the event to determine if additional mitigation should be employed.

- SLR has made assumptions to determine the lighting sub-category for the various analysed locations. The driving factor behind most of these decisions was the desire to enhance the prestige of the area.

Conclusions

A high-level qualitative assessment has been undertaken to determine the required lighting for the various spaces and assess the impact of the proposed precinct renewal on the surrounding area.

SLR has provided a number of recommendations to manage potential light spill which require consideration during the detailed design phase of the proposal.

Recommendations

All lights in the proposed precinct must be designed, installed and operated to comply with All lights in the proposed precinct must be designed, installed and operated to comply with AS1158 series and AS4282.

Recommendations have been provided to minimise any adverse effect of the light installation for the proposed precinct. These recommendations (at times) may need to be weighed against the objectives of the required lighting for the area. Recommendations include:

- Direct lights downward as much as possible
- Use luminaires that are aimed to minimise light spill, e.g. full cut off luminaires where no light is emitted above the horizontal plane
- Do not waste energy and increase light pollution by over-lighting
- Keep glare to a minimum by keeping the main beam angle less than 70°
- Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit
- Direct the precinct lighting away from the sensitive receiver
- Where possible position precinct lighting as far away from precinct boundaries as practicable

As more detailed lighting design plans are generated, SLR recommends quantitative modelling to determine the extent of any light spill, specify appropriate mitigation measures and confirm compliance with AS 4282-2019.

1. Introduction

Blackwattle Bay presents a significant opportunity for urban renewal across 8.4 hectares of predominantly government owned land less than 1km from the Sydney CBD. NSW Government is investigating the delivery of a Metro Station in Pyrmont and has recognised the potential to transform the Pyrmont Peninsula with a new 20-year vision and planning framework through the Pyrmont Peninsula Place Strategy.

In 2015 NSW Government recognised The Bays Precinct as one of the highest potential urban transformation sites in Australia with the release of The Bays Precinct, Sydney Transformation Plan. Following this, the Minister for Planning recognised the renewal of Blackwattle Bay and the broader Bays Precinct as a matter of State planning significance and to be investigated for rezoning through the State Significant Precinct (SSP) process. Study Requirements for the Blackwattle Bay investigation area (formerly known as 'Bays Market District') were issued by the Minister on 28 April 2017.

A critical part of Blackwattle Bay's revitalisation and vision has been NSW Government's decision to relocate the Sydney Fish Market from its existing location on Bank Street to the head of Blackwattle Bay. This was sought through a State Significant Development Application (SSDA) process and approved in June 2020. The new Sydney Fish Market was designed alongside the baseline Blackwattle Bay studies to ensure that key aspects of the project are consistent with the vision and objectives for Blackwattle Bay.

The outcome of the State Significant Precinct process will be a new planning framework that will enable further development applications for the renewal of the Precinct, connected to the harbour and centred around a rejuvenated Sydney Fish Market. The framework will also provide for new public open spaces including a continuous waterfront promenade, community facilities, and other compatible uses.

This light pollution report has been prepared by SLR Consulting Pty Ltd and on behalf of Infrastructure NSW, to form part of the Blackwattle Bay State Significant Precinct Study (SSP Study). The SSP Study seeks a rezoning for new planning controls for Blackwattle Bay, located on the south-western side of Pyrmont.

1.1. Purpose

The purpose of this report is to:

- review policies and guidelines relevant to the 'Blackwattle Bay' and any future planned development within the precinct
- characterise the existing lighting environment via baseline measurements at representative locations within the study area
- identify all future and existing sensitive receivers that may be impacted upon
- identify key lighting issues for the proposed precinct plan
- recommend mitigation to reduce potential light spill where required
- address Study Requirements for light pollution

1.2. ‘Blackwattle Bay’ State Significant Precinct

The Blackwattle Bay SSP Investigation Area (‘Study Area’) encompasses the land and water area, known as Blackwattle Bay, between Bank Street and the Glebe foreshore shown in Figure 1. The land is located within the City of Sydney local government area (LGA).

The land within the Study Area is approximately 10.4 hectares (ha) in size. It largely government owned land containing the Sydney Fish Market (wholesale and retail), recreation and boating operations and facilities. There are three privately owned sites including a concrete batching plant operated by Hymix, wholesaler of seafood Poulos Brothers and Celestino. The Blackwattle Bay land area wraps around the southern and eastern edges of Blackwattle Bay and is bounded by Bridge Road to the south and Bank Street to the east. The Western Distributor road / Anzac Bridge is located adjacent to the eastern boundary before traversing over the northern section of the site. The water area of Blackwattle Bay is approximately 21 hectares.

Figure 1 Location Plan – Source: Infrastructure NSW

The location of the existing and proposed Sydney Fish Market site within the ‘Blackwattle Bay’ study area is shown in Figure 2.

Figure 2 Blackwattle Bay - Source: FJMT

Principles for a future Blackwattle Bay were formed through extensive community consultation in August 2017. These were further developed in 2019, together with a vision for the precinct. Both are provided below. These have guided the development of the Precinct Plan and will continue to guide future development proposals within the Study Area.

i. Vision

"Blackwattle Bay offers an extraordinary opportunity to reconnect the harbour, its surrounding neighbourhoods and the city; to showcase Sydney's living culture and stories of Country; to build an inclusive and iconic waterfront destination that celebrates innovation, diversity and community."

1.3. Principles and Vision for 'Blackwattle Bay'

1. Improve access to Blackwattle Bay, the foreshore and water activities for all users
2. Minimise additional shadowing to Wentworth Park and Glebe Foreshore (in mid-winter) and create new places with comfortable conditions for people to enjoy.
3. Pursue leading edge sustainability outcomes including climate change resilience, improved water quality and restoration of natural ecosystems.

4. Prioritise movement by walking, cycling and public transport.
5. Balance diverse traffic movement and parking needs for all users.
6. Link the Blackwattle Bay precinct to the City, Glebe Island and White Bay and other surrounding communities and attractors.
7. Mandate Design Excellence in the public and private domain.
8. Integrate housing, employment and mixed uses to create a vibrant, walkable, mixed use precinct on the city's edge.
9. Maintain and enhance water uses and activities.
10. Allow for co-existence and evolution of land uses over time.
11. A place for everyone that is inviting, unique in character, socially inclusive and affordable.
12. Expand the range of recreational, community and cultural facilities.
13. Plan for the future community's education, health, social and cultural needs.
14. Deliver development that is economically, socially, culturally and environmentally viable.
15. Embed and interpret the morphology, heritage and culture of the site to create an authentic and site responsive place.
16. Foster social and cultural understanding and respect to heal and grow relationships.

