

Environmental Assessment Report Project Application

Darling Walk, Darling Harbour

Bulk Excavation, Basement Structure and
Construction of Buildings
MP08_0057 and MP08_0092

Submitted to
Department of Planning
On Behalf of Lend Lease Development

September 2008 ■ 08212

Statement of Validity

This Environmental Assessment has been prepared and submitted under Part 3A of the *Environmental Planning and Assessment Act 1979* (as amended) by:

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In respect of	Project Application for bulk excavation, basement structure and construction of buildings

Project Application

Applicant	Lend Lease Development
Address	30 The Bond, 30 Hickson Road, Millers Point NSW 2000
Land to be Developed	Darling Walk, Darling Harbour
Proposed Development	Bulk excavation and the detailed design, layout and construction of the buildings which will comprise: ▪ 64,232m² GFA commercial floorspace; ▪ 2,592m² GFA retail floorspace; ▪ 1,000m² GFA children's theatre; ▪ 200 car parking spaces to service commercial buildings; ▪ 600 space public car parking facility; and ▪ access and egress arrangements.

Environmental Assessment

An Environmental Assessment (EA) is attached

Certificate	I certify that I have prepared the content of this Environmental Assessment and to the best of my knowledge: ▪ It is in accordance with the Environmental Planning and Assessment Act and Regulation. ▪ It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.
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Signature



Name

Kirk Osborne

Date

15 September 2008

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Executive Summary

In July 2008 the Minister for Planning approved a Concept Plan for the redevelopment of Darling Walk, Darling Harbour to provide up 68,000m² GFA of floorspace for commercial, retail, cultural, recreational and entertainment uses.

In accordance with the Concept Plan Terms of Approval this Project Application is submitted for approval under Part 3A of the *Environmental Planning and Assessment Act 1979*.

Site Context and Existing Uses

Darling Walk is located within the Darling Harbour precinct. It is situated west of Harbour Street at the western edge of Sydney Central Business District (CBD), south of the Western Distributor fly over, north of the Chinese Garden and east of Tumbalong Park.

The site comprises the purpose built 2-storey former Sega World games and amusement complex, housing a range of entertainment, retailing and tourism uses and public domain space. A man-made ornamental lake stretches along the existing building's Tumbalong Park frontage. To the west of the lake, and north of Tumbalong Park lies the children's playground area. This comprises a number of fixed climbing structures, a sandpit area and also mobile fair-ground rides including a carousel.

Existing trees, vegetation and landscaped areas define the main boundaries of the site. These include palms, figs, paper barks, plane trees and lemon-scented gums.

The site is currently an underutilised area of Darling Harbour and in need to rejuvenation.

Proposed Development

Lend Lease Development propose to redevelop Darling Walk in accordance with the approved Concept Plan. The proposed development comprises the construction of two buildings incorporating:

- 67,827m² GFA including:
 - 64,232m² GFA of commercial floorspace;
 - 2,592m² GFA of retail floorspace;
 - 1,000m² GFA for a kids theatre;
- 200 car parking spaces to service the commercial buildings;
- 600 space public car parking facility;
- access and egress arrangements; and
- upgraded Bathurst Street Pedestrian Bridge.

The estimated construction cost of the project is \$257 million.

The proposed development provides a mix of commercial and retail uses providing a sustainable working population that will enliven the precinct. The development will also provide retail spaces to service tourists and visitors as well as the local workforce. A new children's theatre and new children's playground maintain the family orientated activities that currently occur at the site. The proposed mix of uses will provide activity in the precinct throughout the week, on weekends and in the evenings.

The proposed buildings are high quality, with a strong focus on sustainability capable of achieving a 5 star AGBR rating. The design delivers two large floor plate campus style buildings, with a central internal atrium providing a high level of internal amenity to the buildings occupants. The buildings establish a stepped form, with the lower scale forms fronting Tumbalong Park. Ground floor retail uses and commercial lobbies will provide active frontages addressing the Darling Walk public domain and Harbour Street.

A new at-grade entry to Darling Harbour is provided through the establishment of a 20m wide Civic Connector between the two buildings, providing a major new east-west connection to the CBD. A new north-south pedestrian boulevard also improves the site's connections to Cockle Bay.

Environmental Assessment

The Project Application has considered and assessment a range of environmental issues including:

- Urban Design and Built Form;
- Environmental Sustainability;
- Residential Amenity;
- Traffic and Pedestrian Management;
- Noise, Vibration and Wind;
- Geological and Groundwater Impacts;
- Contamination and Acid Sulphate Soils;
- Stormwater and Flooding;
- Heritage, Archaeology and Aboriginal Archaeology;
- Air Quality; and
- Construction Management.

The Project Application demonstrates that the development will have minimal adverse environmental impacts, with the potential impacts effectively managed by the measures outlined in the Project Application and draft Statement of Commitments.

The redevelopment will rejuvenate Darling Walk as a high amenity and accessible precinct, with significantly improved built form and public domain. It is therefore recommended that the proposed development is approved.

1.0 Introduction

This Project Application and Environmental Assessment Report (EAR) is submitted to the Minister for Planning pursuant to *Part 3A of the Environmental Planning and Assessment Act 1979* (EP&A Act). This is to fulfil the Environmental Assessment Requirements issued by the Director General for the preparation of an Environmental Assessment of a Project Application for bulk excavation works and building construction at Darling Walk, Darling Harbour.

The Darling Walk site is owned by the Sydney Harbour Foreshore Authority (the Foreshore Authority). Lend Lease Development is currently the preferred proponent for the redevelopment of Darling Walk.

The report has been prepared by JBA Urban Planning Consultants Pty Ltd, for the proponent, Lend Lease Development and is based on information provided by FJMT Architects and supporting technical documents provided by the expert consultant team.

This EAR describes the site, its environs and the proposed development, and includes an assessment of the proposal in accordance with the Director-General's Environmental Assessment Requirements (**Appendix A**) under Part 3A of the EP&A Act. It should be read in conjunction with the information contained within and appended to this report.

1.1 Project Background

The Darling Walk site is located within the Sydney Harbour Foreshore area, identified at Clause 10(d) of Schedule 2 of the Major Projects SEPP. Under this provision, developments with a capital investment value of greater than \$5million (and declared by the Minister) are subject to the provisions of Part 3A of the EP&A Act.

On 19 April 2006, the Minister for Planning formed the opinion that the Darling Walk development proposal is a development of the kind described in Schedule 2 of the Major Projects SEPP and is a 'major project' to be determined under Part 3A of the EP&A Act and also authorised the lodgement of a Concept Plan for the project.

In December 2007, the Foreshore Authority submitted a Concept Plan and Environmental Assessment Report to the Minister for Planning pursuant to Part 3A of the EP&A Act. The preferred project report for the Concept Plan was submitted on 29 May 2008.

The Concept Plan sought approval for the redevelopment of Darling Walk, Darling Harbour to provide:

- redevelopment of Darling Walk, Darling Harbour to provide between 64,000m² and a maximum of 68,000m² GFA of commercial floorspace, including up to 5,000m² GFA of retail floorspace (retail and associated uses) and up to 1,000m² GFA for cultural, recreational and entertainment uses;
- a maximum of 200 car parking spaces to service the commercial buildings and a 600 space public car parking facility;
- public domain improvements;
- demolition of existing buildings; and
- an approvals pathway for the approval of subsequent stages of the development to be assessed under Part 4 of the EP&A Act.

The Concept Plan was approved on 9 July 2008. It also determined that:

- development with a capital investment value of more than \$5 million, excluding remediation be subject to Part 3A of the Act; and
- development with a capital investment value of less than \$5 million and remediation be subject to Part 4 of the Act.

1.2 Overview of Approval Sought

This Project Application seeks approval for bulk excavation, and detailed design, layout and construction of the buildings which will comprise:

- 64,232m² GFA commercial floorspace;
- 2,592m² GFA retail floorspace;
- 1,000m² GFA children's theatre;
- 200 car parking spaces to service the commercial buildings
- 600 space public car parking facility and
- access and egress arrangements.

1.3 Structure of the Report

The report is structured as follows:

Section 1: Introduction, overview of the project, background, project team and approvals process.

Section 2: Site analysis, overview of existing site conditions, and summary of opportunities and constraints.

Section 3: The current strategic and statutory planning framework and context applying to the site.

Section 4: Summary of the key issues from Consultation.

Section 5: Project Description

Section 6: Environmental Assessment of the Project Application.

Section 7: Draft Statement of Commitments.

Section 8: Conclusion

1.4 Project Team

An expert project team has been formed to deliver the project and includes:

Proponent	Lend Lease Development
Project Manager	Bovis Lend Lease
Urban Planning	JBA Urban Planning Consultants
Architects	FJMT Architects
Landscape	Aspect Studios
Quantity Surveyors	Ryder Levitt Bucknall
Geotechnical	Arup/ Coffey Geosciences
Infrastructure	Robert Bird Group
Flooding	Worley Parsons
ESD Strategy	Arup
Traffic and Transport	Masson Wilson Twiney
Heritage	Tanner Architects
Wind Impact	Windtech Consultants Pty Ltd
Air Quality	Holmes Air Sciences
Noise	Acoustic Logic
Reflectivity	Arup
Contamination	ENSR Australia
Archaeology	Casey and Lowe Pty Ltd
Aboriginal Archaeology	Comber Consultants Pty Ltd
Accessibility	Morris-Goding Accessibility Consulting
Waste Management	Bovis Lend Lease

1.5 Capital Investment Value

The estimated cost of works is \$256,866,500 as detailed in the Quantity Surveyors Statement prepared by Rider Levett Bucknall (**Appendix B**).

2.0 Site Analysis

2.1 Site Location and Context

Darling Walk is located within the Darling Harbour precinct. It is situated west of Harbour Street at the western edge of Sydney Central Business District (CBD), south of the Western Distributor fly over, north of the Chinese Garden and east of Tumbalong Park. Town Hall Railway Station is approximately 400m to the north-east and Central Station is approximately 800m to the south-east.

The site's location is shown at **Figure 1** below.

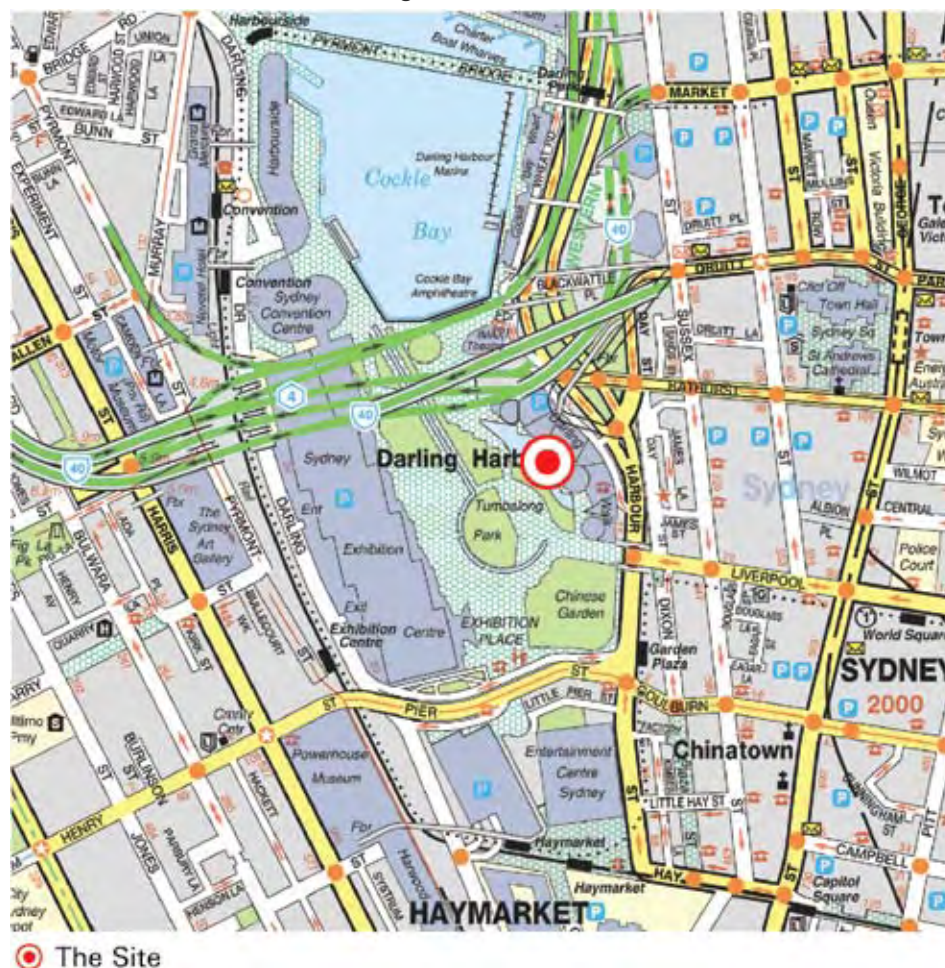


Figure 1 – Darling Walk Locational Context

Darling Harbour is unique in terms of its function, location, land ownership and physical characteristics. Darling Harbour is a 60 hectare mixed use, waterfront precinct located between the Sydney CBD and Pyrmont Peninsula. The land is owned almost entirely by NSW State Government.

Buildings within the precinct are generally orientated towards the centre of a 'valley' that has been formed by infilling a significant part of the original Cockle Bay. The central valley is open and flat, running on a north-south axis from the waters of Cockle Bay to Tumbalong Park and beyond.

The land rises to the east and west from the valley floor, with the ridges reinforced by taller built forms. Buildings fronting onto the harbour and the event area were designed to complement outdoor event functions.

A site context plan is shown at **Figure 2** and included at within **Appendix C**.

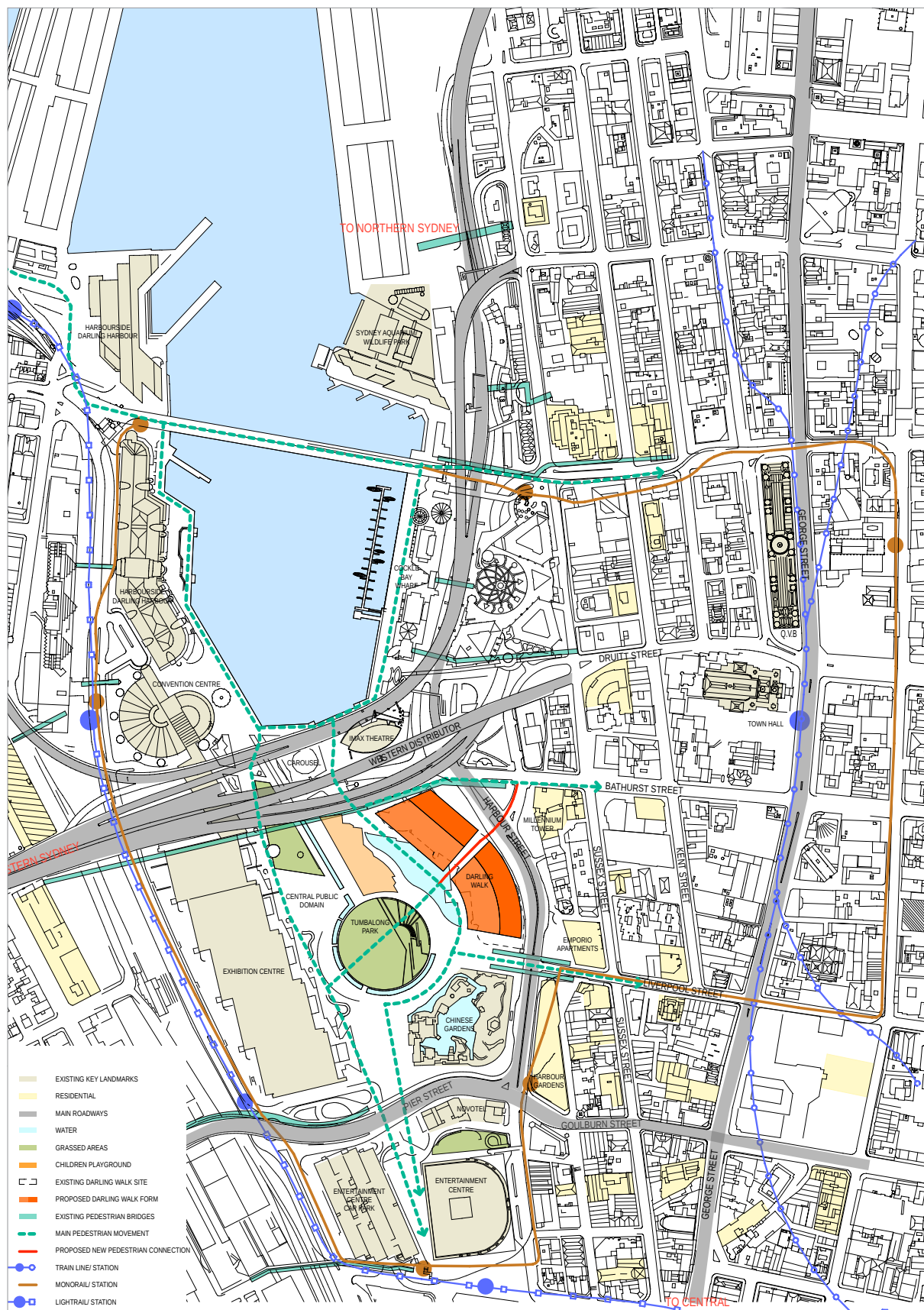


Figure 2 – Site Context Plan (Source: FJMT)

2.2 Site Description

Darling Walk is a highly significant part of Darling Harbour. It forms the edge to the central public domain which includes Tumbalong Park, Darling Harbour's principal green space. The site modulates the increase in scale from Tumbalong Park to the high-rise towers to the CBD, and provides a sense of containment for Darling Harbour.



The Site

Figure 3 – Aerial View

The site is an elongated shape covering approximately 32,900m². The extent of the site is illustrated in **Figure 3**.

2.3 Land Ownership and Legal Description

The site is legally described as shown at **Table 1**. The site includes 38 parcels of land, two of which are currently traffic islands. Ownership of these lands is being transferred from the Roads and Traffic Authority to the Foreshore Authority.

Land ownership is detailed in **Table 1**. A site survey is included at **Appendix C**.

Table 1 – Landownership Details

Lot	Deposit Plan	Owner
318	871455	Sydney Harbour Foreshore Authority
319	871455	Sydney Harbour Foreshore Authority
314	869004	Sydney Harbour Foreshore Authority
52	1009561	Sydney Harbour Foreshore Authority
Pt 11	1048307	RTA
53	1009561	RTA
403	862501	Sydney Harbour Foreshore Authority
305	787105	Sydney Harbour Foreshore Authority
306	787105	Sydney Harbour Foreshore Authority
371	1033766	Sydney Harbour Foreshore Authority
7	1048307	Sydney Harbour Foreshore Authority
8	1048307	Sydney Harbour Foreshore Authority
9	1048307	Sydney Harbour Foreshore Authority
10	1048307	Sydney Harbour Foreshore Authority
13	1048307	RTA
Pt 14	1048307	RTA
Pt 15	1048307	RTA
19	1048307	RTA
26	1048307	RTA
24	1048307	RTA
23	1048307	RTA
43	1048307	RTA
42	1048307	RTA
22	1048307	RTA
48	1048307	RTA
17	1048307	RTA
37	1048307	RTA
21	1048307	RTA
41	1048307	RTA
40	1048307	RTA
32	1048307	RTA
30	1048307	RTA
29	1048307	RTA
Pt 12	1048307	RTA
20	1048307	RTA
18	1048307	RTA
46	1048307	RTA
38	1048307	RTA

2.4 Existing Development

The site comprises the purpose built 2-storey former Sega World games and amusement complex, housing a range of entertainment, retailing and tourism uses and a large area of public domain space.

The Sega World building is a concrete, steel and glass building, clad in prefabricated panels and includes a distinctive glass cone protruding above the roof line.