1.4. Study Requirements

On 28 April 2017 the Minister issued Study Requirements for the Precinct. Of relevance to this study are the following requirements:

22. Noise and Pollution

22.2 Consider and assess potential pollution impacts from the proposed rezoning including, but not limited to, water, air, noise and light pollution.

22.5. Identify and map current and proposed future sensitive receptors (eg residential uses, schools, child care centres and public open spaces).

22.6. Identify current and likely future noise, vibration and pollution affecting the precinct, including sources and nature and impact.

22.10. Outline the recommended measures relating to noise, vibration and pollution to minimise the nuisance and harm to people or property within / adjoining the precinct.

Requirement	Location
22.5	Sensitive receivers are identified in for each area in Sections 5.2.1.2, 5.2.2.2, 5.2.3.2, 5.2.4.2 and 5.2.5.2. pp 22-27
22.10	Recommendations are outlined in Section 6.

	p 28

2. Site Analysis

The Blackwattle Bay Study Area includes Blackwattle Bay and approximately 10.4 hectares (ha) of primarily government owned land containing the Sydney Fish Market (wholesale and retail), cruise and boating operations and facilities, and three privately owned sites.

The land side component of the Study Area is located within the City of Sydney (CoS) Local Government Area. The Western Distributor / Anzac Bridge is located adjacent to the eastern boundary before traversing over the northern section of the site.

The ambition for the precinct is to create a new world class district matching international benchmarks in terms of design, profile and quality of experience. The urban renewal of Blackwattle Bay will draw on the activity and spirit of the new Sydney Fish Market (to be located at the head of Blackwattle Bay) and will provide housing opportunities suited to living on the edge of the CBD, commercial and retail facilities, public open space, community and recreational facilities and marine facilities.

3. Regulatory Context

3.1. Lighting Terminology

A description of the common terminology used for the lighting study, taken from *AS 4282-2019: Control of the Obtrusive Effects of Outdoor Lighting* is shown in Table 1.

Table 1 Lighting Terminology (Consistent with AS 4282-2019)

1	Obtrusive light	2 Spill light which, because of quantitative, directional or spectral attributes in a given context, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information, eg traffic lights.
3	Spill light	4 Light emitted by a lighting installation which falls outside the boundaries of the property on which the installation is sited.
5	Residential property	6 Land upon which a dwelling exists or may be developed, e.g.: land zoned for residential development.
7	Dwelling	8 A building in which people normally reside, especially during the hours of darkness, e.g. house, hotel, motel, hospital.
9	Illuminance	10 The luminous flux arriving at a surface divided by the area of the illuminated surface. Unit: lux(lx); 1 lx = 1 lm/m^2
11	Luminous intensity	12 The concentration of luminous flux emitted in a specific direction. The SI unit of luminous intensity is the candela (cd).
13	Luminous flux	14 The measure of the quantity of light. For a lamp or luminaire it normally refers to the total light emitted irrespective of the directions in which it is distributed. Unit: lumen (lm).
15	Luminaire	16 Apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except for the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary circuit auxiliaries together with the means for connecting them to the electrical supply.
17	Glare	18 Condition of vision in which there is a discomfort or a reduction in the ability to see, or both, caused by an unsuitable distribution or range of luminance, or to extreme contrast in the field of vision (a) Disability Glare – Glare that impairs the visibility of objects without necessarily causing discomfort. (b) Discomfort Glare – Glare that causes discomfort without necessarily impairing the visibility of objects.

3.2. Light Spill Risks

AS 4282-2019 begins by looking at the effects of outdoor lighting on the environment in which it is installed. It acknowledges that in some cases the objective of the lighting may be incompatible with the containment of the light in the intended area.

The effects of light spill are influenced by the following factors:

- The use of the area in close proximity to the proposed development
- The topography of the area. Light spill is more likely to be perceived as obtrusive if the lighting installation is located above the observer. Lighting installations are usually directed towards the ground and an observer could hence have a direct view of the luminaire.
- The surrounding physical features. Trees, buildings, fences and vegetation can be effective in restricting light spill beyond the site boundaries.
- Pre-existing lighting in the area. Light from a particular light source is seen as less obtrusive if it is located in, or perceived in, an area where the lighting levels are already high, e.g. along roads and near built up areas.
- The zoning of the area. A residential area is seen as more sensitive compared to commercial areas where high lighting levels are seen as more acceptable.
- Time of use. Clearly light will be seen as being more obtrusive during night time. This is generally considered to be between 11:00 pm and 6:00 am.

The following four areas should be taken into account:

- Impacts on residents.
- Impacts on road users (eg motorists, cyclists, pedestrians).
- Impacts on transport signalling systems (eg air, rail, water).
- Impacts on areas where astronomical observations are made.

Typical illuminance levels for a variety of circumstances are given in Table 2 for comparison.

Table 2 Typical Illuminance Levels for Various Scenarios

Lighting Scenario		Horizontal Illuminance (lux)	
19	Moonless overcast night	20	0.0001
21	Quarter Moon	22	0.01
23	Full Moon	24	0.1
25	Twilight	26	10
27	Indoor office	28	300
29	Overcast day	30	1,000
31	Indirect sunlight clear day	32	10,000-20,000
33	Direct sunlight	34	100,000-130,000

3.3. Light Spill Requirements

The maximum recommended values of light technical parameters for the control of obtrusive lights are given in Table 3. These number come from Table 3.2 of AS 4282:2019. The zones are defined in table 3.1 of the standard. Table 3.3 of the standard defines the maximum luminous intensities applied to each luminaire for the zones.

Table 3 Recommended Maximum Values of Light Technical Parameters (AS 4282-2019)

Zones	Vertical Illuminance levels (E_v) lx		Threshold Increment (TI)		Sky Glow
	Non-Curfew	Curfew	%	Default Adaptation Level	Upward Light Ratio
A0	Note 1	0	N/A	N/A	0
A1	2	0.1	N/A	N/A	0
A2	5	1	20%	0.2	.01
A3	10	2	20%	1	.02
A4	25	5	20%	5	0.03
TV	See Table 3.4	N/A	20%	10	0.08
V	N/A	4	Note 2	Note 2	Note 2
R1	N/A	1	20%	0.1	Note 3
R2	N/A	2	20%	0.1	Note 3
R3	N/A	4	20%	0.1	Note 3
RX	N/A	4	20%	5	Note 4

1. For A0, E_v shall be as close to zero as practicable without impacting safety considerations.
2. Refer to AS 1158.1.1
3. Refer to AS 1158.1.1
4. Refer to AS 1158.1.1

The vertical illuminance limits for curfew hours apply in the plane of the windows of habitable rooms or dwellings on nearby residential properties. The vertical illuminance criteria for pre-curfew hours apply at the boundary of nearby residential properties in a vertical plane parallel to the boundary.