Sega World opened in March 1997. It ceased operation in November 2000. The current gross floor area of the building is approximately 17,000m² and comprises several food and retail outlets, a video arcade, mini golf centre, the Outback Centre and McDonalds drive thru and restaurant.

A man-made ornamental lake stretches almost the entire length of the existing building's Tumbalong Park frontage, and offers children's paddle-boat rides. Between the lake and the southern part of the building lies a bungee trampoline, rock climbing wall and covered seating area. To the west of the lake, and north of Tumbalong Park lies the children's playground area. This comprises a number of fixed climbing structures, a sandpit area and also mobile fair-ground rides including a carousel (see **Figures 4-6**).

Existing trees, vegetation and landscaped areas define the main boundaries of the site. These include palms, figs, paper barks, plane trees and lemon-scented gums.



Figure 4 – View of southern section of existing building



Figure 5 – View of mid section of existing building



Figure 6 – View across lake to children's playground

2.5 Accessibility

Pedestrian Access

The key pedestrian links to the site from the CBD comprise the Bathurst Street pedestrian bridge which is situated to the north east of the site and the two parallel Town Hall/ Liverpool Street pedestrian bridges which are situated to the south east of the site. These links are illustrated in **Figure 7**.

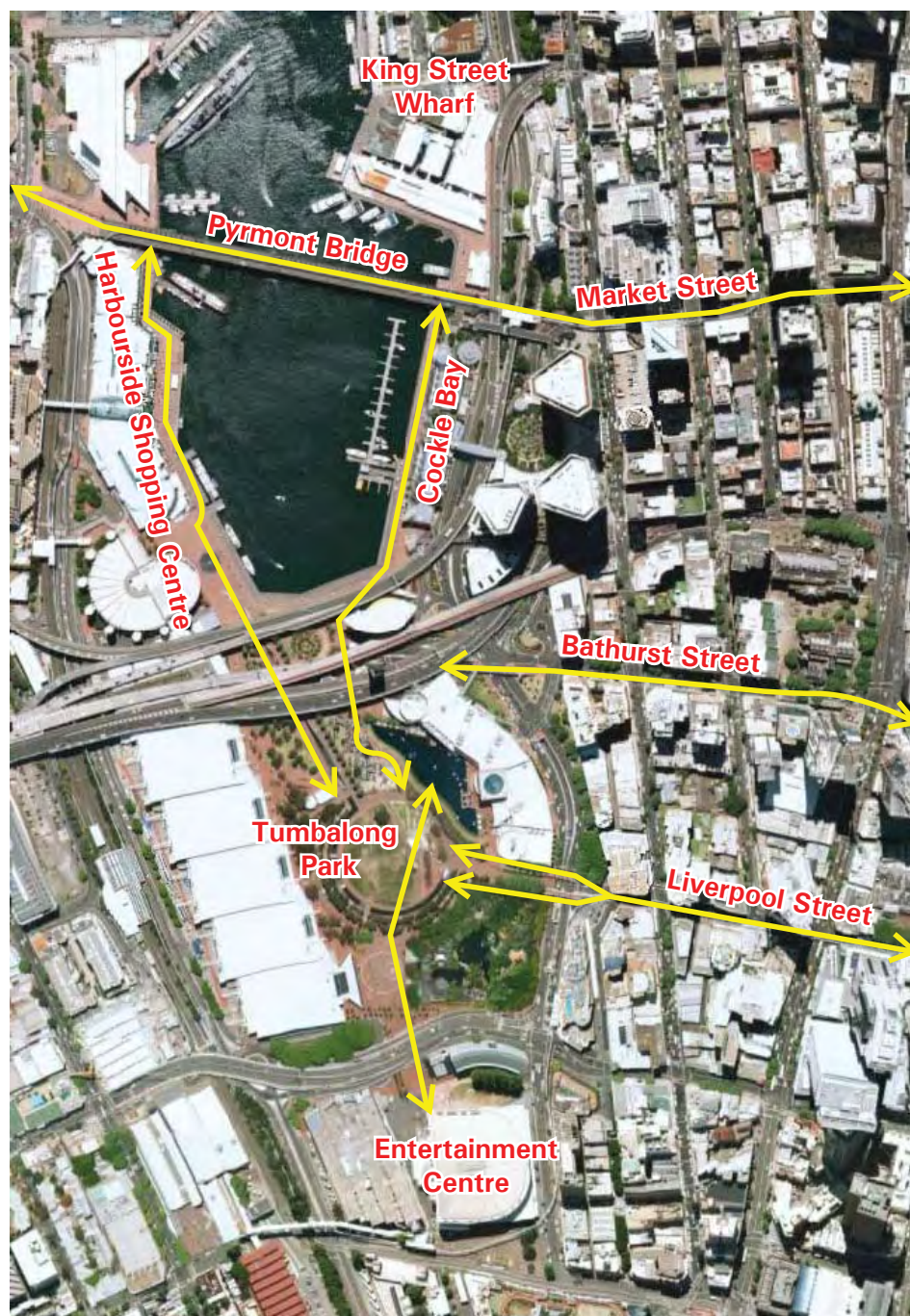


Figure 7 – Pedestrian linkages to Darling Walk

Provision for disabled access to the Bathurst Street walkway is provided via a lift at the intersection of Day Street and Harbour Street (**Figure 8**).

A secondary pedestrian link from the mid-section of the existing building to the CBD is via an 'at grade' traffic signal controlled crossing at the Harbour Street/Day Street intersection.

In addition, the site is easily accessible from the west, north and south, due to the pedestrianised nature of the Darling Harbour and Tumbalong Park areas.



Figure 8 – Bathurst Street pedestrian bridge and lift over Harbour Street

Vehicular Access

Vehicular access to the site comprises an ingress for northbound traffic off Harbour Street just to the north of Liverpool Street, a traffic signal controlled egress at the Harbour Street/ Day Street intersection and an ingress just north of the controlled egress (refer **Figure 9**).



Figure 9 – Site analysis plan and existing vehicular and pedestrian access

Public Transport

The site is within easy walking distance of a number of public transport nodes, including Town Hall Railway Station (400m), Central Railway Station (800m), Darling Harbour Ferry Wharf (500m), the Light Rail Station (400m) and a number of bus services streets. **Figure 10** below illustrates the public transport services within close proximity of the Darling Walk site.

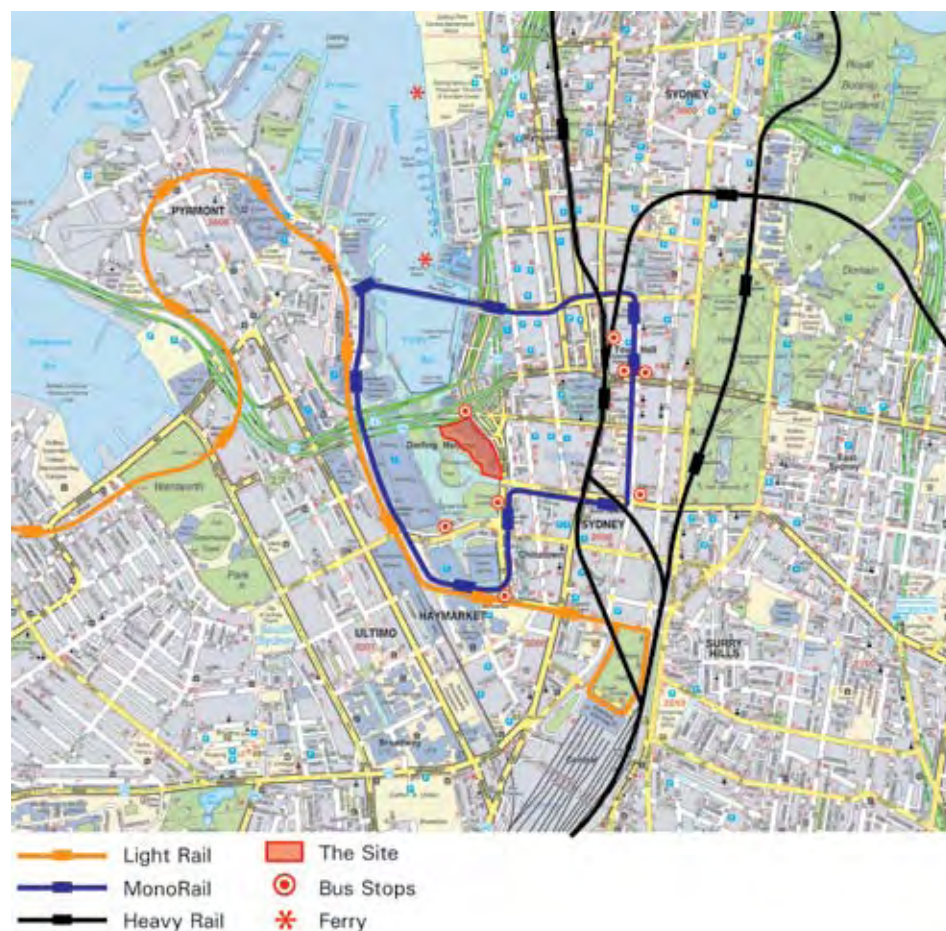


Figure 10 – Public Transport Services

2.6 Surrounding Development

Darling Walk is part of the Darling Harbour precinct which contains a range of entertainment, cultural and exhibition venues on the western edge of the CBD. These venues include Sydney Entertainment Centre, Sydney Convention and Exhibition Centre, the IMAX cinema, and numerous harbour side bars and restaurants.

The pedestrian area to the north of the site links the Darling Walk site to Cockle Bay and the waterside. Within this area lies the Palm Grove amphitheatre, an event space which has recently been upgraded, and the IMAX cinema.

Immediately to the south of the site is the Chinese Garden of Friendship.

Tumbalong Park bounds the Darling Walk site to the south-west. It is circular in shape and comprises a large grassed area, a raised covered stage area and back stage facilities. Further west is the Sydney Convention and Exhibition Centre.

To the east, the site is bounded by Harbour Street, which links to the Western Distributor. The eastern side of Harbour Street includes a range of uses, such as the Crown Plaza hotel, residential apartment buildings (Millennium Towers and Emporio), Global College and a police station (**Figure 11**). These buildings vary in height between 14 storeys (Crown Plaza hotel) and 21 storeys (Millennium Towers), both substantially taller than the proposed development at Darling Walk.



Figure 11 – Aerial view of site and surrounding development

3.0 Planning Framework and Context

3.1 Relevant Planning Instruments

The following planning instruments are relevant to the proposed development:

- Darling Harbour Development Plan No. 1
- State Environmental Planning Policy (Major Projects) 2005
- State Environmental Planning Policy (Infrastructure) 2007
- State Environmental Planning Policy 55: Remediation of Land
- Sydney Regional Environmental Planning Policy (Sydney Harbour Catchment) 2005

3.1.1 Darling Harbour Development Plan No.1

The principal environmental planning instrument applying to the site is the Darling Harbour Development Plan No.1 (DHDP). Under Schedule 6 Part 7 sec 23(1) of the EP&A Act, the DHDP is taken to be a regional environmental plan. Its principal aim is to define the type of development which may be permitted within the Darling Harbour Development Area. Permissible uses include commercial, retail, cultural and entertainment uses.

An assessment of the proposal against the Darling Harbour Development Plan controls is included in Section 6.

3.1.2 State Environmental Planning Policy (Major Projects) 2005

The Major Projects SEPP identifies certain categories of development and certain specified sites that are subject to assessment and determination under Part 3A of the EP&A Act. The Minister for Planning is the consent authority for Part 3A projects. The site is listed under Schedule 2 of the Major Project SEPP.

3.1.3 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005, provide a set of planning principles for land within the Sydney Harbour Catchment and general matters for consideration for sites within the Foreshores and Waterways Area that consent authorities must consider before granting consent under Part 4 of the EP&A Act.

An assessment of the proposal against the Sydney Harbour REP is included at Section 6.

3.1.4 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP requires that applications for specific types of development are referred to the Roads and Traffic Authority (RTA) for its comment prior to determination. Under the provisions of the Infrastructure SEPP, this application is required to be referred to the RTA for comment.

3.1.5 State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

SEPP 55 provides controls and guidelines for the remediation of contaminated land. In particular, this policy aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

Clause 7 specifies that a consent authority must not consent to the carrying out of any development on land unless it has considered whether land is contaminated and if the land is contaminated, it is satisfied that the land is/ can be suitable for the proposed development.

An assessment of the proposal against the SEPP 55 is included at Section 6.

4.0 Consultation

In accordance with Part 3A of the EP&A Act consultation is required to occur at the following stages:

- the Director General of the Department of Planning is required to consult with relevant public authorities in preparing the environmental assessment requirements for the Concept Plan; and
- the Director-General is required to advertise and exhibit the Environmental Assessment and appended reports and documentation.

In preparing the DGRs for the Environmental Assessment, the Department of Planning consulted with the following assessment authorities and groups:

- City of Sydney Council
- NSW Heritage
- Roads and Traffic Authority
- NSW Health

Comments and issues raised by these authorities and groups were considered is undertaken in preparing the DGRs.

The DGRs required that an appropriate and justified level of consultation in accordance with the Department's Major Project Consultation Guidelines.

During the preparation of the Concept Plan, City of Sydney Council, Sydney Water and Ministry of Transport were consulted. Approximately 116 submissions were received in response to the public exhibition of the Concept Plan and a response to issues raised was provided in the Preferred Project Report. The issues raised were also taken into consideration during the preparation of the Project Application.

4.1 Agency Consultation

In preparing the Project Application the proponent consulted with Sydney Water, the Roads and Traffic Authority (RTA), Energy Australia, RailCorp, Telstra and Agility.

Table 2 summarises the key issues from the consultation.

Table 2 – Summary of consultations

Issues / Discussion	Comment
RTA	
Meetings were held on 2 nd and 29 th May 2008 regarding RTA's planned maintenance work to Western Distributor	Proposed Darling Walk work program and access implications were discussed with RTA.
An on-site meeting was held on 16 th May 2008 to discuss the proposal and Bathurst Street footbridge augmentation	An overview of the project was presented with a focus on augmentation of the Bathurst Street footbridge. RTA to provide 'as built' documentation of the CCT to facilitate designs of footbridge augmentation.
Sydney Water	
On-going discussion and correspondence with Sydney Water regarding stormwater diversion and other works has been occurring since January 2008	Preliminary documentation and applications for stormwater approval have been lodged with Sydney Water. In-principle approval for the stormwater diversion was issued by Sydney Water on 7 April. Sydney Water Notice of Requirements will be issued upon Project Approval

Issues / Discussion	Comment
Energy Australia	
Ongoing consultations with Energy Australia have included 11kv and 33kv distribution mains, temporary supply, new.	Consultations have been ongoing regarding potential building works and infrastructure clashes. Building designs have been modified to minimise clashes. Energy Australia has advised there will on be a minimal impact on their easements
RailCorp	
Ongoing consultation and correspondence with RailCorp regarding cabling infrastructure.	The current condition of infrastructure assets have been investigated with RailCorp. Detailed discussions with RailCorp on protection of key assets have occurred. Design and construction of a new cabling pit is proposed and awaiting approval from RailCorp.
Telstra	
Ongoing consultations with Telstra regarding cabling infrastructure assets	Telstra have been advised of the latest building designs and in-principle approval has been received to build over assets.
Agility	
Consultation / correspondence with Agility has occurred in February, March and April.	Agility have been advised of the building design and a meeting was held with Agility in March 2008. Following the March meeting further information regarding routes, connections and capacity has been provided.

5.0 Description of Proposed Development

This Project Application seeks approval for bulk excavation and the detailed design, layout and construction of the buildings which will comprise:

- 67,827m²GFA including:
 - 64,232m² GFA of commercial floorspace;
 - 2,592m² GFA of retail floorspace;
 - 1,000m² GFA for a kids theatre;
- 200 car parking spaces to service the commercial buildings;
- 600 space public car parking facility;
- access and egress arrangements; and
- upgraded Bathurst Street Pedestrian Bridge.

Note: A separate application is proposed to be lodged for the building fitout. It is proposed that this application is assessed and determined under Part 4 of the *Environmental Planning and Assessment Act*.

5.1 Design Principles

FJMT Architects have prepared a design statement and architectural drawings (**Appendix D**). The development proposal is generally consistent with the key objectives of the Darling Walk Concept Plan. The design delivers two large floor plate campus style buildings, with a central internal atrium (refer to **Figure 12**). The buildings establish a stepped form, with the lower scale forms to Tumbalong Park. Double height commercial lobbies are provided to Harbour Street and a pedestrian through site link.

The principles underpinning the detailed design are:

- create a permeable, unified and legible Darling Walk precinct;
- create an at-grade extension of Day Street into the site, establishing new vistas and connections between Tumbalong Park to Bathurst Street;
- establish a built form that provides an appropriate balance between the geometries of the site and form of the city;
- site buildings to generally follow the alignment of Harbour Street from Liverpool Street to Day Street;
- create a public domain with a variety of activity zones and a strong north-south connection to Cockle Bay and east-west connection between the city and Tumbalong Park;
- activate frontages addressing the Darling Walk public domain and Harbour Street;
- establish clear site arrival, entry and exit points;
- ensure that facade treatments respond to the site's context and deliver environmental outcomes.
- ensure that the buildings are within heights and setbacks in accordance with the Concept Plan;
- ensure that the development incorporates Safety by Design principles.



Figure 12 – Proposed buildings (Source: FJMT)

5.2 Numeric Overview

A numeric of the proposed development is provided in **Table 3** below:

Table 3 – Numeric Overview

Component	Proposal
Site area	32,900m ²
GFA	67,827m ²
Heights	26.2m fronting Tumbalong Park 37.3m fronting Harbour Street
No. of buildings	2
No. of storeys	6 (ground + 5) fronting Tumbalong Park 9 (ground + 8) fronting Harbour Street
Site coverage of buildings	9,533m ²
Open space/ Landscaped area	23,367m ²
Car parking spaces	200 commercial tenant spaces 600 public car park spaces

5.3 Bulk Excavation

Approximately 10,000m² or 75% of the building footprint will be subject to bulk excavation. Excavation to between 12 and 14m below existing ground level is required for the construction of the four basement levels. Approximately 110,000m³ of material is to be excavated and removed from the site.

Bulk excavation will be carried out over an eight month period with material removed by trucks (dog and trailer), with an estimated 7,400 trucks required to remove the materials for disposal. For the eight month bulk excavation period this will be about eight trucks per hour.

A bulk excavation site plan is included at **Figure 13** and within **Appendix H**.

The initial and critical activity of the bulk excavation is the installation of basement perimeter piling. This will be done in conjunction with the site remediation. A separate application has been lodged with the Foreshore Authority for remediation works and piling works. The remediation works include the excavation and remediation of contaminated solid waste and acid sulphate soils to an approximate level of RL -1.0m AHD.