Values given are for the direct component of illuminance, ie no reflected light is taken into account.

- Limits for luminous intensity for curfew hours 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; and
- Limits for luminous intensity for pre-curfew hours apply to each luminaire in the principal plane, for all angles at and above the control direction.

As can be seen in Table 2, the applicable limits for adverse spill light depend on the time of operation for the lighting installation. Operation taking place during pre-curfew hours is less likely to give rise to complaints from adjacent residential properties, while a more restrictive limit would be applicable to curfew hours.

3.4. Baseline Requirements

Based off standards outlined in AS/NZS 1158.3.1-2005 Lighting for Roads and Public Spaces the required minimum illuminance values for relevant outdoor spaces of the sites are outlined in

Table 4. The City of Sydney Lights design code also refers to this standard.

Table 4 Minimum Lighting Values for Different Outdoor Areas (AS/NZS 1158.3.1 - 2005)

Location	Assessed Category	Average Horizontal Illuminance for Site (lux)
Pedestrian pathway	P6-P7	14-21
Outdoor shopping precinct	P6-P7	14-21
Open arcades	P6-P7	14-21
Transport terminals and interchanges	P6-P7	14-21
Steps, stairways and ramps	P9	14-21

3.5. Sydney Lights – Public Domain Design Code

The main purpose of the Sydney lights document is to outline Sydney City's approach to public lighting through the selection of lights and technical/performance requirements to guide lighting works within the City of Sydney Local Government Area.

The key aim is to develop a coordinated approach to the lighting of the City's public domain that contributes to a safe, active and sustainable City, reinforces a sense of place and encourages creative and artistic expression.

The Code applies to exterior lighting of all streets, public spaces and public areas within the City of Sydney Local Government Area (LGA) that are under the City's control and therefore applies to Blackwattle Bay.

Blackwattle Bay falls into the Harbour Foreshore Walk which comes under the Creative Lighting Masterplan. The walk acts as an important linking element between the existing and growing harbour side features. The lighting strategy to the Foreshore walk should create an overall and consistent experience. Lighting should allow for experiencing the harbour at night-time in a safe and guided way, whilst allowing view across and to the water.

4. Methodology

To assess the future light spill potential of the precinct SLR has analysed the precinct plan and identified areas that are likely to have lighting added to enhance the safety and use of a part of the precinct. This analysis is based on our engineering expertise from past projects. It takes into account the current illuminance of an area, the possible future use of an area, the distances and terrain in the surrounding area and any shielding elements that may be present. The following drawings, cad model and information were used:

- Drawing SK-81 dated the 13th December 2020
- Precinct Plan 3D model
- Aerial and site inspection photos

5. Assessment

5.1. Proposed Development

Figure 4 and Figure 5 show the precinct plan for the study area. SLR has noted the following features from the provided plan and 3D model:

- The iNSW site contains three low scale buildings. To the south east of this is an open space with a new marina under the Anzac Bridge
- Continuing to the south east the buildings increase in scale with four buildings of similar height over lower podium structures. There is also a foreshore area and public open space between the buildings
- Moving southeast again to the current Fish Market site there are a three high-rise towers over podiums along with additional other eight storey buildings. Within this area is a large waterfront promenade with public open spaces. There is also a four storey building in the southwest section of this area
- The Wharf site at the south end of the bay will be redeveloped to accommodate the new Sydney Fish Market which will be approximately three storeys in height. A significant waterfront promenade will connect the current and new fish market sites

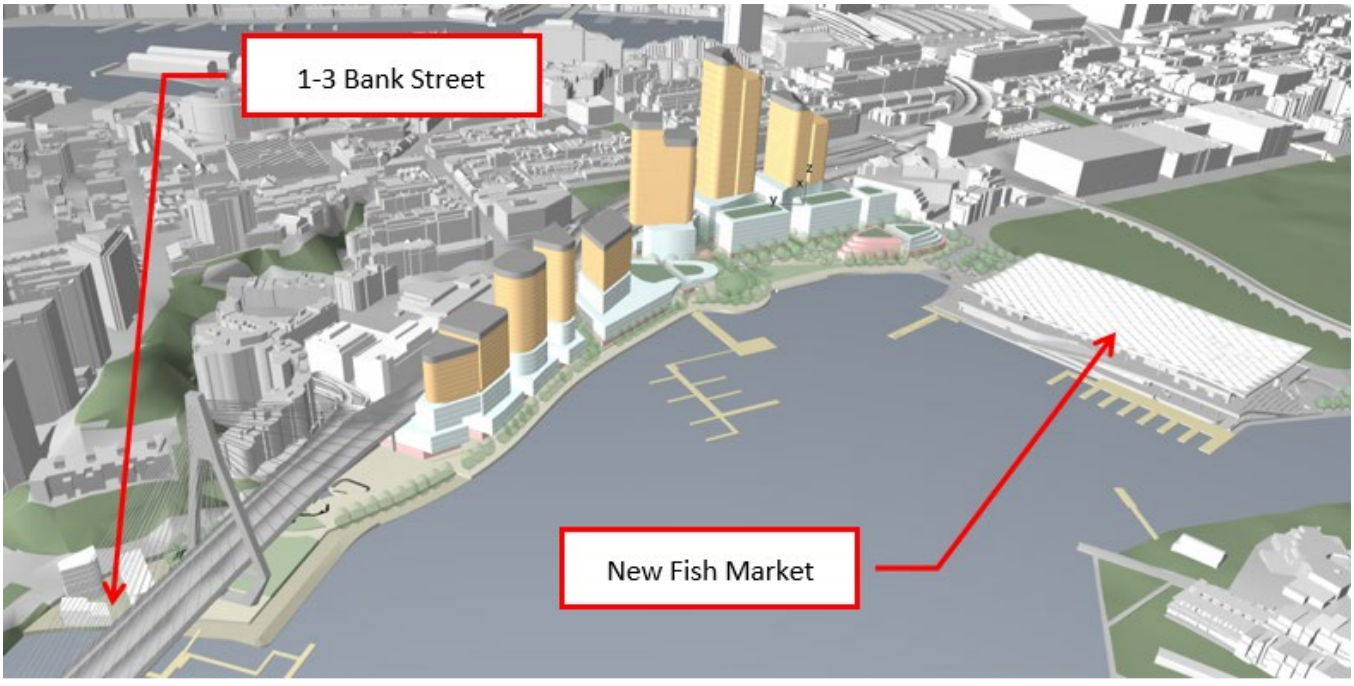

Figure 3 3D Precinct Plan – Source: FJMT

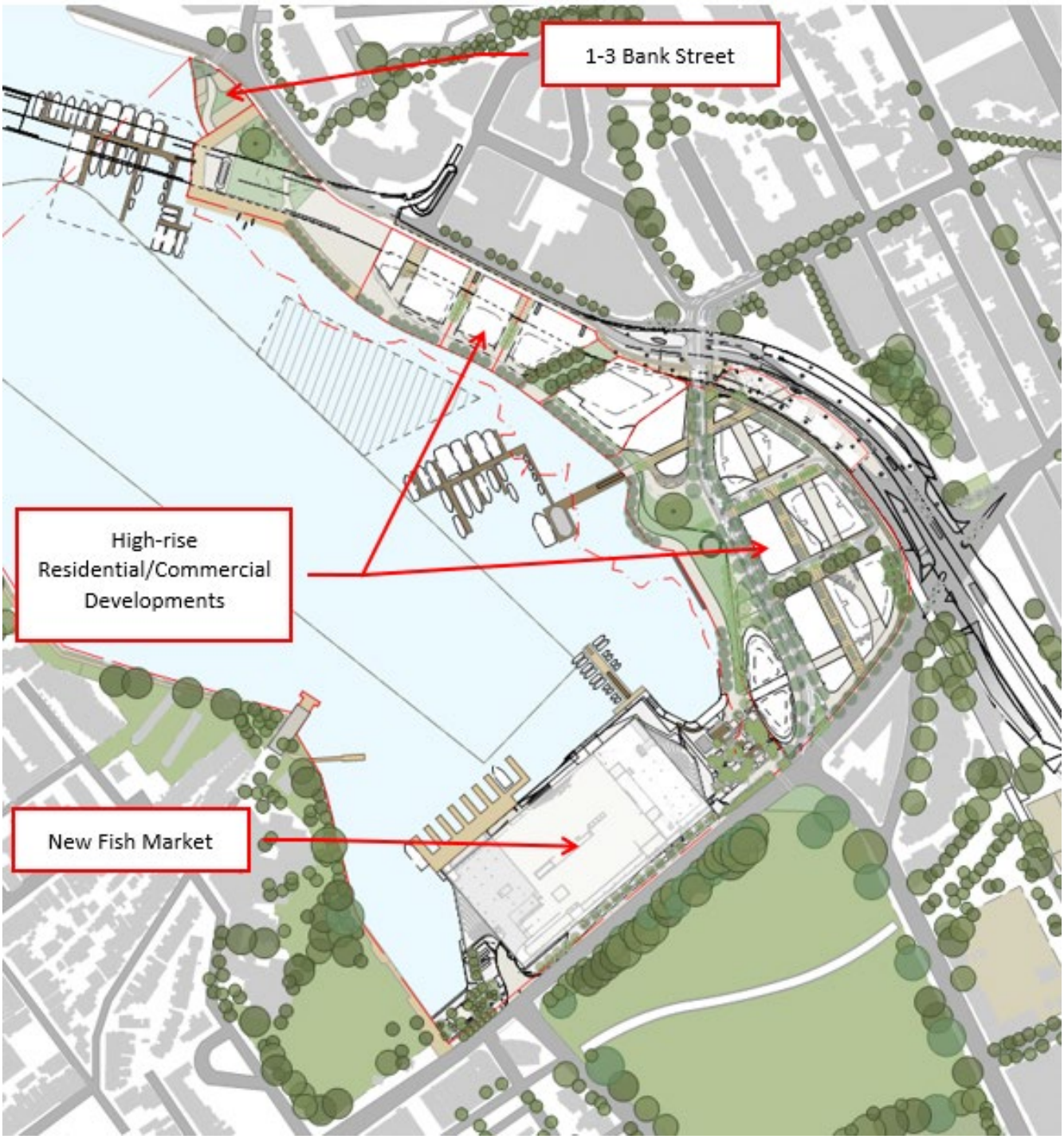

Figure 4 Precinct Plan

5.2. Light Spill Assessment

5.2.1 Area around 1-3 and 5 Bank Street

5.2.1.1 Requirements

From AS1158.3.1:2005 the site can be categorised into a few different types: pathways, pathways along roads, stairs and areas for pedestrian use. For the purposes of this report SLR has assumed a 'low' risk of crime due to the likely high number people and public nature of the area and a 'medium' need to enhance the prestige of this part of the overall development. Therefore, the applicable lighting subcategories for this area will be P2 for pathways and cycleways, P7 for activity areas and P9 for any stairs.

These categories determine the lighting parameters for the site as shown in the extracts form AS 1158.3.1 below.

TABLE 2.6

VALUES OF LIGHT TECHNICAL PARAMETERS AND PERMISSIBLE LUMINAIRE TYPES FOR ROADS IN LOCAL AREAS AND FOR PATHWAYS

1	2	3	4	5	6
Lighting subcategory	**Light technical parameters**				**Permissible luminaire type (see Table 2.10)**
	Average horizontal illuminance[a,b] ($\overline{E}_h$) **lux**	**Point horizontal illuminance** [a,b] (E_{Ph}) **lux**	**Illuminance (horizontal) uniformity**[c] **Cat. P** (U_{E2})	**Point vertical illuminance** [a,b] (E_{Pv}) **lux**	
P1	7	2	10	2	Type 4 where part of a road reserve or Types 2, 3, 4 or 6 elsewhere
P2	3.5	0.7	10	0.7	
P3[e]	1.75	0.3	10	0.3[d]	
P4[e]	0.85	0.14	10	N/A	
P5[e]	0.5	0.07	10	N/A	

These are the maintained values and compliance is achieved by being greater than or equal the values in the table. A table of the lighting types is shown in Appendix A although not all types may be suitable for each application.