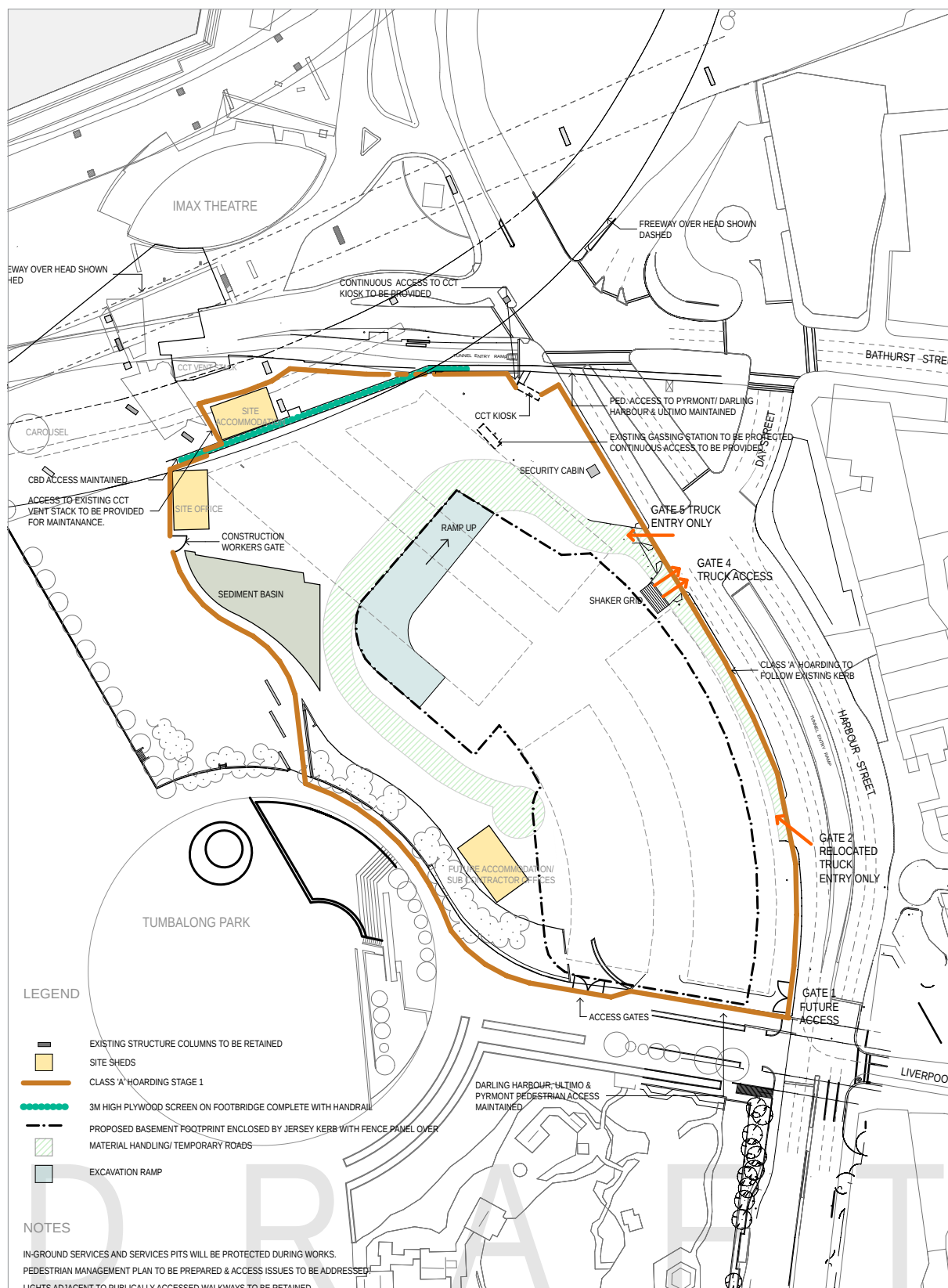


Figure 13 – Bulk Excavation Plan

5.4 Land Use and Floorspace

The proposed building uses include retail and a kids theatre at the ground floor, commercial office uses on Levels 1 to 8 and basement level car parking (tenant and public car park).

The proposed land use and gross floor area (GFA) is shown in **Table 4** below.

Table 4 – Land use and total GFA

Land Use	GFA
Commercial	64,235m ²
Retail	2,592m ²
Cultural (Kids Theatre)	1,000m ²
Total	67,827m ²

The gross floor area (GFA) in each of the proposed buildings is shown below in **Table 5**.

Table 5 – GFA of each building

Building	Use	GFA
Northern Building	Commercial / retail / cultural	31,985m ²
Southern Building	Commercial / retail	35,376m ²

5.5 Building Heights and Setbacks

Building Heights

The heights of the proposed buildings, excluding plant, equipment and architectural roof features are shown in **Table 6** below.

Table 6 – Building Heights

Building	Height
North Building	6-9 storeys 26.2m fronting Tumbalong Park (ceiling of uppermost habitable floor) 37.3m fronting Harbour Street (ceiling of uppermost habitable floor)
South Building	6-9 storeys 26.2m fronting Tumbalong Park 37.3m fronting Harbour Street

5.6 External Materials and Finishes

The building is to be constructed of structural reinforced concrete and steel with an external façade comprising glass, lightweight cladding, and timber

The materials and finishes used in the proposed development are in **Table 7** below.

Table 7 – Materials and Finishes

Building Component	Material and Finishes
Structure	Concrete and steel
Facades	Glazed glass Eastern façade includes timber and glass. Metallic panelling
Roof	Opaque materials include metallic panelling

A materials board will be submitted under separate cover. A materials board in digital format is enclosed with the application.

5.7 Landscaping and Public Domain

A separate Project Application will be lodged for landscaping and public domain works. However, as detailed in the Concept Plan, the public domain and streetscape will be significantly upgraded as follows:

- **Pedestrian Boulevard** – along the western side of the buildings, activated by cafes and retail areas at the ground level of the development.
- **Active Play Area** – a play environment comprising a series of activity zones to cater for varying age groups. The play area will consist of play equipment, sand play, terrain slides, climbing walls, swings and net structures.
- **Water Play** – interactive water play elements which may comprise classic water mechanics (such as locks, wheels and sluice gates), interactive bubblers, streams and jets, and shallow water pools.
- **Terraced Community Green** – two large terraced lawn areas incorporating timber boardwalks and water features at its edges. The Community Green is bound on the west by the existing Melaleuca Grove.
- **Civic Connector** – the public space between the two buildings will have a public plaza character, providing a strong through site link as well as a clear address to each building and place for meeting and gathering. The Civic Connector will be a minimum of 20m wide
- **Streetscape Upgrades** – Upgrades to pavements and avenue planting along Harbour Street. An at-grade pedestrian crossing is proposed at Day Street and an upgrade to the existing pedestrian bridge with lifts and stairs at the northern part of the site is proposed.

The public domain design and material selection will incorporate sustainable design elements such as water sensitive urban design and use of recycled material (where possible). It will also seek to maximise safety & security, consistent with 'Safer by Design' principles. Detailed design and material selection will be provided in a separate Project Application.

An illustrative Public Domain Plan is provided at **Figure 14** and within the Landscape Report at **Appendix E**.

The Public Domain Concept Plan is subject to further design development and review as part of the future project application.

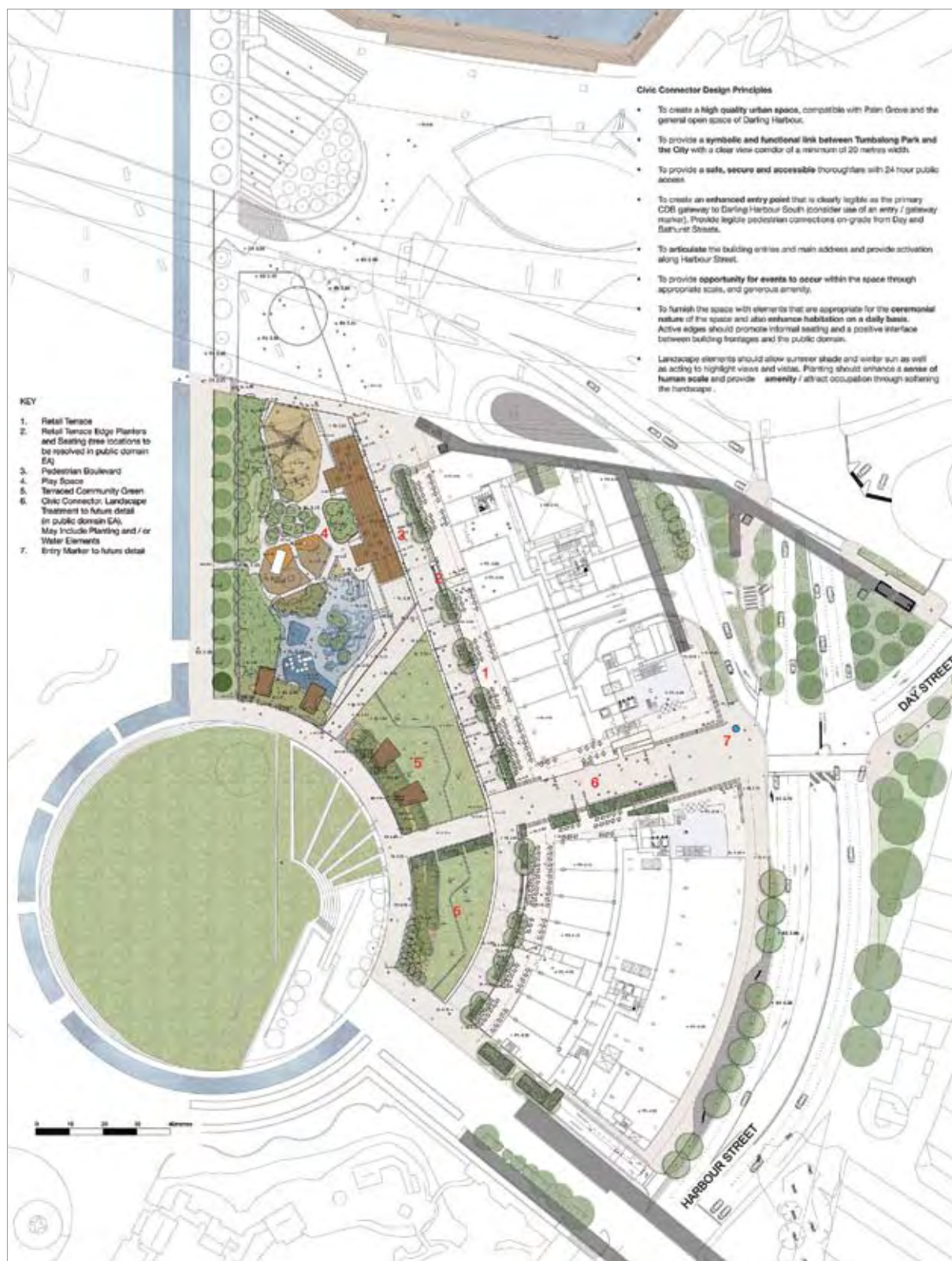


Figure 14 – Public Domain Concept Plan

5.8 Access and Parking

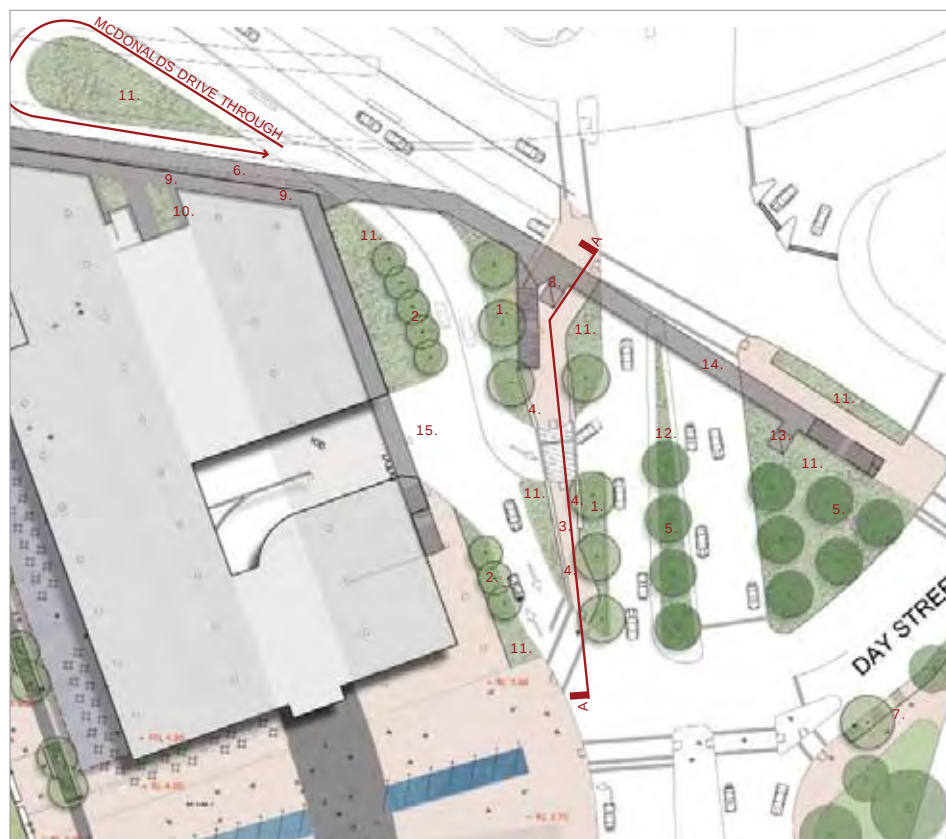
5.8.1 Access

Vehicular Access

Vehicular entry into the site (as proposed in the Concept Plan) is to be via a fourth leg to the existing Harbour Street/Day Street intersection. Entry into the site off Harbour Street will be north bound only, via a left turn deceleration lane. A direct approach from Day Street is also proposed.

The new access road will provide entry only to the tenant and public car park and entry and exit for the loading dock, service vehicles and the McDonalds drive through. A single entry point to the tenant and public car park is proposed to establish a single address to the complex. The exit for the tenant and public car park is at the southern side of the southern building, near to the Liverpool Street/Harbour Street intersection. In addition, a separate set-down/pick-up access lane off Harbour Street is proposed in front of the southern building. The proposed access arrangements are illustrated at **Figure 15**.

Detailed information on roadworks will be included in the Project Application for Public Domain and Road Works. As per Condition C7 of the Concept Plan approval Lend Lease Development will continue to liaise with the Roads and Traffic Authority regarding road and intersection works.



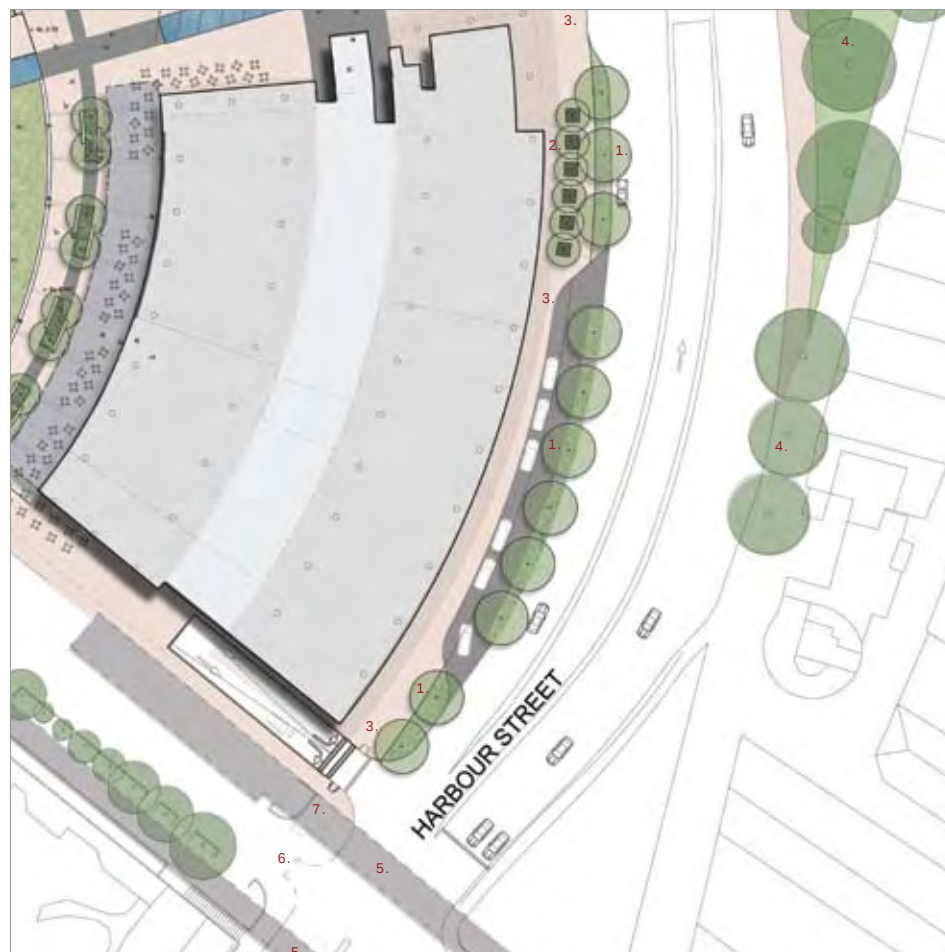


Figure 15 – Vehicular access arrangements

Pedestrian Access

Existing pedestrian access to the site is primarily from the CBD to the east and through the broader Darling Harbour precinct to the west, north and south. Access from the CBD is via three pedestrian bridges (one at Bathurst Street and two at Liverpool Street) and one at-grade crossing at the intersection of Harbour Street and at Day Street.

The section of the Bathurst Street pedestrian bridge from Day Street over Harbour Street is to be retained. The existing section of the pedestrian bridge from Harbour Street into Darling Walk is to be demolished and replaced with a new pedestrian bridge integrated with the new northern building. A new lift and stairs are to be provided on the western side of Harbour Street and a new pedestrian connection will be provided along the eastern elevation at Level 1 of the northern building (refer to **Figure 16**). The augmentation of the existing footbridge, including the addition of the new lift and stair at the western side of Harbour St will be included in the Project Application for Public Domain works.

At street level along the Harbour Street frontage, the streetscape is to be upgraded, providing a clearly defined pedestrian path between the new lift and stairs on Harbour Street to the new through site link between the northern and southern buildings.

On the western side of the building fronting into Darling Harbour, a new north-south pedestrian boulevard will be created. The boulevard will be a minimum 7m wide. Additional circulation space and seating will be provided immediately in front of the cafes and retail at ground level. The boulevard will connect to Palm Grove and Cockle Bay in the north and Liverpool Street to the south.

The boulevard will also connect to the new through-site link between the two new buildings. Pedestrian routes are illustrated in **Figure 17**.