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 [a,b] ($\overline{E}_h$) **lux**	**Point horizontal illuminance** [a,b] (E_{Ph}) **lux**	**Illuminance (horizontal) uniformity** [c] **Cat. P** (U_{E2})	**Point vertical illuminance** [a,b] (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	

These are the maintained values and compliance is achieved by being greater than or equal the values in the table

TABLE 2.8

VALUES OF LIGHT TECHNICAL PARAMETERS AND PERMISSIBLE LUMINAIRE TYPES FOR CONNECTING ELEMENTS

1	2	3	4	5	6
Lighting subcategory	**Light technical parameters**				**Permissible luminaire type (see Table 2.10)**
	Average horizontal illuminance [a,b,d] ($\overline{E}_h$) **lux**	**Point horizontal illuminance** [a,b] (E_{Ph}) **lux**	**Illuminance (horizontal) uniformity** [c] **Cat. P** (U_{E2})	**Point vertical illuminance** [a,b] (E_{Pv}) **lux**	
P9	Same as for highest lighting subcategory applying to areas that abut the connecting element but, where forming part of a road or pathway, to be not less than subcategory P8 in Table 2.3.				
P10	35	17.5	10	17.5	Types 3, 4, 5 or 6

These are the maintained values and compliance is achieved by being greater than or equal the values in the table.

5.2.1.2 Light Spill

This area around the new buildings will have some additional light particularly around the building entrances. The open spaces will likely have lighting for safety, security and general activities. The stairs will have dedicated lighting and the connecting pathways and foreshore will some lights. Streetlights along Bank Street should be sufficient for the paths along it although there may be additional ones in some areas such as the public open space. The area surrounding this section would most likely fall into Category V requiring any light spill to be below 4 lux

SLR is of the opinion that there is a low risk for light spill onto the surrounding residential buildings in this area.

- The Building at 2 Bowman Street is well screened by the large trees between it and the study area, the new buildings will also help screen any additional light from the open space.
- Buildings on the opposite side of Bank Street such as 1 Distillery Drive will have screening from the embankment as well as being set higher than the study area which will have a positive impact on any light spill assuming a well-designed lighting layout with full cut off luminaires.

The most noticeable lights which could be seen from these surrounding buildings are likely to be those on the Anzac Bridge.

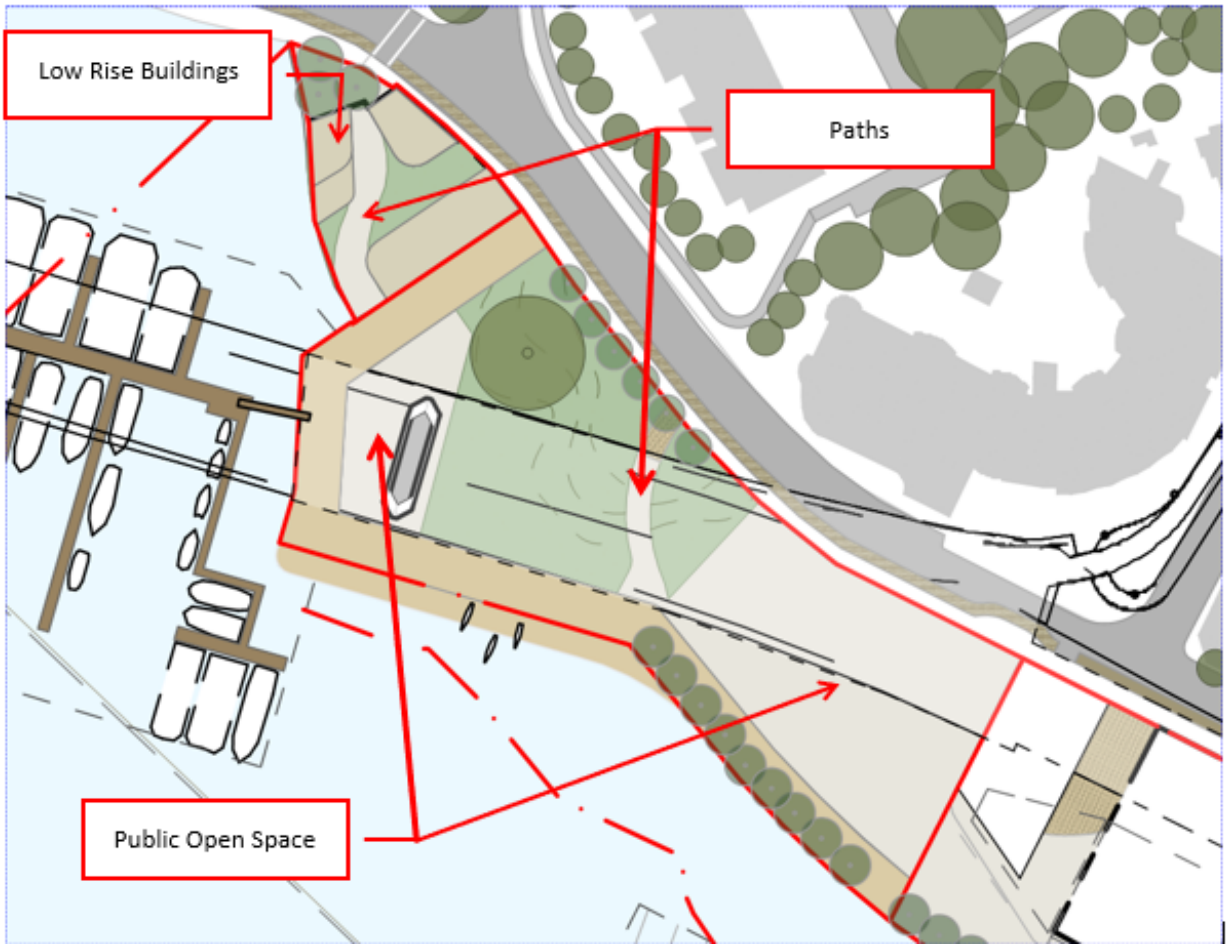

Figure 5 1-3 Bank Street and Bank Street Open Space

5.2.2 Bank Street Buildings

5.2.2.1 Requirements

This part of the precinct has walkways between buildings, pathways and public open space along the foreshore and between the buildings. SLR has assumed a 'low' risk of crime but a 'high' need to enhance the prestige of the foreshore promenade area which will likely have active ground floor uses. Therefore, the applicable lighting subcategories for this area will be P2 for pathways and cycleways, P6 for foreshore strip and P9 for the stairs. Walkways beneath the towers could be classed as 'subways' and would fall under category P10.