Figure 16 – Harbour Street Elevation (Northern Building)

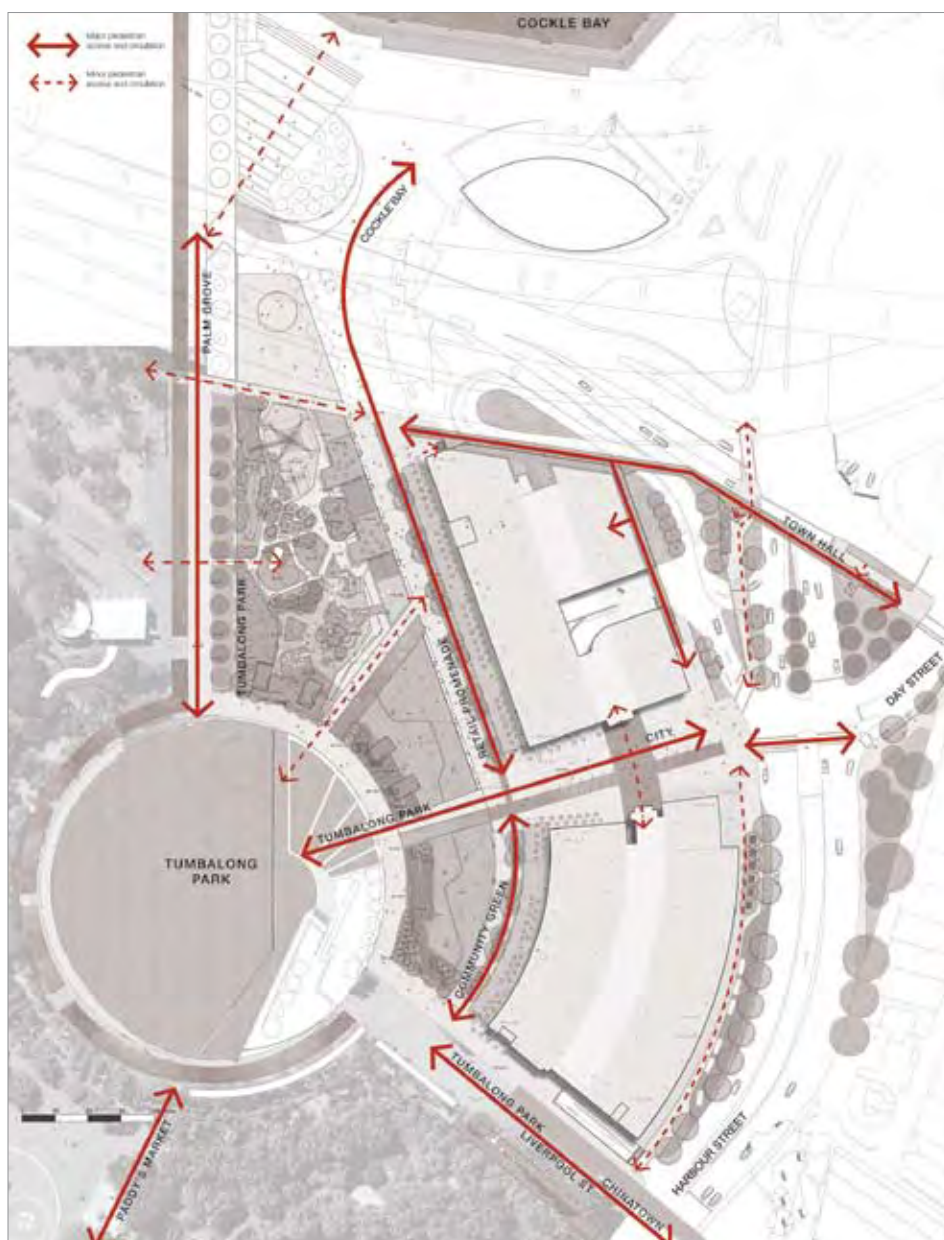


Figure 17 – Pedestrian Access to and from the site

5.8.2 Parking

The project proposes 200 tenant (private) car parking spaces and 600 public parking spaces in accordance with the Concept Plan. **Table 8** provides a breakdown on car parking per basement level. Four basement levels of car parking will be provided. Tenant car parking will be provided on Basement Level 1 and the public car parking will be provided on Basement Levels 2, 3 and 4.

Table 8 – Number of car parking spaces per level

Level	No. of Car Spaces
Basement Level 1	200
Basement Level 2	177
Basement Level 3	209
Basement Level 4	214
Total	800

One space for people with disabilities is proposed for the tenant car park and 12 spaces for people with disabilities are proposed for the public car park.

415 bicycle racks are also proposed on Basement Level 2 within a specified cycle area.

Car Park Design

The car park has been designed in accordance with the relevant Australian Standards. The car park design principles are:

- single entry point off Harbour Street to present a single entrance to the complex;
- combined car park access for tenant and public car and loading docks;
- widened entry ramp to separately stream public and private parking and service vehicles;
- separate public and private car park entries and separate access ramp for loading dock and service vehicles;
- car park exit feeding to Harbour Street near Liverpool Street, with separate connections from the public and private car parks;
- single entry and exit gates for the private parking, consistent with the capacity requirement for a 200 space car park and double entry and exit gates for the public car park; and
- public car park internal ramps, designed to allow quick up/ down movements between floors so as to minimise internal circulation traffic flows.

Loading Dock

Loading dock facilities are provided on Basement Level 2. Access to the loading and service bay is via the Harbour Street/Day Street intersection. At ground level the access road and ramp is shared with general traffic accessing the car park and then separated at Ground/Basement Level 1, with a two-way ramp serving the loading dock.

The following spaces have been provided for service vehicles:

- 2 spaces for 12.5m Heavy Rigid Vehicle;
- 2 spaces for 8.8m Medium Rigid Vehicle;
- 1 space for 6.4m Small Rigid Vehicle;
- 9 spaces for utes, vans and cars;

- 3 spaces for motorbike couriers; and
- 10 spaces for bicycle couriers.

The loading area has been designed in accordance with the relevant Australian Standards to accommodate Heavy Rigid Vehicles up to 12.5m.

5.9 Environmental Sustainability

Arup have prepared an ESD Report, included at **Appendix F** which describes energy performance parameters and energy efficient design principles proposed for the building. The report also includes a Green Star rating assessment for the buildings.

The proposed buildings have been designed to achieve a 5 star ABGR design rating and target a 6 Green Star rating in design. These ratings ensure that the proposal will deliver a best practice level of sustainability.

The key proposed ESD initiatives for the buildings include:

- Highly efficient facade to control solar loads and optimise daylight.
- Highly efficient HVAC System, including chiller beam with 100% outside air.
- Water saving fixtures and rainwater harvesting and collection to provide for WC flushing and irrigation.
- Co-generation system coupled with an absorption chiller to achieve a 25% reduction in peak energy demand.
- Blackwater system capable of providing water for WC flushing, irrigation and cooling tower water consumption.
- Daylight Glare Control devices.
- PVC minimisation and use of sustainable timbers.

In addition a rainwater irrigation tank will be incorporated into the proposal for use by the Foreshore Authority. A rainwater tank of 550KL currently exists within the basement of the existing Sega World building. A tank of a similar size is to be provided on Basement Level 4.

5.10 Building Plant and Services

A Building Standard Report has been prepared by Bovis Lend Lease and is included at **Appendix G**. The report presents a technical description of the mechanical, electrical, communications, hydraulic, fire services and building automation systems required for the development.

5.11 Security Management

The Building Standard Report prepared by Bovis Lend Lease (**Appendix G**) details the proposed security management system. The system will comprise two key elements – access control and CCTV surveillance.

The access control is to be provided at the car park entry and exits, main building entry, loading dock, major plant rooms and all perimeter doors. CCTV cameras will monitor ground floor lift lobby area, perimeter of the ground floor, car park and building entries and other common areas.

5.12 Construction Management

A Construction Management Plan (CMP) has been prepared by Bovis Lend Lease and is included at **Appendix H**. The CMP sets out how appropriate management of the site will be achieved during the construction phase including site establishment, construction methodology, materials handling, site access, and loading/unloading areas.

The CMP includes environmental management plans for:

- Traffic and Pedestrian Management;
- Noise and Vibration;
- Waste Management;
- Erosion and Sediment Control; and
- Flora and Fauna Management.

These plans set out the objectives and measures for managing the environmental impacts of the construction phase.

5.13 Development Contributions

There is no Section 94 Contributions Plan that applies to the site. In lieu of a Section 94 contribution the proponent proposes to undertake significant public domain upgrades as indicated in Section 5.7. Specific details of the public domain upgrades will be included in a separate project application. However, the estimated value of the public works is \$8.7 million.

The proponent will enter into an agreement with the Foreshore Authority committing to the delivery of public domain works, this is reflected in the draft Statement of Commitments.

5.14 Staging

Construction (demolition) works are to commence in October 2008 and are planned for completion in January 2011.

The key stages of construction are:

- Site establishment works and demolition (consent for works granted under Major Project approval 06_0054);
- Stormwater drainage diversion works (subject to DA 122/08/08 lodged with Sydney Harbour Foreshore Authority);
- Installation of perimeter piling system and remediation (subject to DA 133/08/08 lodged with Sydney Harbour Foreshore Authority);
- Bulk excavation works (subject of this Project Application);
- Major structural works (subject of this Project Application);
- Installation of civil infrastructure, services and utilities (subject of this Project Application);
- Construction of buildings and basement car park (subject of this Project Application);
- Façade and roof installation works (subject of this Project Application);
- Fit-out and finishes to offices, retail units and children's theatre (subject to future application) ; and
- Landscaping, external works, rebuilding children's playground and provision of street furniture (subject to future application).

Note: Separate applications will be lodged for the building fit out and public domain works.

6.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the proposal. It addresses the matters for consideration set out in the Director-General's Environmental Assessment Requirements (DGRs).

The draft Statement of Commitments (Section 7) complements the findings of this section.

6.1 Director General's Environmental Assessment Requirements

Table 9 provides a detailed summary of the individual matters listed in the Director General's Environmental Assessment Requirements (DGRs) and / or identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 9 – Director General's Environmental Assessment Requirements

Director General's Requirements		Location in Report / Application
1	Relevant EPI's Policies and Guidelines	Section 3 and 6.2
2	Concept Plan	Section 6.3
3	Built Form	Section 6.4
4	Excavation and Construction	Section 5
5	Urban Design	Section 5, 6.3 and 6.4
6	Heritage	Section 6.15 and 6.16
7	Safety / Public Domain / Landscaping	Section 5.11, 6.7 and 6.16
8	Environmental and Residential Amenity	Sections 6.6, 6.8 and 6.9
9	Car parking / Traffic Impacts	Section 5.3 and 6.7
10	Environmental Management	Section 6.21
11	Ecologically Sustainable Development	Section 6.5
12	Contributions	Section 5.13
13	Drainage	Section 6.14
14	Flooding	Section 6.14
15	Groundwater	Section 6.11
16	Infrastructure	Section 6.20
17	Consultation	Section 4

6.2 Compliance with Relevant Statutory Plans

The proposal is permissible in accordance with the Darling Harbour Development Plan.

Table 10 provides a summary of consistency with key relevant strategic and statutory plans. The consistency of the proposal with other provisions and controls in the relevant environmental planning instruments is provided in the Tables of Compliance at **Appendix I**.

Table 10 – Summary Table of Compliance

Instrument	Comment
Darling Harbour Development Plan	The objectives of the Darling Harbour Development Plan No.1 are to encourage the development of a variety of tourist, educational, recreational, entertainment, cultural and commercial facilities and to set out those uses which are deemed permissible. The provision of commercial, retail, recreation, cultural and entertainment facilities are permissible uses and meet the objectives of the Plan. The proposed development therefore is in accordance with the Plan.
Major Project SEPP	The Darling Walk site is located within the Sydney Harbour Foreshore area, identified at Clause 10 of Schedule 2 of the Major Projects SEPP. On these sites, developments with a capital investment value of greater than \$5m (and declared by the Minister) are subject to the provisions of Part 3A of the EP&A Act. This Project Application is subject to assessment under Part 3A.
Sydney Harbour Catchment REP	Within the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (SREP), the Darling Walk site is identified as being within the: - Sydney Harbour Catchment Area; - Foreshores & Waterways Area Boundary; and - City Strategic Foreshores Area. Part 3, Division 2 within the SREP refers to matters which are to be taken into consideration by consent authorities before granting consent for development. The proposed Darling Walk Development is generally consistent with the relevant provisions and matters for consideration set out in Clauses 20 to 27 of the Sydney Harbour REP.
Infrastructure SEPP	The Infrastructure SEPP requires that applications for specific types of developments are referred to the Roads and Traffic Authority (RTA) for its comments prior to determination. As part of the process in formulating this Concept Plan the RTA has been consulted. The Project Application is required to be referred to the RTA.
SEPP 55 – Remediation of Land	Clause 7 specifies that a consent authority must not consent to the carrying out of any development on land unless it has considered whether land is contaminated and if the land is contaminated, it is satisfied that the land is/ can be suitable for the proposed development. An Environmental Site Assessment of the site has been prepared. The assessment considers that the site can be made suitable for the proposed development.

6.3 Compliance with Concept Plan

An overview of the Project Application's compliance with the Concept Plan is provided in **Table 11**.

The proposed development is generally consistent with Concept Plan, as required under condition A3 of the Concept Plan determination, as follows:

- the GFA proposed is within the maximum GFA approved;
- the proposed uses are consistent with those nominated in approved by the Concept Plan;
- the building heights are consistent with the height controls as defined in the Concept Plan;
- the buildings meet the design objectives of the Concept Plan, including providing a transition in height from Tumbalong Park to Harbour Street;

- a major 20m wide view corridor, radial to Tumbalong Park is provided;
- the Bathurst Street pedestrian bridge is augmented and integrated in the northern building;
- the buildings are sited within the approved building footprint; and
- the buildings will achieve a minimum 5 star ABGR rating.

There is a partial non-compliance with the tower setbacks established in the Concept Plan, however the proposal responds to the Concept Plan by providing an articulated rooftop. Further, the proposed buildings do not occupy the full extent of the approved development footprint. As a result, the buildings will generally cast less shadow than the approved Concept Plan envelope, resulting in a slight reduction in the overshadowing of the Chinese Garden (refer to discussion below).

Table 11 – Numeric Overview

Component	Concept Plan Control	Project Application	Compliance Yes / No
GFA (total)	maximum 68,000m ²	67,827 m ²	Y
Commercial		- 64,232 m ²	Y
Retail	maximum 5000m ²	- 2592m ²	Y
Cultural	minimum 1000m ²	- 1,000m ²	Y
Parking	200 tenant car parking spaces	200 tenant car parking spaces	Y
	600 public car parking space	600 public car parking space	Y
	Secure bicycle storage facilities	415 bicycle racks on Basement Level 2	Y
Heights (excluding roof and plant)	Tumbalong Park - RL26.2 Harbour Street - RL37.3	RL26.2 RL37.3	Y Y
Setbacks			
Harbour St	5m at southern building	5m	Y
Southern Building	6m from southern boundary of development footprint	6m	Y
Northern Building	3m from northern boundary of development footprint	5m	Y
Tower Block	35m from western boundary of building footprint	25.2m-37.1m	Partial non compliance
	30m from southern boundary of building footprint	21m-34.1m	Partial non compliance

Setbacks

The Concept Plan sought approval for up to 68,000m² of floorspace. An indicative layout and massing (as illustrated in **Figure 18** below) was also included in the Concept Plan.

The Concept Plan envelopes are representative of the building footprint and floorspace, rather than the final built form, which includes atriums, architectural roof treatments, projections and building shading screens and devices.

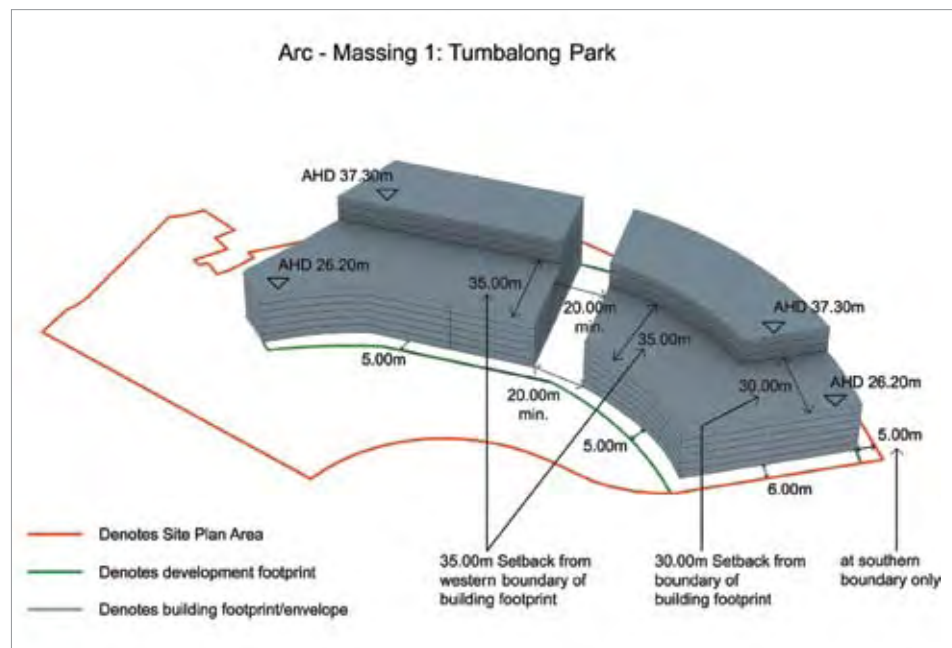


Figure 18 – Concept Plan Illustrative Arc Massing

The siting of the buildings is consistent with the Concept Plan. The setbacks to Harbour Street and the northern and southern site boundaries are also consistent with the Concept Plan. To further minimise the potential for overshadowing and to penetrate an improved north-south pedestrian connection into the wider Darling Harbour precinct, the buildings have been further setback, as illustrated in **Figure 19**.

At the northern and southern ends of each atrium, lifts, stairs, core and amenities serving each floor are provided. These are centrally located to service the floor spaces either side of the atrium. As a result there are minor encroachments into the tower block setbacks (refer to **Figure 19**), however, as noted above, the floor plates do not extend fully out to the building footprint established in the Concept Plan. This minor non-compliance to western setback does not create any additional overshadowing from that of the approved Concept Plan envelope.

The building setbacks and massing are also a function of the internal design.

A fundamental component of the building's design innovation is the inclusion of a large internal atrium located between the two floor plates. The atrium is designed to optimise the internal workplace environment by providing natural light and hub spaces for staff interaction, via stair cases and pods suspended in the atrium.

To enable the atrium to be proportional to the floor plates and functional in terms of providing solar access, the cores were required to be split and located to the end of each building to facilitate the central atrium.

As noted above and illustrated in **Figure 19**, the full extent of the approved building envelopes on the ground plane have not been utilised, with the north-west edge of the building re-aligned to help achieve an improved physical and visual connection between Darling Walk and the Cockle Bay precinct to the north.

The setback at the south eastern corner allows midwinter sun into the Chinese Garden. The minor encroachments will not cause any additional overshadowing nor other adverse environmental impact. The building design achieves a modulation in height and meets the setback objectives of the Concept Plan, including providing active frontages, enhanced landscape character and an appropriate safe setback from the Western Distributor.

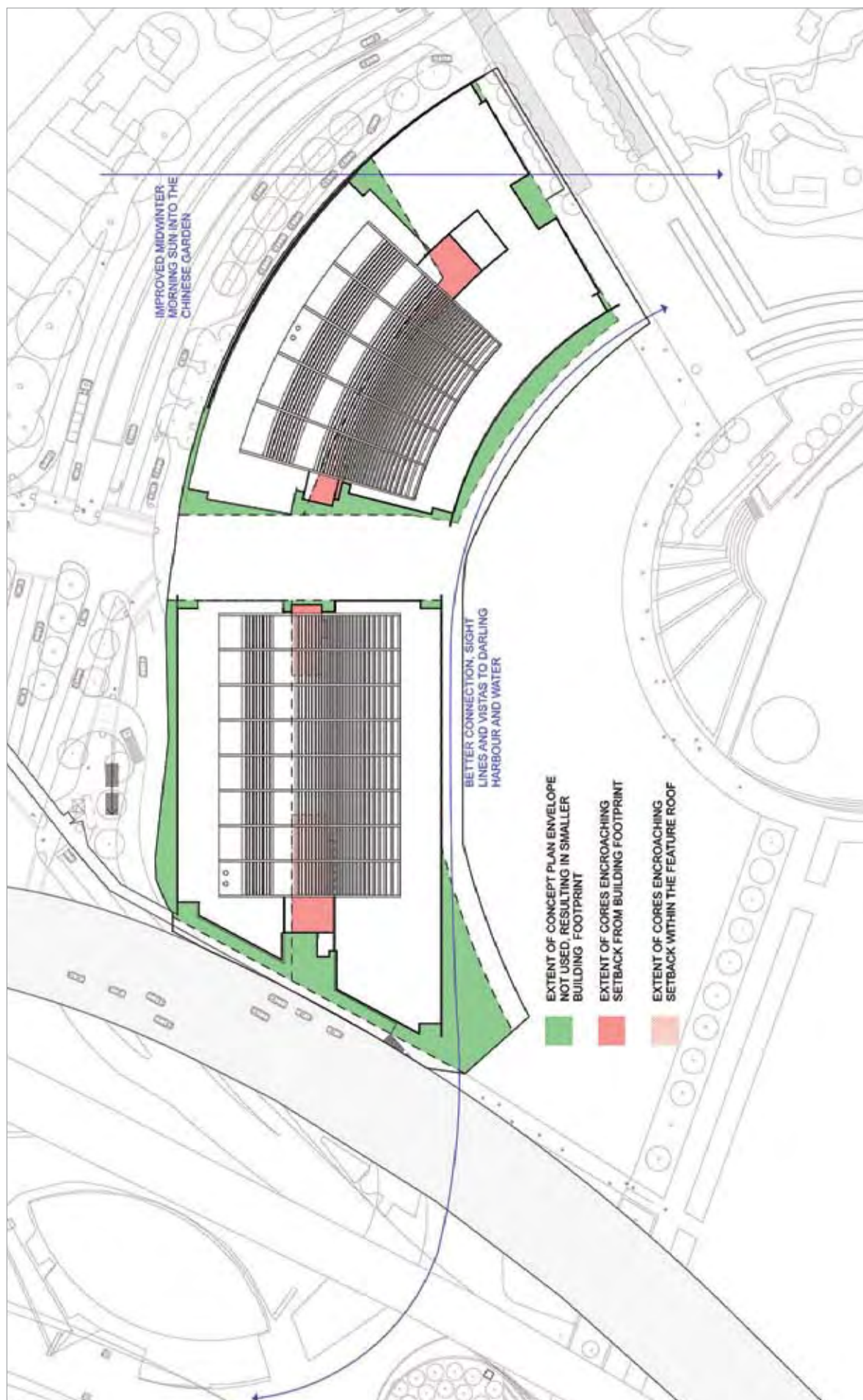


Figure 19 – Development footprint, proposed buildings and setbacks (Source: FJMT)

6.4 Urban Design and Built Form

The development seeks to reactivate the underutilised Darling Walk site by providing an increased working population, kids theatre, new public domain and activated ground floor with retail and commercial uses. The redevelopment of Darling Walk will provide a permeable and legible development, with a clear connection though to the CBD. The buildings have been sited in accordance with the Concept Plan, reinforcing curvilinear form of the site and providing a sense of containment to Tumbalong Park.