5.2.2.2 Light Spill

The buildings in this area are approximately 20 storeys high with undercrofts over the promenade area and podiums underneath. The western side the towers are proposed adjacent to the Western Distributor. Open space leads from the water toward the corner of Bank, Miller and Saunders Streets which extends under the Western Distributor. The western most tower spans across two podiums. The light spill category for these surrounds will be either A4 or V with limits of 5 or 4 lux depending on the use of the building and distance from the precinct.

Lighting along Bank Street is likely to be similar to the current levels although there will be additional lighting around the entrances to the new buildings and stairways. There will be significant lighting on the water facing side for outdoor eating areas and high traffic areas although these could be designed so they don't impact any adjacent residential dwellings. There will be lighting for the paths between the buildings and some form of lighting is anticipated for the green space.

Lighting in the spaces between buildings may be visible from residential buildings along Miller Street but the distance and screening between the areas means any light spill above the requirements is unlikely. Directly opposite this part of the precinct along Bank Street are commercial buildings. The requirements for these buildings are higher than for residential buildings and are unlikely to be exceeded.

Figure 6 Bank Street between Miller Street and Quarry Master Drive

5.2.3 Sydney Fish Market Site

5.2.3.1 Requirements

The current Sydney Fish Market site has two main areas, with buildings on the eastern side and open space on the western side. There are new roads permeating the site and through site links between the buildings. There are also several outdoor seating areas shown. Again, SLR has assumed a 'low' risk of crime and a 'high' need to enhance the prestige of the open space. Therefore, the applicable lighting subcategories for this area will be P2 for any pathways and cycleways and P6 for public space at the foreshore and for movement between the buildings particularly the mall. Again, walkways beneath the towers could be classed as 'subways' and would fall under category P10.

5.2.3.2 Light Spill

The precinct plan shows three high-rise towers with podiums, three additional eight storey buildings and a four storey building. There will likely be additional lighting around the new building entrances and podiums. There will be lighting in the main mall running north-south through the site and in other key pedestrian areas between buildings. The foreshore promenade and open public space will also have additional feature lighting. General street lighting along Bank Street will likely be similar to existing conditions. Here again surrounding building will fall into categories A4 or V with required limits of 5 or 4 lux respectively.

The nearest residential properties to this area are terrace houses along Bulwara Road. The distance to these is approximately 100 metres. SLR is of the opinion that any light spill above the requirements onto these facades will be mitigated by the significant vegetation and proposed noise wall.

The promenade and open spaces will be well lit to allow use in the evening but light from these areas is unlikely to migrate off-site as there are plenty of buildings to provide screening.

Additional lighting to building entrances and between buildings along Pyrmont Bridge Road such as outdoor food and beverage facilities also need to be considered. There is a risk of light spill on the facades of the residential buildings at 99-103 Pyrmont Bridge Road and some on Wattle Street. From the plans provided there appears to be a line of trees planned along the boundary which could help to prevent light migrating across the road and this would be considered and mitigated during design development. Modelling could be used in this area to calculate the light spill.

Generally, there is significant vegetation throughout this section of the proposed development which will have a positive effect on any light spill.