A clearly defined north-south pedestrian boulevard is proposed, bound by cafes and retail areas to enable activation of the western edge of the buildings. Retail/commercial space at ground level is also proposed along the Harbour Street frontage of the southern building to help activate the Harbour Street frontage.

A new at-grade entry to Darling Harbour is provided through the establishment of a 20m wide Civic Connector between the two buildings. This link effectively establishes a pedestrian extension of Day Street into the Darling Harbour public domain, linking with the north-south boulevard. The through site links provide a clear at-grade connection to the CBD and new view corridor from Bathurst/Day Street to Tumbalong Park. The Civic Connector will be activated by retail uses at the western end and by the commercial building lobbies at the Harbour Street end.

Built Form

The buildings generally follow the alignment of Harbour Street and provide a modulating built form, with a stepping up in height from the Tumbalong Park frontage to Harbour Street. This is consistent with the Concept Plan Design Criteria and Darling Walk Urban Design Guidelines.

The building design includes a 12m wide atrium through the centre of each building, resulting in 24.5m floor plates on either side of the atrium (refer to **Figure 20**). The atrium is a key feature of the design and the environmental performance of the building. The buildings provide a high quality contemporary office environment, with the atrium providing a high level of internal amenity by allowing solar access. Double height commercial lobbies identify and provide legible access from Harbour Street and the Civic Connector.

The office uses are complimented with ground floor retail uses along a new pedestrian promenade. Ground floor retail uses are also proposed for the Harbour Street frontage of the southern building providing the opportunity for the activation of Harbour Street.

For the northern building, the ground floor uses on Harbour Street include the commercial lobby, car park entry/exit and plant rooms. The north east corner on the ground floor does not include retail uses, as this area in the context of the site is remote from the key pedestrian access routes serving the site. Minimising pedestrian movements in this part of the site also avoids potential pedestrian/vehicular conflicts as the only vehicular entry into the basement carpark is via the northern building. Further, the required building services are most appropriately located in the northern east corner of the northern building.

Active ground floors uses along the Tumbalong Park frontage comprise outdoor seating areas, separated from the main promenade by changes of pavement material, a line of shade plantings and public seating.

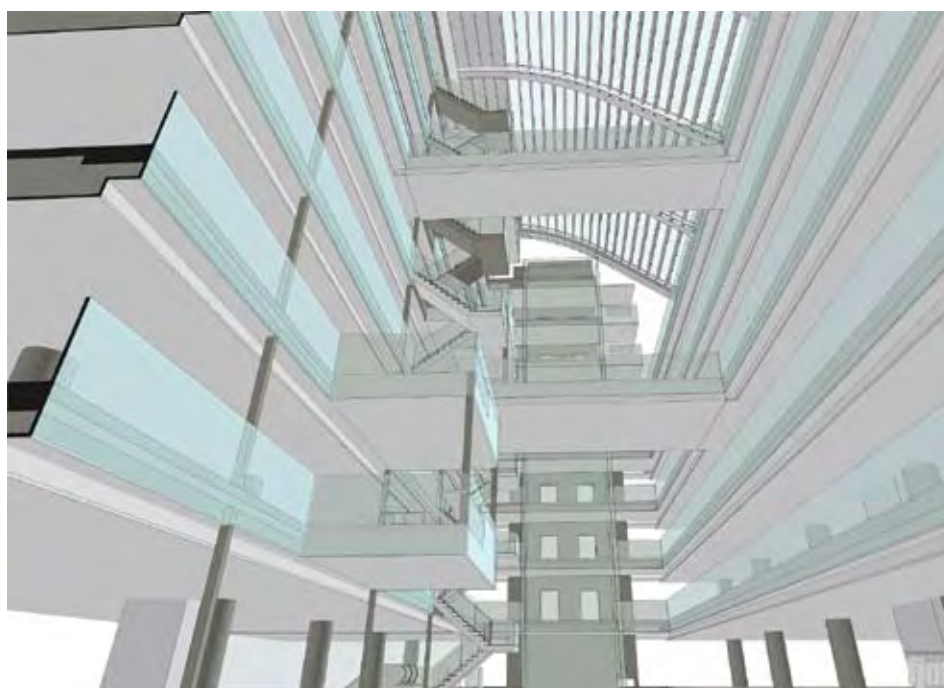
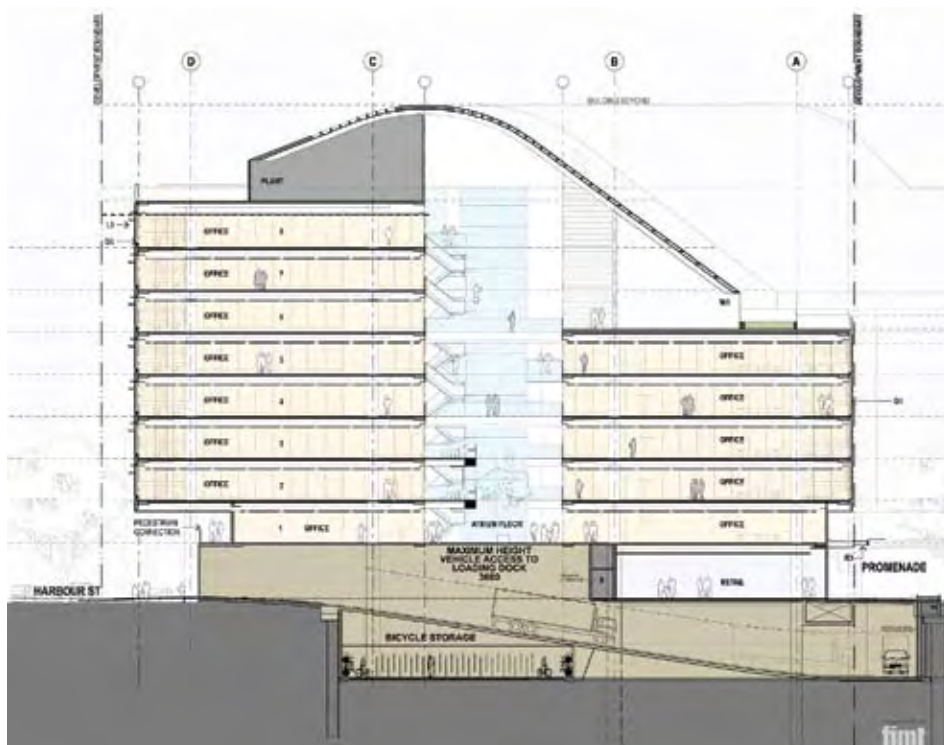


Figure 20 – Images of atrium (Source: FJMT)

Façade

The architecture and façade treatments are of a high quality and compliment the Darling Harbour precinct. Consistent with the Concept Plan, façade treatments are varied. The Harbour Street façade includes double glazed glass and angled aluminium sunshades. The Tumbalong Park façade incorporates timber elements and internal blinds to reduce internal glare.

The use of glass on the facades is designed to provide high transparency and visual connections into and out of the building. The sunshades and varied façade depths control solar access and reflectivity as well as giving the façades visual depth through shadowing.

Roof

An iconic articulated roof form, consistent with the Concept Plan is a key design feature of the new buildings. It is both functional and aesthetic, and has been designed to be predominantly light weight, transparent and elegant. The vaulted roof (refer to **Figure 21**) is a curving roof structure that is integral with the building massing and a key design feature of the buildings external response to the surrounding buildings.

As the roof of the new buildings will be highly visible from surrounding residential and commercial buildings, particularly those on the eastern side of Harbour Street, a high quality roofscape has been designed to minimise the visual impact of the plant and equipment on the roof.

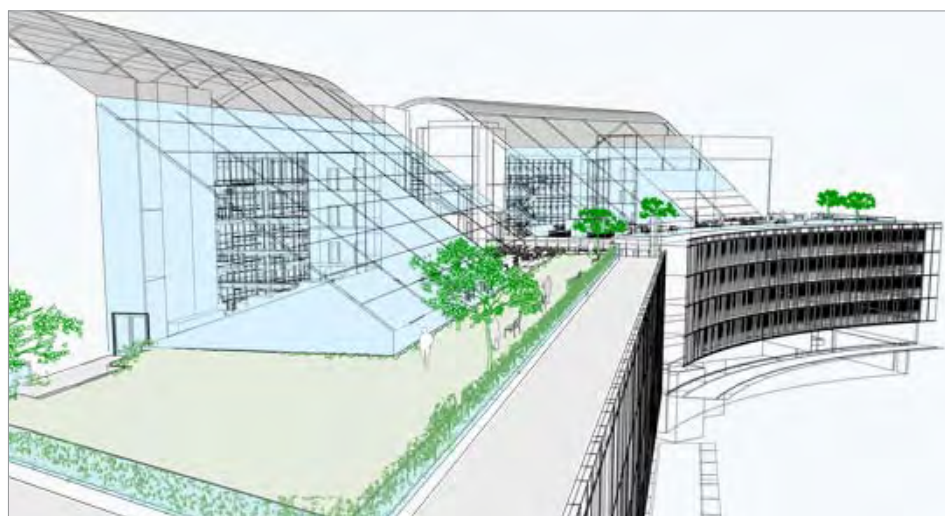
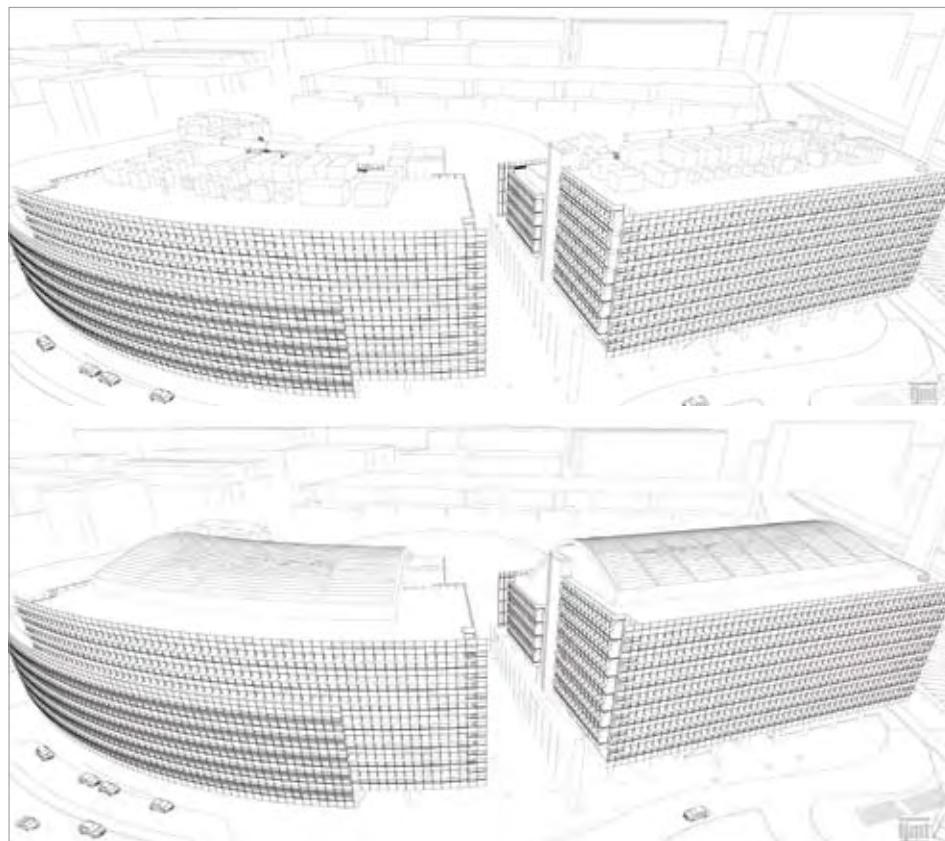


Figure 21 – Views of proposed roof (Source: FJMT)

The roof structure conceals the roof plant including cooling towers, generators, air handling units and fans and delivers a high quality roofscape. Above the cooling towers an open louvered roof is provided, ensuring functional requirements of the cooling towers are met. The vaulted roof allows daylight to penetrate into the atrium whilst limiting the transmission of heat and glare.

The curving roof form also softens the transition in the building heights from Tumbalong Park to Harbour Street, whilst allowing for the activation of the roofscape on the Tumbalong Park frontage.

The roof design is consistent with the Concept Plan which seeks to include architectural elements to integrate rooftop plant and equipment into the design and articulate roof forms to provide a quality roofscape.

Bathurst Street Footbridge

The Concept Plan approval (Condition B2) requires the integration of the Bathurst Street footbridge into the development and that any enhancement of the existing footbridge be of high quality design, safe, accessible and provide an integrated response to the building and surrounding public domain.

As discussed in Section 5.8 and illustrated in the architectural drawings (**Appendix D**), the existing section of the pedestrian bridge from Harbour Street into Darling Walk is to be demolished and replaced with a new pedestrian bridge integrated with the new northern building.

Access to the footbridge for persons with mobility difficulties will be provided via new lifts at the eastern and western ends of the footbridge. At the western end a new external lift will be provided at the northwest corner of the development, near the proposed McDonalds tenancy.

A new lift is also to be provided on the western side of Harbour Street, providing access to the bridge and a new pedestrian connection along the eastern elevation at Level 1 of the northern building. The augmentation of the existing footbridge, including the addition of the new lift and stair at the western side of Harbour St will be included in the Project Application for Public Domain works.

The western end of the pedestrian bridge will be above the proposed McDonald's tenancy. Spaces under the remainder of the pedestrian bridge on the northern elevation will be activated by the proposed McDonald's drive-thru roadway. Appropriate lighting and landscaping will also be provided to enhance the public domain. Details of landscaping and lighting treatments will be provided in the Project Application for the Public Domain. The drive thru and landscaping treatments will ensure that space under the footbridge will not become degraded or unsafe.

Safer by Design

The buildings have been designed to provide a safe environment for building occupants and the general public, meeting the safer by design principles. Ground floor retailing is provided to the majority of frontages in particular the western frontage and civic connector. Through landscaping measures pedestrians will be discouraged from walking at ground level around the north west area of the site to minimise conflicts with cars entering the site and trucks entering and exiting the site. A glass lift with night lighting will be provided to the pedestrian walkway at the north west corner.

The facades of the floors above ground level will be predominately glass, providing high visibility into the Darling Harbour public domain and along Harbour Street. This will allow for passive surveillance from above for crime prevention and reduction.

The landscaping and lighting of the Public Domain will be designed in accordance with the CPTED principles and further detail will be provided in the Project Application for Public Domain works.

Western Distributor

The existing Bathurst Street pedestrian bridge is at the north-east corner of the site, less than 1m at its closest point to the Western Distributor.

The proposed northern building is a minimum of approximately 5m from the Western Distributor as indicated in **Figure 22**. The new pedestrian footbridge, will also be about 8.5m below the kerbline of the Western Distributor.

In addition, the Concept Plan approval allows for the building footprint to be set back 3m from the Western Distributor. However, as noted in Section 6.3, the full extent of the building envelope has not been utilised along the northern elevation and at the north west corner. This provides greater separation between the Western Distributor and the new buildings than the approved Concept Plan envelope.

Given separation distances, neither the decking nor pylons of the Western Distributor will be able to be directly accessed from the building or pedestrian bridge.

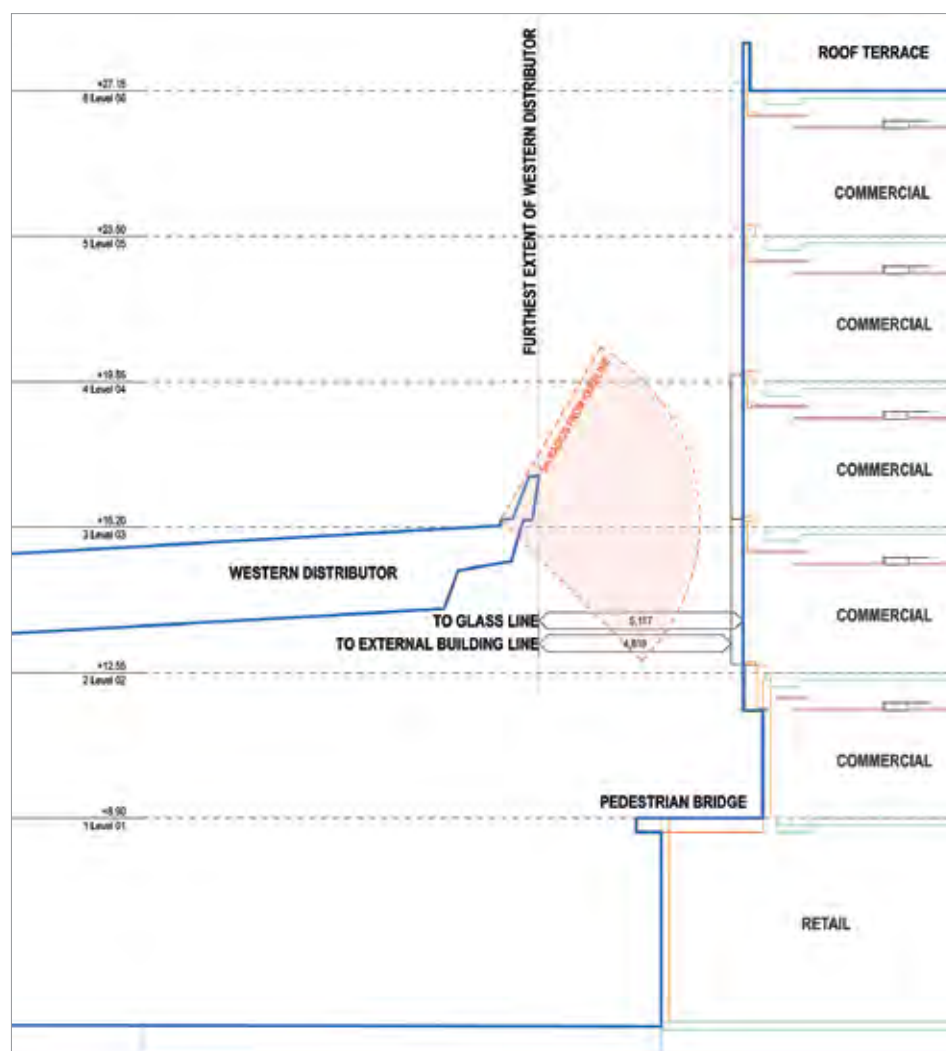


Figure 22 – Section of Western Distributor and northern building

6.5 Environmental Sustainability

The Concept Plan requires that buildings achieve a minimum 5 star Australia Building Greenhouse Rating (ABGR) for the building and a minimum 5 Green Star Buildings Council of Australia – Office Design v2 rating.

The proposed buildings have been designed to achieve a 5 star ABGR design rating and target a 6 Green Star rating in design. Arup have prepared an ESD Report (**Appendix F**) which identifies the key elements including architectural, mechanical, electrical, hydraulic, façade and ESD strategies to achieve the 6 Green Star target.

Assessment

Arup have assessed the requirements necessary to achieve a 5 Green Star rating and the additional requirements required to achieve a 6 Green Star rating.

The proposed development will be designed to achieve a 5 Green Star rating, however, the proposed design can achieve a 6 star rating provided that additional credits are achieved. The proposed design can achieve an overall weighted score of 76 points (1 point over the 6 Green star threshold) however in order to safely attain 6 Green Star rating, an overall weighted score of 79 points is sought.

Management

In order to achieve a 6 Green star rating, the following measures will be implemented:

- High performance clear double glazed west/ south façade with operable timber blinds to optimise daylight and thermal comfort.
- High performance upper dark glazed section capable of dealing with glare and a clearer glazed lower section shaded by a horizontal shading device on east/ north façade.
- Southern and northern facades at the short ends of the buildings to comprise full height glazing elements incorporating shading devices. The southern façade will comprise glazing which deals with heat loads and optimises daylight penetration.
- The northern façade adjacent to the western distributor will mostly be opaque to overcome reflectivity issues with smaller glazing openings to allow daylight penetration. Solar radiation will also be controlled to cater for the chiller beam system whilst optimising visual and thermal comfort of building occupants.
- A mechanical system is to include:
 - Co-generation plant providing electricity to the building coupled with an absorption chiller;
 - Energy efficient mechanical plant which will include high efficient chillers, boilers, fans, pumps, cooling towers and air handling units;
 - Increased fresh air rates provided by the mechanical system;
 - Sophisticated energy and water metering system;
- A blackwater treatment system to provide the maximum amount of non-potable water for the development.
- Stormwater recycling strategy (refer to Section 6.14).
- Green commuter strategy to seek to reduce the dependence on the use of private cars for transport to work.
- Provision of bike facilities, showers and change rooms.

6.6 Residential Amenity

The environmental amenity of the surrounding residential properties will not be impacted on by overshadowing, noise or loss of visual privacy as a result of the development.

The Residential Flat Code provides guidance on building separation which establishes controls to minimise amenity impacts including lack of visual and acoustic privacy, loss of daylight and overshadowing. For buildings of nine storeys (or over 25 metres) the building separation control is 24 metres between habitable rooms and 18 metres between habitable rooms and non-habitable rooms.

The residential apartments on the eastern side of Harbour Street are over 40m from the new buildings at their closest point. This is well in excess of the building separation recommended in the Residential Flat Code and there will be minimal impact on visual privacy. The roof plant will be appropriately attenuated and the vaulted roof structure will further reduce potential noise impacts.

FJMT (**Appendix D**) have undertaken an analysis comparing the overshadowing of the proposed building against the Concept Plan envelopes. The change in overshadowing between the Concept Plan and the final building design, including the roof structure is overall negligible. However the extent of overshadowing on Harbour Street is reduced from the proposed Concept Plan, and there will be no additional adverse impacts on surrounding residential properties.

Visual Impact

The redevelopment of the Darling Walk site will result in the creation of new public views and vistas into and out of Darling Harbour. The new buildings will also result in the loss or change of some views from existing buildings along Harbour Street. A visual impact analysis was included in the Concept Plan which found that impacts on private views were reasonable, particularly given the creation of new public views through the civic connector. Some private views will also be improved.

The approved Concept Plan heights of RL26.2 and RL37.3 are to the internal ceiling heights of the uppermost floors and the Concept Plan allows for mechanical and other building plant to be located on the building roof. The Concept Plan envelopes and visual analysis study did not include rooftop plant and equipment and detailed design had not been undertaken.

As a result of the rooftop plant there will be some additional view loss from some floors of the buildings on the eastern side of Harbour Street. FJMT has undertaken a view analysis study which is included in the Architectural Design Statement (refer to **Appendix D**).

The rooftop plant and equipment is up to 9.5 metres in height, which results in some additional loss of views down into Tumbalong Park from the upper levels of the Millennium Tower however, the upper levels still retain horizon views. Some private views directly west from the mid levels of the Millennium Tower will have diminished or changed views into Darling Harbour.

As set out in the Concept Plan, the visual impacts vary from building to building and within each of the buildings as some residences will experience a loss of views into Tumbalong Park or skyline views across Darling Harbour. Other residences will have new views created or there is change to views.

The articulated roof form, consistent with the Concept Plan is a key design feature of the buildings to significantly improve the visual amenity of the existing roofscape which will be overlooked by the surrounding properties.

6.7 Traffic and Pedestrian Management

Masson Wilson Twiney (MWT) have undertaken a traffic impact assessment of the construction works phase (**Appendix H**) and of the traffic impacts of the ongoing use of the building and public car park (**Appendix J**).

An assessment of the traffic and parking implications of the proposed development was also undertaken by Transport and Traffic Associates and submitted with the Concept Plan. Overall, the Concept Plan traffic assessment found that operational performance of Harbour Street will continue to remain generally satisfactory and the operational performance of Harbour Street intersections at Goulburn, Liverpool, Bathurst and Day Streets will not be adversely affected.

6.7.1 Construction Phase

The proposed construction hours are 7.00am-7.00pm Monday to Friday and 7.00am to 5.00pm on Saturday. Construction is estimated to take approximately 29 months, commencing November 2008. Approximately 20,400 trucks will visit the site during the construction period, with the number of trucks visiting the site ranging from 2 to 17 per hour (10 to 100 per day) depending on work being carried out.

Four entry/ exit gates will be established along Harbour Street as follows:

- Gate 1 – located just north of Liverpool Street (for exiting the site);
- Gate 2 – located about 100m north of Liverpool Street (for entering the site);
- Gate 4 – Existing signalised exit driveway at the intersection of Harbour Street/Day Street (for entry and exit);
- Gate 5 – Existing entry driveway to McDonalds Restaurant (for entering the site).

It is proposed that the truck marshalling area for trucks be in Hickson Road. From Hickson Road, trucks will travel south bound to Sussex Street, turn right into Liverpool Street, then turn right into Harbour Street and enter into the site via Gates 2, 4 or 5 (entering the site in a north bound direction off Harbour Street). Trucks exiting the site will turn left onto Harbour Street and proceed north over the Harbour Bridge or travel straight into Day Street to access Bathurst Street.

Assessment

Harbour Street is an arterial road running north south, generally two lanes in each direction. A signalised pedestrian crossing operates across Harbour Street at the intersection of Day Street/Bathurst Street. Harbour Street carries between to 1,200-1,450 vehicles per hour in each direction during peak hours. Footbridges crossing Harbour Street link to Bathurst Street at the northern site boundary and Liverpool Street at the southern end of the site.

As detailed above, about 20,400 trucks will visit the site during the 29 month construction period. The maximum number of trucks visiting the site is 17 trucks per hour, with an average of about seven trucks per hour. The estimated maximum truck generation trips of 17 per hour will have minimal impact on traffic operation in Harbour Street. Furthermore, intersection performance analysis for Harbour Street/Day Street and Harbour Street/Liverpool Street undertaken by MWT shows that both intersections operate at Level of Service B or better in peak periods and that construction traffic will have insignificant changes to the operation of these intersections.

With regard to pedestrian access, the pedestrian crossing at the Day Street / Harbour Street intersection is proposed to be closed during construction works. The footpath on the western side of Harbour Street will also be closed (the footpath will be closed for the demolition of the existing buildings). Pedestrians will be required to use the footpath on the eastern side of Harbour Street to access the pedestrian bridges to the north and south of the site, which will continue to provide access into Darling Harbour. There will be no public access through the site during construction.

Pedestrian movements on the western side of Harbour Street are generally low. In addition the current pedestrian movements generated from the existing site uses will not occur. Therefore the impact on pedestrians will be low.

Minor works to the footpath and kerb on Harbour Street will be required for the construction of new entry gates. These works will require closure of the northbound kerbside lane of Harbour Street for a limited time. To minimise traffic disruption these works will be carried out at night and completed in one night.

There will be no re-direction of public transport required during the construction phase.

Management

Hoardings installed during demolition will remain in place during construction and all works, loading and unloading will occur within the site.

Traffic control plans as detailed in the MWT report will be implemented by the proponent. Closure of any lane or road is not required, however advanced warning signage of truck movements will be provided on the northbound lane of Harbour Street.

Night road works will be undertaken in accordance with the Traffic Control Plan included in the MWT report. Advanced warning signs will be installed in Harbour Street to inform drivers of the lane closure. The speed limit will also be reduced to 40km/h in the work area and immediate approach.

The Pedestrian Way Finding Signage Plan (as detailed in the **Appendix H**) will be implemented by the proponent to assist and direct pedestrians to alternative pedestrian crossing facilities, including signalised crossings and footbridges at Bathurst Street and Liverpool Street.

6.7.2 Operation Phase

The completed buildings will include 200 tenant car parking spaces and a 600 space public car park. The public car park as proposed in the Concept Plan will operate 7 days a week, 24 hours a day with the management and pricing structure similar to the existing Entertainment Centre Car Park.

Vehicle access into the site is proposed to be (as set out at Section 5.8 above) a single entry point leading off a fourth leg from the existing Harbour Street/ Day Street intersection. The proposed exit for the tenant and public car park is at the southern side of the southern building, near to the Liverpool Street/ Harbour Street intersection. The entry and exit point for service vehicles is the Harbour Street/ Day Street intersection. A separate set-down/ pick up access lane off Harbour Street is proposed on the eastern side of the southern building.

The upgraded Bathurst St footbridge over Harbour Street will provide significantly improved access directly to the site and the northern building. The pedestrian bridge will provide access directly into Level 1 of the northern building and the main foyer space.

Traffic Assessment

Current Annual Average Daily Traffic counts indicate that Harbour Street carries about 37,000 vehicle trips per day, with counts at Liverpool Street indicating an average annual increase in traffic of about 1%. The existing two-way peak hour flows along Harbour Street during the morning and afternoon peak periods are shown in **Table 12**.

Table 12 – Existing two-way peak hour traffic flow

Location	Morning Peak	Evening Peak
Bathurst Street, east of Harbour Street	1,676	1,141
Day Street, east of Harbour Street	335	349
Harbour Street, south of Bathurst Street	2,422	2,701
Harbour Street, south of Day Street	2,650	2,911
Harbour Street, south of Liverpool Street	2,767	2,941
Liverpool Street, east of Harbour Street	378	618

Harbour Street has peak hour two way traffic volumes of between 2,400-2,900 vehicles per hour.

An assessment of post development traffic conditions was included in the Concept Plan which estimated that 270 vehicles per hour (vph) will be generated during the peak periods as shown in **Table 13**.

Table 13 – Post Development Traffic Generation

Use	Morning Peak	Evening Peak
Tenant Car Park	52	38
Public Car Park	186	188
McDonalds Drive Thru	30	40
Total	268	266

MWT have also undertaken an assessment of the post development performance of the Day Street and Liverpool Street intersections with Harbour Street, which is summarised in **Table 14**.

Table 14 – Intersection performance analysis

	Morning	Evening
Intersection	Level of Service	Level of Service
Harbour Street / Day Street		
Existing Conditions	B	B
Post Development	C	C
Harbour Street / Liverpool Street		
Existing Conditions	A	B
Post Development	B	D

Level of Service B is considered good, with acceptable delays and spare capacity, Level of Service C is satisfactory and Level of Service D is operating near capacity.

MWT consider that the traffic and parking aspects of the proposed development are satisfactory and that the key intersections will continue to operate satisfactorily.

Management

A Car Park Management Plan that specifies the charging rates, signage and conditions of use for the public car park. A Green Commuter Strategy will also be prepared which will include initiatives to reduce private car use and encourage public transport use, cycling and car pooling.

Conclusion

Overall, it is considered that the proposed access arrangements, car parking arrangements and development will not incur any significant adverse impacts. It is proposed that a Car Park Management Plan and Green Commuter Strategy will be prepared and submitted for approval prior to the Occupation Certificate for the building and public car park.

6.8 Noise and Vibration

Acoustic Logic have undertaken a noise and vibration impact assessment, included at **Appendix H**. The report assesses the noise and vibration levels that are likely to occur during the construction phase.

6.8.1 Noise

Existing Conditions

Acoustic Logic have calculated noise levels from piling works and construction activities at selected noise sensitive receiver locations surrounding the site. These include residential receivers being Millennium Towers Apartments and Emporio Apartments and commercial receivers being the Union Offices, Global College, Police Station and Imax Cinema.

For each of the 6 receiver locations, Acoustic Logic measured the existing background noise levels. Typical background noise levels recorded for Day Street and the Imax Cinema are set out below:

Table 15 – Typical background noise levels for Day Street

Measurement Location	Time Period	Background Noise Level L ₉₀ dB(A)
Along Day Street and at the Imax cinema	7.00am – 8.00am	59
	8.00am – 7.00pm	60

Assessment

The construction phases of a building can be separated into the following five categories. These comprise:

- Demolition
- Excavation
- Erection of Structure
- Installation of Façade/ external finishes
- Internal fit out/ internal finishes.

Noise levels generated for each stage are dependent upon the activities undertaken within each stage and the equipment used. Excavation works have been assessed as one of the noisiest stages of construction, whilst the erection of the structure and the installation of the façade/ external finishes are not expected to produce as high noise levels.

Acoustic Logic have calculated the predicted noise levels for each stage of construction. These activities comprise piling, excavation and construction. The analysis includes the following information for each noise receiver:

- the time period for which noise levels are predicted;
- the type of construction activity;
- the resultant noise level at the noise receiver (these take into account any mitigation measures which will be applied to the construction activities, and represent the attenuated level);
- the measured background noise levels;
- the relative magnitude of the activity to the background noise level;
- the construction noise criterion; and
- the nomination whether noise from the construction activity complies with the nominated criterion

For the commercial noise receivers along Harbour Street, the analysis also includes the following information;

- the resultant internal noise levels at the receiver location from the subject construction activity.
- the internal noise criteria based on Australian Standard 2107-2000 'Acoustics Recommended Design Sound Levels and Reverberation Times for Building Interiors'; and
- the relative magnitude of the activity to the nominated internal noise criterion.

Acoustic Logic consider (as adopted by the City of Sydney code of practice) that the following noise goals are acceptable:

- Between 7.00am and 8.00am – $L_{av\ max} \leq \text{Background} + 5\ \text{dB(A)}$
- Between 8.00am and 7.00pm – $L_{av\ max} \leq \text{Background} + 10\ \text{dB(A)}$

Furthermore, the resultant noise levels at the noise receivers for the activities proposed will comply with the noise goals and the criteria within the relevant Australian Standard and City of Sydney code of practice.

Compliance with the above noise levels will therefore minimise the noise impacts. The receiver locations, as set out above, present the locations where noise impact would be at its greatest. Therefore if noise levels are deemed to be acceptable at these locations, they will be acceptable at all other locations.

Management

To minimise noise emissions from the construction process, noise goals recommended by Acoustic Logic (as set out above) will be adopted.

Mitigation measures will be undertaken to reduce noise (as specified in the Noise Management Plan at **Appendix H**) these include the use of equipment that generates the least noise, use of noise barriers, screens and silencing devices, regular noise checks and monitoring of noise management measures.

Once final mechanical plant and equipment has been selected an external noise assessment will be carried out at Construction Certificate stage to ensure external noise emissions comply with the relevant industrial noise standards.

The above management measures including implementation of the Noise Management Plan are reflected in the Draft Statement of Commitments.

6.8.2 Vibration

Vibration during construction, can potentially impact upon human comfort. In order to mitigate any adverse impact, it is proposed that the following vibration criteria will be applied during the excavation and construction works.

Table 16 – Vibration Criterion

Location		Vibration Limitation PPV
Nearest Residential building facade		10 mm / s
Cross City Tunnel		20 mm / s
Service Authorities Infrastructure (Drains, sewers etc).	Steel Structure	20 mm / s
	Brick/ Masonry Structure	5 mm / s
	Other Fragile Structure	2 mm / s

Management

To manage vibration emanating from the proposed works within the abovementioned acceptance criteria, vibration monitoring will be implemented during the works. In addition, the proposed works will comply with all relevant Australian Standards. A commitment to implement these measures is included in the Draft Statement of Commitments.

6.9 Wind Impact

Windtech Consultants Pty Ltd have prepared a Wind Environment Statement (**Appendix K**), which assesses the likely impact of the proposed design of the buildings on the wind environment within and around the site.

The current prevailing winds are from the north-east and south between the months of September to April and from the west between April and September.

Assessment

Windtech consider the potential wind impacts to be on the outdoor ground level areas within and around the site and roof gardens on both buildings.

Due to shielding from adjacent buildings to the north and east of the site, proposed trees along the eastern side of the development and the design of the roof, it is not expected that the north-easterly winds will have any adverse effects on the outdoor areas surrounding the site, pedestrian footpaths and thoroughfares and proposed roof gardens.

Similarly, the Chinese Garden, proposed trees and the development itself will shield the outdoor ground levels within and around the site from southerly winds. It is not expected therefore that the southerly winds will have any adverse impact upon the outdoor areas within the site, surrounding streets, pedestrian footpaths and thoroughfares. The roof gardens however are expected to be somewhat exposed to the southerly winds.

The development will provide a stagnation effect to the westerly winds at outdoor ground levels along the western side of the building. In addition the trees surrounding Tumbalong Park are expected to mitigate adverse wind impacts from the westerly winds. Windtech consider that the proposed development will not have any adverse wind impacts on the surrounding local streets and footpaths. It is noted however that the proposed roof gardens will be somewhat exposed to the westerly winds.

Management recommendations to mitigate the impact of the winds upon the roof gardens are set out below. Additional planting of trees within the public domain is also expected to improve general wind conditions across the site.

Overall however, the proposed development is not expected to be exposed to any strong adverse wind effects.

Management

As the lower roof areas of the buildings are to be trafficable, densely foliated vegetation and/ or impermeable balustrades will be provided within the roof gardens.

6.10 Geological Considerations

Arup have prepared a Geotechnical Appraisal of the site (**Appendix L**), which describes the engineering approaches that will be adopted for the in-ground works. Appended to the Arup report are the following reports:

- Geotechnical Site Investigation, prepared by Arup Geotechnics Pty Ltd (Arup), dated January 1995;
- Preliminary Geotechnical Desk Study, prepared by Coffey Geosciences Pty Ltd (Coffey), dated March 2006; and
- Assessment of the Impact of proposed Darling Walk Development on City West Cable Tunnel, prepared by Pells Sullivan Meynink Pty Ltd (PSM), dated March 2008.

In addition, Coffey has prepared a separate Geotechnical Investigation, dated May 2008 (**Appendix L**). ENSR have also considered the characteristics of the soil and groundwater within their Stage 2 Detailed Site Investigation Report (**Appendix M**) and Bovis Lend Lease have considered the same characteristics within the Dewatering Management Plan (**Appendix N**).