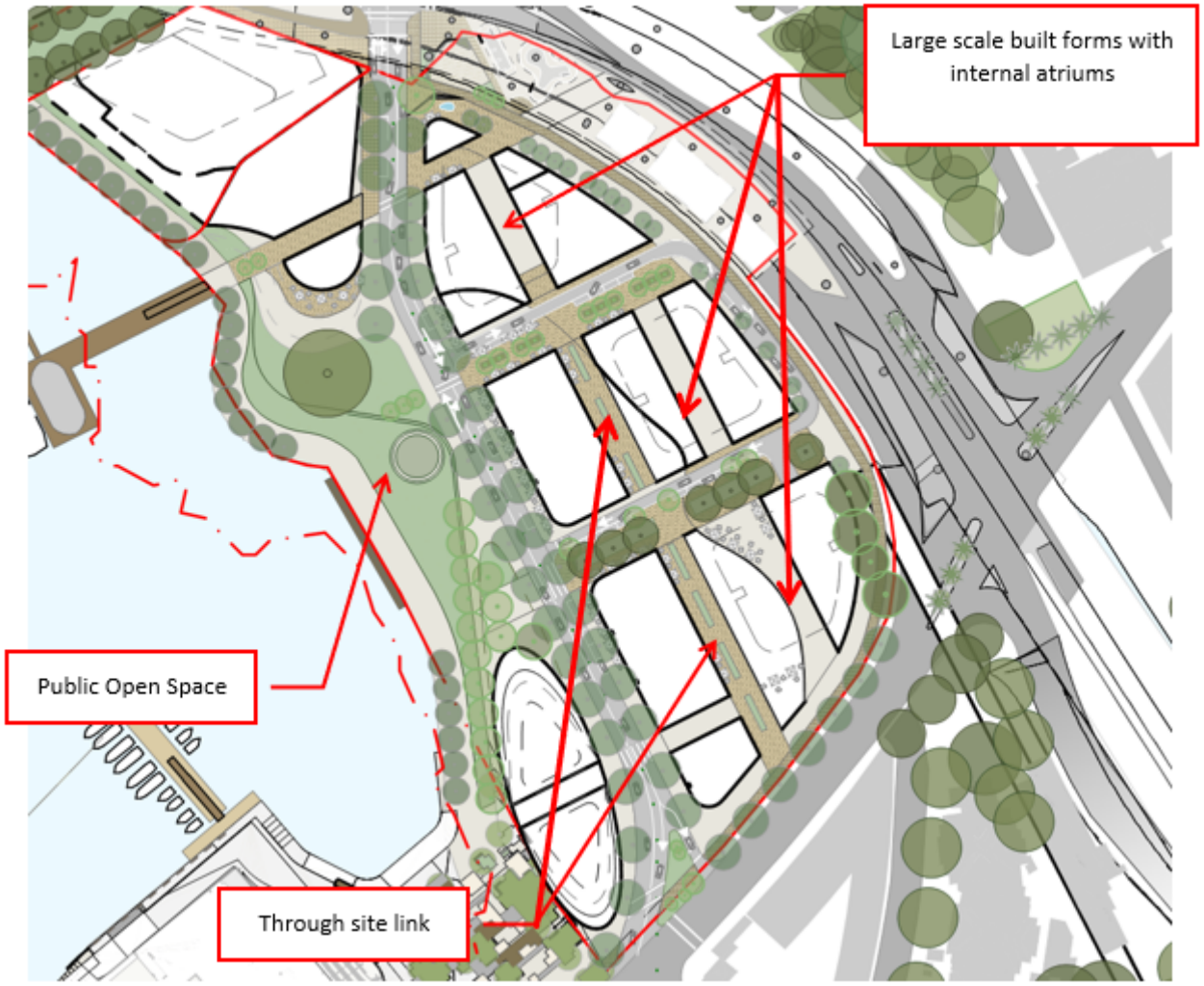

Figure 7 Current Sydney Fish Market Site

5.2.4 Market Plaza

5.2.4.1 Requirements

It has been indicated to SLR that the plaza area between the old and new fish market sites could host public events on an ad-hoc basis. It is expected that in these circumstances temporary lighting would be used to improve safety and the experience of visitors. For these reasons the lighting levels may be greater than the categories referenced previously.

5.2.4.2 Light Spill

For events, additional floodlights could be placed with feature lights to illuminate stalls, seating areas or displays. As previously stated for the areas around this zone the light spill category will be A4 as it is a commercial building with required limit of 5 lux.

There is some risk of light spill above the requirements for the residential properties to the south such as 84 Wentworth Park Road and rooms at the Kauri Foreshore Hotel. There is a significant amount of vegetation in the area and along Pyrmont Bridge Road which could provide some screening for surrounding areas. Modelling is recommended during design development to quantify the light spill on the facades of the surrounding residential properties during event and non-event times.

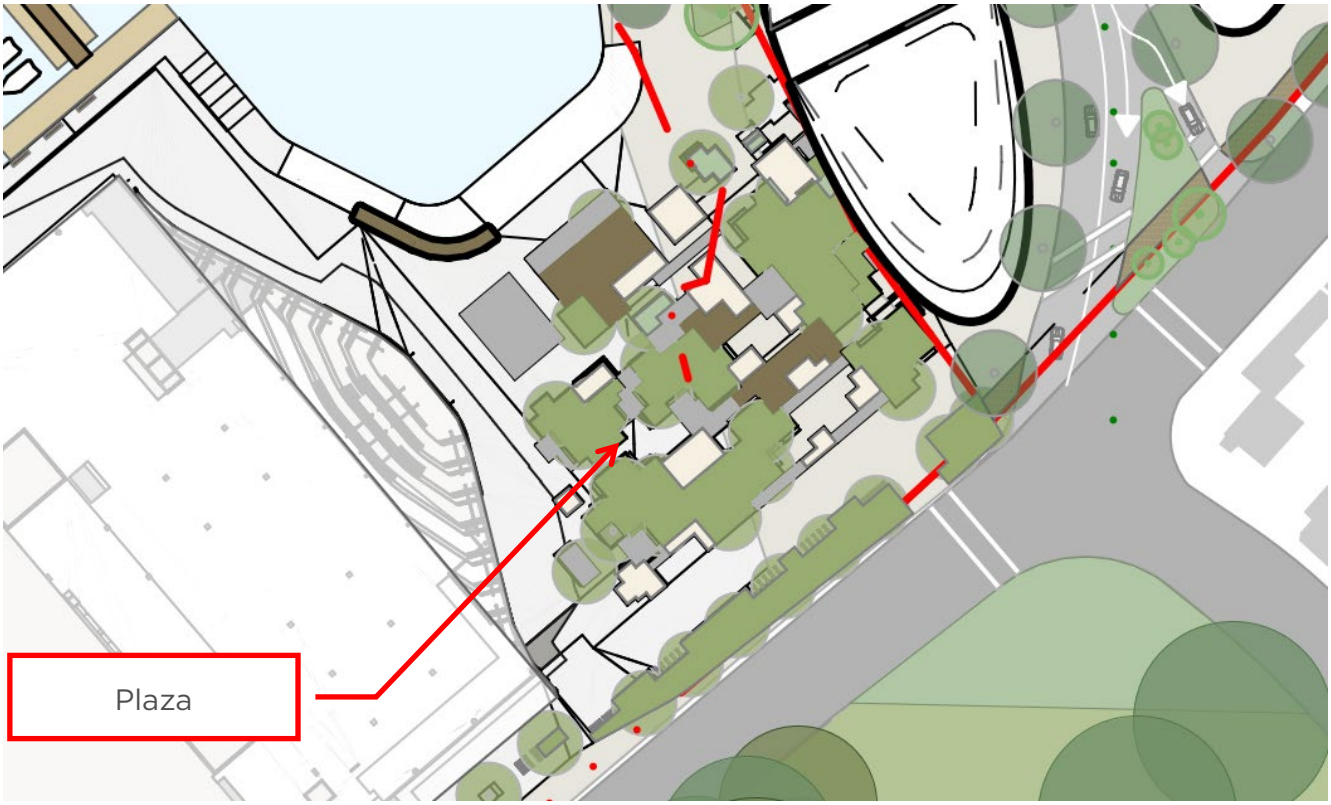

Figure 8 Plaza

5.2.5 New Sydney Fish Market

5.2.5.1 Requirements

The new fish market will have general pedestrian movement around it as well spaces for public activities on the southwest and northeast sides. Again, SLR has assumed a 'low' risk of crime and a 'high' need to enhance the prestige of this entire section as it will be a major reason for attracting visitors to the area. Therefore, the applicable lighting subcategories for this area will be P2 for any pathways and cycleways and P6 for public spaces.

5.2.5.2 Light Spill

The fish market will have lighting around all sides as well as signage lighting around the parking entrance opposite Wentworth Park Road. There are some outdoor eating spaces on the site that will also require additional lighting. It is expected there will be additional lighting along the Pyrmont Bridge Roadside of the building due to the increase in foot traffic. Around the New Fish Market, the light spill category will be A4 as it is a commercial building with required limit of 5 lux.

The detailed lighting specification is set out in Section 13 of AECOM's "New Sydney Fish Markets D&C Performance Specifications" report covering electrical services and associated drawings.

- EL-3-95S-NL00
- EL-4-95S-NL00
- EL-5-95S-NL00

Having reviewed the drawings provided it is SLR's opinion that the exterior lighting of the new Sydney Fish Market should not cause adverse light spill on the properties highlighted in the previous section due the various luminaire's setback from Pyrmont Bridge Road and planned vegetation and landscaping which will provide an intermittent screen. This could be confirmed via modelling at a later stage.