Existing Conditions

The Preliminary Geotechnical Desk Study undertaken by Coffey in March 2006 and their Geotechnical Investigation Report, May 2008 found that the subsurface profile of the site varies across the site, with the top rock level ranging from 2.45m on the east side which deepens towards the west and south to approximately 10.1m below the ground surface. The subsurface profile comprises the following:

Table 17 – Subsurface profile

Unit	Depth to Top of Unit (m)	Thickness (m)
1 - Fill	0	2.3 to 8.4
2 - Alluvium	2.9 to 7.0	2.8 to 5.8
3 - Residual Soil	2.3 to 8.5	>1 to 2.8
4A - Class V Sandstone	1.7 to 10.1	0 to 1.35
4B - Class IV Sandstone	2.0 to 13.1	0 to 1.8
4C - Class III Sandstone	3.8 to 14.5	4.2 (in BH 105)
4D - Class II Sandstone or better	9.5 to 14	Not penetrated

Mapping of the GPO Fault Zone has also found that it crosses the middle of the site.

Assessment

The lower basement level of the development will have a finished floor level at approximately -8.4m AHD, and minor localised excavations beyond this depth for lift pits and footing and piled foundations. The maximum depth of excavation is therefore expected to be approximately 12m to 14m below the existing ground surface level (i.e. between -8.75m and -11.95m AHD).

The excavation is expected to penetrate the site through Units 1, 2 and 3 and in to Unit 4A, 4B and 4C sandstone and even 4D in some locations. The excavation will penetrate below the ground water level, which ranges from approximately 1.8m AHD to -1.3m AHD.

In addition, the City West Cable Tunnel, is currently under construction and lies beneath the site at approximately RL-27.0m to RL -28.0m. The tunnel runs from Tumbalong Park eastwards, through the approximate centre line of the northern tower towards the Cross City Tunnel. The PSM impact assessment considers that the proposed basement excavation and building loads, will result in extremely small movements, largely due to the good quality rock beneath the site, the relatively shallow basement depth and the considerable vertical separation that exists between the tunnel and the basement.

Given the proposed tunnel lining system and the serviceability requirements of the tunnel, PSM consider the risk of negative physical impacts on the tunnel is insignificant.

Management

There have been a number of recommendations and options made in the Coffey (May 2008) report for the proponent to consider and apply. Through further consultation with Coffey and Arup the following structural systems will be implemented to control the ground water levels, settlement and potential ground movement:

- Prior to excavation, a CFA shoring system will be installed down to rock levels around the entire basement perimeter. The 750mm diameter piles will be located at 1500mm centres. The gaps between the piles will be grouted using a Jet Grout system. This wall system is designed to oppose any expected surcharges, hydrostatic pressures and horizontal earth loads.
- The toe of the CFA piles will be socketed at least 600mm into the rock. During excavation, rock anchors will be progressively installed at intervals depicted by the structural engineer.
- In areas where the excavation is deeper than the pile toe, it is envisaged that water flows will be minimal. Should localised flow be encountered, high pressure grout injection will be used to reduce or stop the flow of water.
- Exposed rock faces are expected on levels B3 and B4 along the eastern side (Harbour Street) of the basement excavation. Water penetration in the final state will be managed with a subsoil drainage system. In the construction phase, all subsoil water will be pumped to sedimentation ponds and treated if required.
- Subsoil water in the final state will be pumped into the stormwater drainage network. No treatment is expected as defined in the ENSR report.

In addition, Coffey (May 2008) advise that the foundations within the basement can comprise pad or strip footings, and for areas where little or no excavation is proposed, bored piles or continuous flight auger (CFA) grout or concrete injected piles that penetrate to bedrock will be required.

6.11 Groundwater Impact

ENSR have undertaken a Stage 2 Detailed Site Investigation (**Appendix M**).

Forty-nine boreholes were drilled and seven boreholes were converted into monitoring wells to determine the existing groundwater and assess its quality. The groundwater was tested for heavy metals, petroleum hydrocarbons, monocyclic hydrocarbons, semi-volatile organic compounds, volatile organic compounds and polychlorinated biphenyls and the results were compared against the marine water setting the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000) and other relevant guidelines. Site Assessment Criteria from these guidelines were then adopted for analysis purposes.

Assessment

Groundwater Levels and Flow

Ground water levels encountered within the boreholes during the subsurface investigation ranged from approximately 1.8m AHD to -1.3m AHD. Within the seven monitoring wells the groundwater levels ranged between approximately 0.3m AHD and -0.6m AHD. The levels vary seasonally and are influenced by tidal movements in Darling Harbour. At high tide, they range between 0.36m AHD and -0.56m AHD and at low tide they range between 0.34m AHD and -0.56m AHD.

The groundwater gradient at the site is expected to be north-west toward Cockle Bay and Darling Harbour and the groundwater generally flows in a westerly direction.

The groundwater flow in the fill is expected to be highly variable across the site and the flow velocity in the natural material underneath (soil and bedrock) is likely to be more consistent across the site. ENSR note however that the bedrock is controlled by fracture geometry.

It is estimated that the fills and soils overlying the sandstone bedrock will contain approximately 8,500m³ of water and that the majority of this water will be removed from the site with the soil, during the bulk excavation stage of construction.

It is expected however that groundwater flows through defects in the sandstone rock will be relatively minor, however significant local groundwater inflows may be possible if major structure is encountered within the rock mass. Inflows into the excavation could be in the order of 100 litres/ hour through the sandstone rock mass but up to 1000 litres/ hour based on 25% of the rock mass containing significant structure in the form of joints with small openings. To manage these flows dewatering will be implemented.

Groundwater Quality

An assessment of the groundwater quality was also undertaken. The results of the water quality measurements found the presence of fresh saline conditions, hydrogen sulphide odour due to the presence of potential acid sulphate soils, and a minor exceedence of copper and arsenic above the Site Assessment Criteria. The pH level of the groundwater indicated normal conditions and no petroleum hydrocarbon odours were observed at any monitoring wells.

Based on groundwater laboratory results, the groundwater contamination is not considered to significantly pose risk of harm to human health or the environment.

Management

The basement has been designed to include a retaining soldier pile wall with jet grout infill between the piles. However, dewatering is considered necessary during the construction phase of the development and as an ongoing measure.

Bovis Lend Lease have prepared a Dewatering Management Plan (**Appendix N**). The key management methods included within the DMP include grouting of defects in the rock mass and the basement walls, use of sump and pump methods, treatment of extracted groundwater prior to discharge if necessary and ongoing water quality monitoring will be performed.

In addition, ENSR consider that the groundwater will require management during the disturbance of acid sulphate soils as part of the excavation works. An Acid Sulphate Soils Management Plan is included in **Appendix O**.

Lend Lease Development commit to implementing the Acid Sulphate Soils Management Plan and the Dewatering Management Plan. This is reflected in the Draft Statement of Commitments.

6.12 Contamination

Environmental Investigation Services (EIS) undertook a preliminary environmental site assessment for the Concept Plan. This was based upon the analysis of six bore holes across the developed part of the site.

The results found that elevated levels of benzo(a)pyrene (B(a)P) and nickel were evident, however it was considered that contamination was isolated to hotspots.

ENSR Australia Pty Ltd have subsequently undertaken a Stage 2 Detailed Site Investigation (**Appendix M**) for the whole of the Darling Walk site. This involved:

- review of historical, geological and hydrogeological information;
- site inspection;
- development of a conceptual model of contamination at the site;
- development of a sampling, analysis and quality plan to assess the nature and extent of contamination identified at the site;
- drilling and analysis of 37 boreholes and 12 hand auger locations;
- conversion of 7 boreholes to ground water monitoring wells;
- groundwater monitoring and sampling; and
- laboratory analysis of soil and groundwater sample.

Assessment

In undertaking the detailed analysis, ENSR split the site into 4 separate areas, comprising:

- Site 1 – Public domain 7,827m²
- Site 2 – Public Domain/ Development Lot – 2,030m²
- Site 3 – Development Lot – 18,087m²
- Site 4 – Public Domain – 1,055m²

These are illustrated below in **Figure 23**.

ENSR consider that the historical use of the site (various industrial and commercial activities) and the previously identified extensive filling on the site, present the potential for contamination from substances such as heavy metals, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), organochlorine pesticides (OCPs) and asbestos.

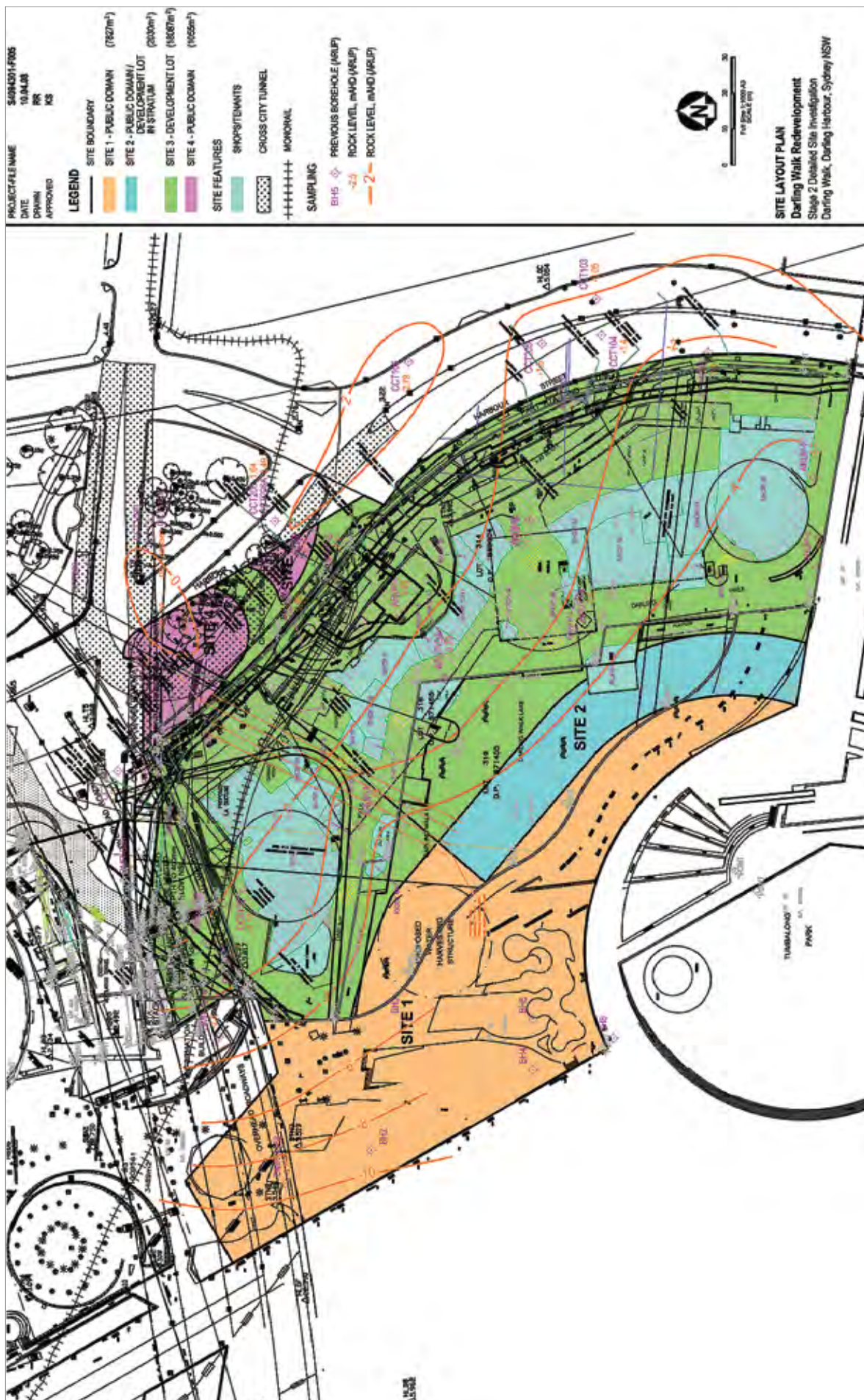


Figure 23 – Contamination survey sites

The results of the Stage 2 investigations found:

- Concentrations of VOCs ranged from 0 to 33.8 ppm across the site.
- Concentrations of heavy metals, phenols, TPH (C₆C₉), OCPs, OPPs, VOCs, SVOCs, PCBs and asbestos were found to be less than the site assessment criteria (SAC).
- Concentrations of TPH (C10C36) were found to be less than the SAC in all samples with the exception of 2 boreholes;
- Concentrations of BTEX were found to be less than the SAC in all samples with the exception of 1 borehole; and
- PAHs were found to be less than the SAC in all samples with the exception of 4 boreholes.
- The soils samples taken from the part of the site to be excavated meets the waste classification criteria for "General Solid Waste".
- Concentrations of heavy metals, cations and anions within the Lake Water were less than the site criteria, with the exception of copper, which reported a concentration of 0.004mg/L. The soil data however, does not indicate the presence of a source of copper at the site.

ENSR consider that the elevated concentrations of contaminants appear to be localised and not associated with a particular layer of fill, however they marginally exceed the SAC within sites 1, 3 and 4. Based on the results, ENSR concluded that the fill materials at public domain sites 1 and 3 are considered suitable for the commercial and recreational use.

However, the fill materials at the public domain site 4 are not suitable for the recreational land use as PAHs and B(a)P levels at one location is above the SAC, although this is considered an isolated hotspot which can be remediated.

In ENSRs opinion, the site can be made suitable for the proposed commercial and public open space land use.

Management

In accordance with the Concept Plans Statement of Commitments and ENSRs recommendations, in conjunction with the commencement of bulk excavation works on the site, a Remedial Action Plan (RAP) has been prepared. This addresses the site 4 hotspot and any potentially impacted materials that may be encountered during the excavation of the site. It also includes procedures for identification, classification and management of materials for on-site retention / reuse or off-site disposal.

If during the excavation works any materials are encountered that are different to those found within the Stage 1 or Stage 2 investigations, an assessment of the materials will be undertaken in accordance with the RAP.

A separate development application has been lodged with the Foreshore Authority for remediation works on the site and includes the RAP.

6.13 Acid Sulphate Soils

Environmental Investigation Services (EIS) undertook a preliminary Acid Sulphate Soils Assessment during the process of preparing the Preliminary Environmental Site Assessment for the Concept Plan. This preliminary Acid Sulphate Soils Assessment identified the presence of potential acid sulphate soil (PASS) conditions in natural soils on the site.

The Stage 2 Detailed Site Investigation, undertaken by ENSR found potential acid sulphate soils across the site in both laboratory analysis and field observations at depths ranging from -3.0m AHD to >0.6m across the proposed excavation areas of the site. In addition, mild to strong hydrogen sulphide odours were observed at some borehole locations.

Management

ENSR consider that on-site management and testing of PASS will be required prior to off site disposal at a landfill facility. In order to ensure this, ENSR have prepared an Acid Sulphate Soils Management Plan (**Appendix O**) which forms part of the RAP lodged with the application for remediation works to the Foreshore Authority. The strategies set out within the management plan include:

- site management to ensure that PASS materials are kept separate from non-PASS materials;
- leachate control to ensure that no acid is released in to the water system;
- treatment of PASS, including soil sampling and analysis during the treatment;
- proposed methods and strategies in relation to the transportation of acid sulphate soils;
- PASS off-site disposal; and
- water quality treatment strategies.

These strategies will ensure that the potential acid sulphate soils material is removed and treated in an appropriate manner and leachate water from the acid sulphate soils material will also be managed and treated to ensure that no acid is released to the environment.

Lend Lease Development commit to the implementation of the Acid Sulphate Soils Management Plan and this is reflected in the Draft Statement of Commitments.

6.14 Stormwater and Flooding

An Infrastructure Report (prepared by Robert Bird Group) included with the Concept Plan assessed the existing infrastructure servicing the site. The Infrastructure Report found that there is generally adequate capacity in the existing infrastructure to meet the demands of the proposed development. Specifically, the report found the following:

- There will be no increase in stormwater run-off as a result of the proposed development.
- Existing stormwater drains have reserve capacity and that site stormwater drainage lines could be connected to the system.
- The water mains servicing the site have adequate capacity and pressure to service the proposed development. Internal pressure boosting may be required for the upper floor level.
- An existing 450mm gravity fed sewer mains currently services the site. The connection to the sewer main may need to be upgraded.
- Up to three substations may be required to service the proposed development.

6.14.1 Stormwater Management

Hyder Consulting have prepared a Stormwater and Erosion and Sediment Control Report which is included at **Appendix H**. Robert Bird Group have prepared a Services Infrastructure Report (**Appendix P**) and Worley Parsons have prepared an update of the Darling Walk Flood Study (**Appendix Q**).

The stormwater management strategy for the site comprises Water Sensitive Urban Design (WSUD) measures and conventional piping systems, and includes the following:

- stormwater collection and reuse;
- rainwater tanks and treatment plant;
- use of rainwater for public domain irrigation;
- use of non-potable water for cooling towers, irrigation and toilet flushing;
- diversion of the James Street stormwater drain;
- connection to existing stormwater infrastructure.

The Public Domain and Road Works Project Application will also include further details on WSUD.

Construction Phase Assessment

The James Street Stormwater drain currently traverses the site and requires diversion to allow for the construction of basement structures. The diversion of the James Street Stormwater drain is illustrated in **Figure 24** and at **Appendix CC**. This is the subject of a separate development application, submitted to the Foreshore Authority for assessment under Part 4 of the EP&A Act.

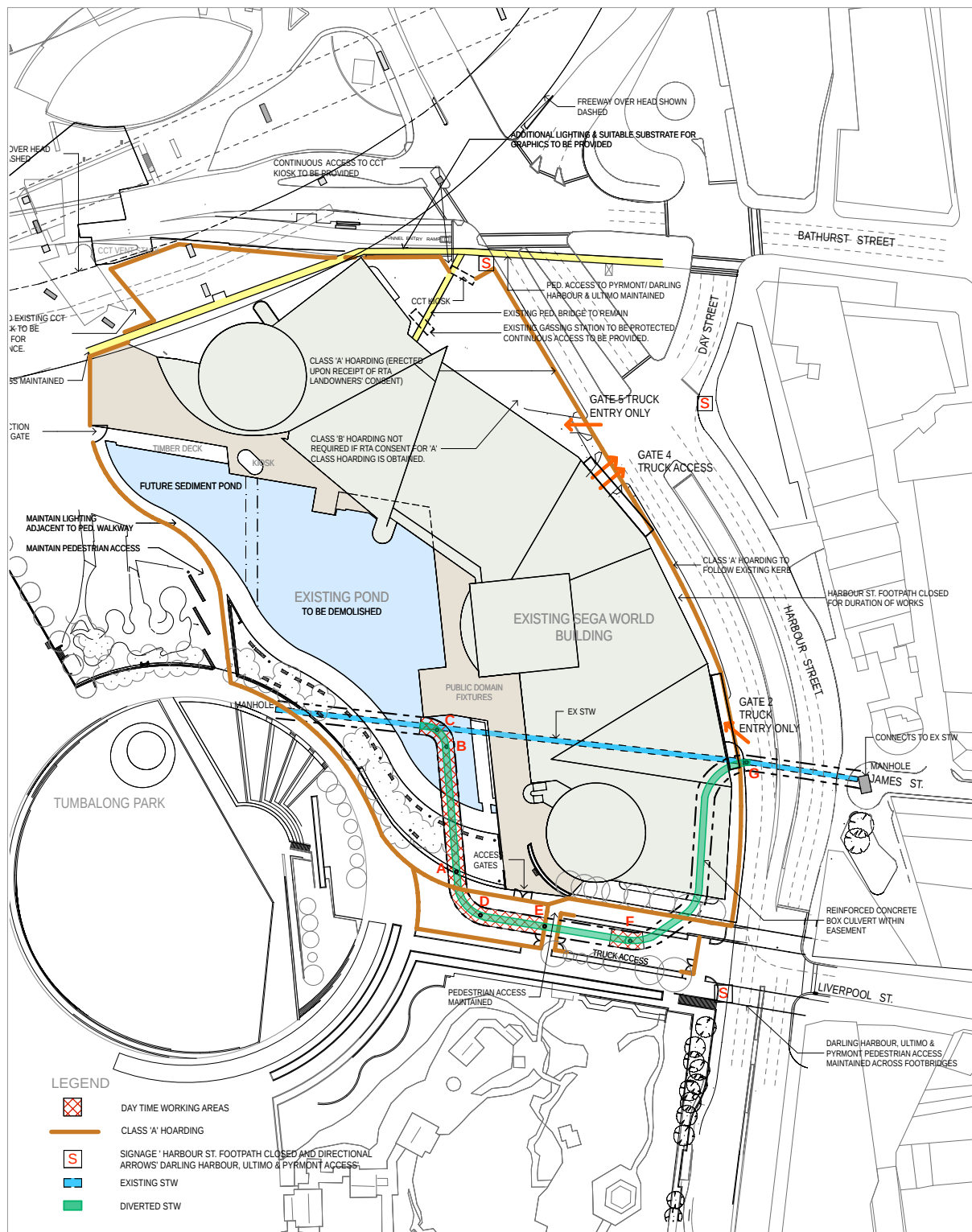


Figure 24 – Stormwater Diversion Plan

To manage erosion and sedimentation during construction an Erosion and Sediment Control Plan has been prepared and is included in the Construction Management Plan (refer to Section 6.22). A sediment control basin will be established on site to collect sediment generated during construction. The sediment control basin will operate in accordance with the requirements of the *Managing Urban Stormwater: Soils and Construction Manual*.