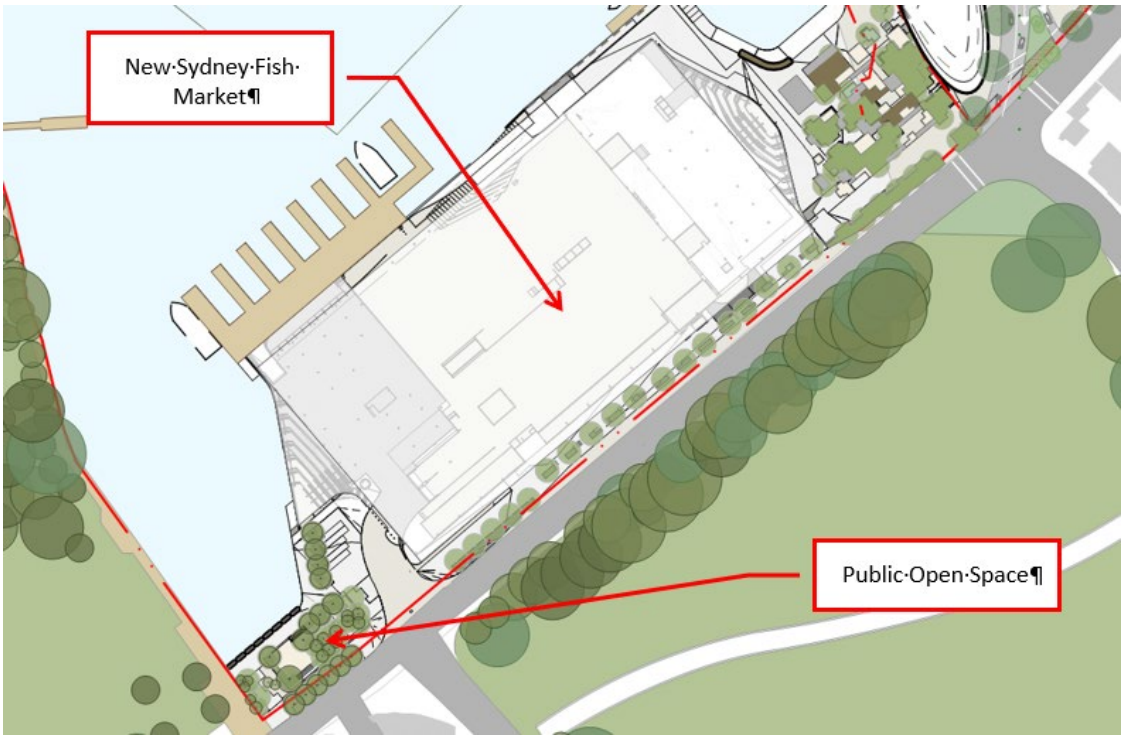

Figure 9 New Sydney Fish Market

6. Recommendations

All lights in the proposed precinct must be designed, installed, and operated to comply with AS4282.

When designing outdoor lighting, to minimise any adverse effect of the light installation, the following general principles should be used during the detailed lighting design phase (as set out in *AS4282-2019 Control of the Obtrusive Effect of Outdoor Lighting)*:

- Direct lights downward as much as possible
- Use luminaires that are aimed to minimise light spill, e.g. full cut off luminaires where no light is emitted above the horizontal plane
- Note that reducing spill light means that more of the light output is used to illuminate the area and a lower power output can be used. The energy consumption for the fitting can thus be reduced without decreasing the illuminance of the area.
- Do not waste energy and increase light pollution by over-lighting
- Keep glare to a minimum by keeping the main beam angle less than 70°. Refer Figure 11
- Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit
- Be aware of the location of any surrounding sensitive receptors and direct the site lighting away from these locations where feasible
- Where possible position site lighting as far away from site boundaries as practicable

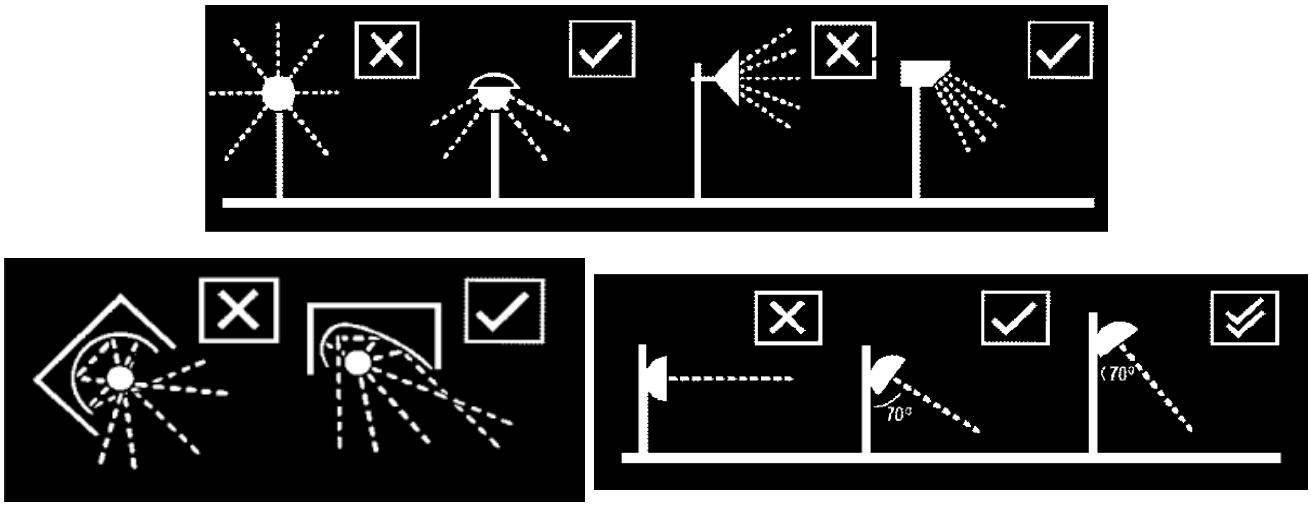

Figure 10 Luminaire Design Features that Minimise Light Spill

References

1. AS 4282-2019, Control of the Obtrusive Effects of Outdoor Lighting
2. AS/NZS 1158.3.1-2005 Lighting for Roads and Public Spaces
3. Sydney Light Design Code – City of Sydney – NSW Government