Where possible, water from the basin will be utilised for dust management, with excess water discharged to the existing Hay-Lackey stormwater drainage culvert. Prior to discharge, the water will be treated to ensure it meets the water quality requirements.

Operational Phase Assessment

Stormwater from the site currently drains into the existing lake which then flows into the Hay-Lackey trunk stormwater drain. Post development, impervious areas on the eastern side of the new building will drain into the Harbour Street drainage system. The remainder of the site will drain into the Hay-Lackey stormwater drain. These existing stormwater drains have reserve capacity and can accommodate the volume of water expected from the development.

To achieve a 6 Green Star rating the new buildings will also incorporate water recycling measures to assist in stormwater management and water use minimisation. A rainwater harvesting system will be incorporated into the new buildings.

All roof water will be collected and drained towards a rainwater tank located on the western side of the site. The rainwater will be treated and reticulated back into the building for toilet flushing and the irrigation of landscaped areas. Overflow from the tank will be directed into the Hay-Lackey drain.

Surface drainage will be collected, treated via gross pollutant traps (or similar) and discharged into the Hay-Lackey drain.

Management

The stormwater management infrastructure proposed for the site includes rainwater harvesting and recycling as well as piping and connection to the Hay-Lackey drain. During the construction phase stormwater flows and quality will be managed in accordance with the Stormwater and Erosion and Sediment Control Management Plan.

Lend Lease Development commit to implementing the Stormwater and Erosion and Sediment Control Management Plan and this is reflected in the draft Statement of Commitments.

6.14.2 Flooding

A Preliminary Flood Assessment was prepared by Worley Parsons (**Appendix Q**) and submitted with the Concept Plan. The preliminary report assessed the likelihood of flood impacts from the stormwater drainage systems in proximity of the site. The assessment found that the trunk drains surrounding the site have good to excellent capacity between the 20 year ARI and 100 year ARI. The preliminary assessment also concluded that stormwater flooding is unlikely to impact on the site in a 100 year ARI event.

In addition, Worley Parsons have prepared an addendum statement to address sea level rise and increases in rainfall intensity (**Appendix Q**).

Assessment

Worley Parsons have undertaken further flood modelling on overland flow paths and flood behaviour in the vicinity of the site. The flood modelling is ongoing and will be further refined to determine final flood levels, overland flow path and recommended final floor levels. Notwithstanding the further refinements to the flood model, Worley Parson have concluded that, based on current analysis the 100 year ARI overland flood flows will generally not pose a significant flood hazard. The adoption of a 300mm freeboard above the 100 ARI flood level at ground floor is reasonable and the adoption of a 500mm freeboard above the 100 ARI flood level to the below ground basement entry is reasonable. A flood evacuation strategy should also be prepared to minimise risk to basement occupants.

In addition, given that the predicted climate change affected Mean High Water Springs (MHWS) is 1.61 AHD, and the ground level adjacent to the waters edge in Cockle Bay is 2.2m AHD, Worley Parsons consider that the potential for future sea level rise is not expected to impact greatly upon flood levels at the site and it is highly improbable that MHWS combined with flooding in the Harbour (in a 100 year ARI storm) would coincide with the peak flood discharge from the site.

Further, an increase in rainfall intensity would also be unlikely to adversely impact the proposed development site. Worley Parsons hydraulic analysis has found that if there is an increase in rainfall intensity, this would only increase the flood level by approximately 20mm in the Civic Connector, and as a freeboard of 300mm for ground floor levels has been adopted, this flood depth increase would not cause any any significant impact.

Overall, it is considered that flooding is not a constraint to the development of the site.

Management

To manage potential flood impacts a 300mm freeboard above the 100 ARI flood level at ground floor will be adopted and a 500mm freeboard above the 100 ARI flood level to the below ground basement entry will be adopted.

In addition a flood evacuation strategy will be prepared for basement occupants prior to building occupation and flood compatible building material will be specified for the ground level and underground premises to prevent and minimise flood damage.

6.15 Heritage

Tanner Architects have prepared a Heritage Impact Statement (**Appendix R**), in accordance with the NSW Heritage Office guidelines for Statements of Heritage Impact.

The Carousel on the concourse under the Western Distributor is the only item of non-indigenous heritage significance within the site boundary. The Carousel is listed on the State Heritage Register and Sydney Harbour Foreshore Authority's Section 170 Register. Four other items of heritage significance were identified within the vicinity of the site. These are:

- Darling Harbour (Cable-stayed) Footbridge Link from Harris Street to Hay Street;
- Darling Harbour (North Car Park) Footbridge over Old Railway Right of Way;
- Darling Harbour Footbridge from North Car Park to Festival Market; and
- Darling Harbour/Glebe Tunnel.

Assessment

The Carousel is a rare, complete and intact example of an Edwardian carousel. Tanner Architects consider however that the existing setting of the Carousel does not enhance its heritage significance. The proposed redevelopment is considered to respect or enhance its heritage significance for the following reasons:

- landscaping improvements will be more sympathetic;
- the new building footprint is reduced from the existing Sega World building, providing a wider visual separation; and
- the proposed Kid's Theatre and upgraded children's play area reinforce the family friendly character of the area.

Two potential negative impacts of the proposed development were identified as being the increased building height when compared to the existing proposal and excavation. The potential impact from the height of the new buildings is reduced as the building footprint at north-west corner is pulled back and the impact of the overall scale is reduced by the stepping back of the built form. The excavation will potentially impact on archaeological remains, however a program of investigation and recording as discussed in Section 6.16 below will minimise and manage any potential impact.

6.16 Archaeology

Casey & Lowe Pty Ltd have undertaken a Non-Indigenous Archaeological Assessment for the site (**Appendix S**). This included:

- Research of historical maps, pictorial material, directors, council records and secondary sources.
- Comparisons of the historical analysis against the extant buildings and vacant spaces on the site.
- Assessment of heritage significance of the site's archaeological sites in accordance with the criteria listed in the NSW Heritage Act 1977 and implemented through the Burra Charter and the State Heritage Inventory Program.
- Production of recommendations for the management of the archaeological deposits on the site.

Assessment

Casey and Lowe found that the Darling Walk site previously was the location of 19th Century industrial and residential buildings. Areas of State Significance which lie within the Darling Walk site comprise:

- Barkers Mill;
- P.N. Russell foundry; and
- Anchor flour mill (which includes the remains of the first steam saw mill in Sydney and an early sugar mill).

Darling Walk's fill deposits generally cover all of the 19th Century industrial sites.

The proposed excavation works will remove all the potential archaeological deposits contained within that particular area. In addition, it is expected that piling works, new services, and wall footings are likely to impact on areas previously the site of the Anchor Flour Mill, the P.N. Russell works and workers housing.

Management

In order to mitigate the impacts and ensure that the heritage significance of the archaeological sites are preserved, Casey and Lowe recommend the following:

- Undertake a program of archaeological investigation (based on best practice standards) to record aspects of the archaeological remains prior to development works commencing on the site.
- Design landscaping works to avoid impacts on areas of archaeological significance, as identified.
- Test areas of impact to determine the nature and depth of archaeological remains and to assist the development of an archaeological management strategy.
- Undertake a program of archaeological recording, to include sampling sections of the site and investigate the nature of the area's reclamation fills. Recording is to be undertaken in accordance with Heritage Branch guidelines and best practice archaeological methodologies.
- Produce an archaeological strategy and research design to guide the archaeological program, and outline the methodologies and approaches to the archaeological investigation.
- Assess (by a qualified indigenous consultant) the likelihood for indigenous sites and remains present under the reclamation fills.

The above actions are to be undertaken prior to the demolition and development works commencing on the site. A commitment to this is included in the Draft Statement of Commitments at Section 7.

6.17 Aboriginal Archaeology

Comber Consultants Pty Ltd have prepared an assessment of Aboriginal Cultural Heritage of the site (**Appendix T**). This included:

- Background research including a search of the Department of Environment and Climate Change's (DECC) Aboriginal Heritage Information Management Systems (AHIMS).
- An archaeological assessment to determine whether any Aboriginal sites or places are located within the site or have the potential to exist within the area, and to record any such sites located.
- Consultation with the Metropolitan Local aboriginal Land Council and other relevant people or groups to ascertain Aboriginal concerns and interests in the land or project.
- An assessment of the impact of the proposed development of Aboriginal cultural heritage.
- Management recommendations for the appropriate management of Aboriginal Cultural Heritage values within the study area.

Assessment

A search of DECC's AHIMS register indicated that no known Aboriginal sites or places have previously been recorded within the Darling Walk site. Furthermore, as the ground surface visibility of the site was found to be nil, there was no visibility of such things like open artefact scatters.

Comber Consultants, predict that sub-surface archaeological deposits containing artefact scatters and/ or middens may be located within the north and north eastern section of the site, near to the original shoreline, however if these are in existence, they are expected to be disturbed. The remainder of the site was originally harbour, which has since been reclaimed, therefore no sites of heritage significance are expected.

Management

Comber Consultants recommend the following actions:

- A program of aboriginal archaeological sub-surface testing be undertaken prior to the redevelopment of the Darling Walk site.
- All necessary approvals should be obtained prior to commencement of the sub-surface testing.
- If any Aboriginal 'objects' are located during the course of the testing program, the metropolitan Local Aboriginal Land Council should apply for a Care Agreement with the Department of Environment and Climate Change to enable them to keep the objects,
- The program of sub-surface testing should be co-ordinated with Casey & Lowe archaeologists.
- If during the course of the redevelopment, any previously undetected Aboriginal 'objects', artefacts or sites or uncovered, work must cease in the vicinity of that object, artefact or site and further advice sort from the archaeologist who undertook the program of sub-surface testing.

An Aboriginal Archaeological Management Plan is included at **Appendix T**.

6.18 Utilities

Robert Bird Group prepared a site services and constraints report for the Concept Plan application. The report investigated the capacity of the existing infrastructure servicing the site and found that there was generally adequate capacity in existing services to meet the demands of the proposed development.

The report also identified potential constraints to development from infrastructure crossing and surrounding the site. One of the key constraints was the James Street stormwater drain which crosses the site from east to west. As discussed in Section 6.14 the stormwater drain is proposed to be relocated and will be subject to a separate development application. Correspondence from Sydney Water (refer to **Appendix Y**) gives in-principle agreement to the deviation of the James Street stormwater drain.

Assessment

Robert Bird Group have prepared a further Services Infrastructure Report which is included at **Appendix P**. The report assess the impact of the proposed development on existing infrastructure services including stormwater, sewer, water, energy, communications, gas and RailCorp cables.

Correspondence from Sydney Water (refer **Appendix Y**) advises that the existing sewerage system has sufficient capacity to cater for the proposed development. As detailed in the ESD strategy (**Appendix F**) a blackwater system integrated with sewer mining will be constructed to minimise sewer discharge.

Similarly, the existing water supply system has sufficient capacity to cater for the proposed development.

Condition C6 of the Concept Plan requires that all manholes are to have physical access, 24 hours a day. There are three manholes within the site, one located within the building footprint, one at the western end (near the children's playground) and one at the north-east corner of the site (near the proposed loop road for the McDonalds drive through). The sewer manholes near children's playground and loop road will remain accessible for maintenance work. Sydney Water has advised in writing (refer **Appendix Y**) that the sewer manhole affected by the buildings work can be sealed off and that there is no requirement to install a new manhole.

Consistent with current conditions on site, all sections of sewer mains that will be inaccessible will be concrete encased and maintenance free.

Further investigations into Energy Australia infrastructure have found that the previously identified 33kv cables within the site are inactive and no diversions will be required. Potential clashes between the structural piles and 11kv cables within the electrical easement have been reduced by altering the building position within the site. Only one pile will clash with an existing Energy Australia pit, which will be bridged over.

An existing electricity substation within the site will be decommissioned and replaced with two new substations to service the development, with one substation located within each new building. An additional substation previously shown on Energy Australia drawings has already been decommissioned and removed. In addition to the two new substations, a cogeneration system will be constructed to achieve a 25% reduction in peak energy demand (refer to the ESD Strategy).

Further investigations regarding Telstra cables confirm (to date) that there will be no clashes between the cables and structural piles. Additional investigations will be carried out following building demolition to confirm some cable locations in close proximity to the structural piles.

Gas connections to the existing building will be terminated prior to demolition and new connections provided to the new buildings. Alinta gas mains are located to the north and east of the site and no infrastructure clashes have been identified.

A major RailCorp cable jointing pit is located within the building footprint. It is proposed to be extended and rebuilt in reinforced concrete to ensure the pit withstands traffic, vibration and loading. Plans and sections for the new pit have been submitted to RailCorp for approval. Potential clashes between the structural piles and RailCorp cables have also been identified. To manage these potential clashes the cables are to be bridged over.

Management

To manage potential clashes with infrastructure, where required, services will be diverted or bridged over. In addition, where required, the maintenance and access pits will be demolished and rebuilt to the requirement of the relevant authority.

Where required, easements will be provided to allow access to infrastructure and services that are within the site. The exact location and terms of easements will be negotiated with the relevant authorities.

6.19 Reflectivity

Arup have reviewed the architectural drawings and have prepared a Reflectivity Report (**Appendix V**), which assesses the impact of solar reflections off the proposed buildings on the amenity of drivers along surrounding streets, pedestrians and neighbouring building occupants.

Assessment

Arup found that some façade aspects of the buildings can potentially cause disability glare i.e. reflections which impact the observer in a way that they are unable to perform a visual task, such as reading or driving, without taking evasive action. In particular, aspect 339, as illustrated in **Figure 25** below, on the north-west façade facing the elevated Western Distributor Highway, will exceed the luminance limit of 500 Cd/m² for approximately 1 hour in the year for drivers driving westbound. Despite this being a significantly short period, it represents a risk and Arup consider that it is critical that a driver's view is totally unaffected by disability glare, as this has the potential to cause road accidents.

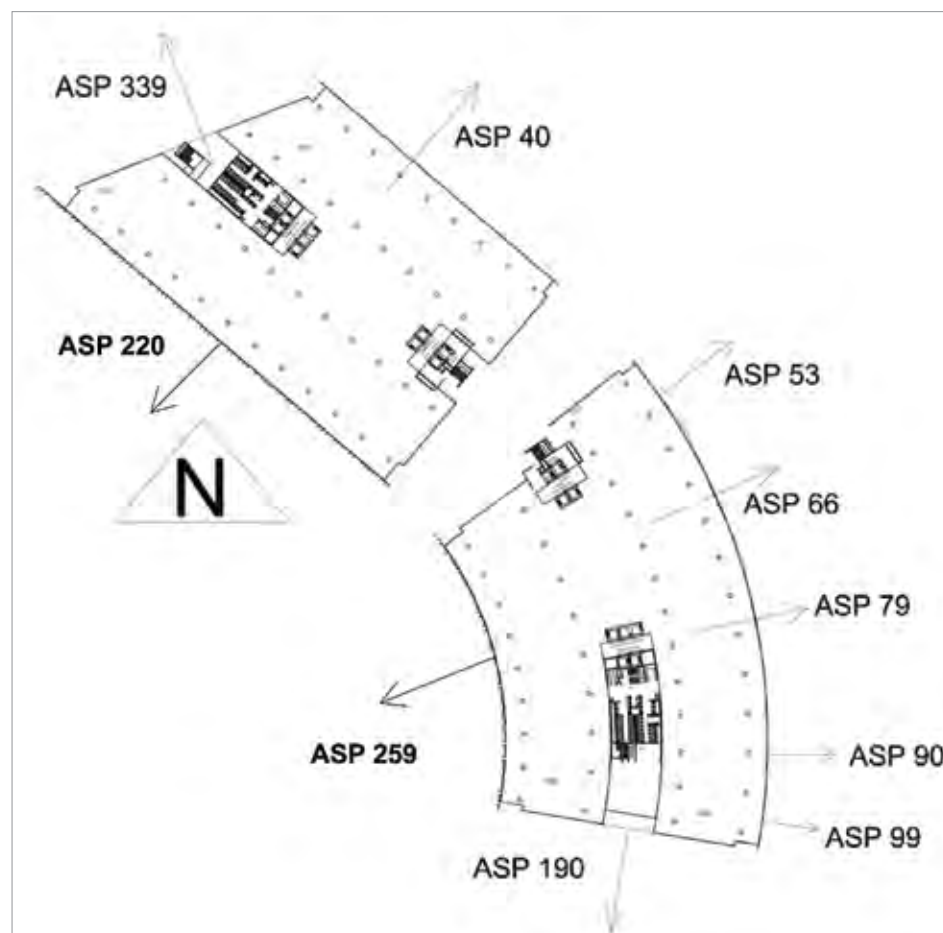


Figure 25 – Floor plan showing aspects of each facade

Arup found that the other façade aspects would not cause disability glare as the luminance would not exceed 500 Cd/m^2 or adjacent buildings would block reflections that could cause glare. Arup also found that the proposed roof structure would not impact on drivers in terms of reflectivity.

Overall the proposed buildings generally perform well in terms of solar reflectivity, and glare is unlikely to exceed the limits of acceptability which could affect drivers on surrounding streets.

Management

In order to mitigate the impact of disability glare Arup recommend replacing glass with opaque elements, or ensuring the glass is provided with external shading devices to ensure that potential sources of glare are shaded, eliminating any reflections.

In addition, roof glazing will not exceed the 20% threshold to minimise the impact of the roof reflection on neighbouring buildings surrounding the site.

These recommendations have informed the final design of the materials for the buildings.

6.20 BCA

Philip Chun and Associates Pty Ltd have prepared a BCA Review Report (**Appendix W**). The reports sets out the use and class of buildings and the construction and fire resistance ratings. The requirements of BCA 2008 for the proposed development in relation access and egress, health and amenity issues, energy efficiency, window cleaning, and place of public entertainment provisions were assessed.

In addition, Defire (NSW) Pty Ltd undertook a review of the proposed development (**Appendix W**), to develop the basis for alternative solutions to the deemed-to-satisfy (DTS) provisions of the BCA in relation to fire safety engineering. This report assessed the proposed development in relation to:

- possible alternative solutions required;
- reduction in FRLs of ground floor retail area;
- increased compartment size;
- extended travel distances; and
- atrium provisions.

Furthermore, Arup has prepared a Structural Design Report (**Appendix X**) which outlines the design philosophy and loadings that will be used for the proposed buildings.

Assessment

Philip Chun and Associates consider that the fundamental design of the proposed development is capable of meeting the requirements of BCA 2008 with the inclusion of fire engineering.

Defire consider that the proposed alternative solutions to the DTS provisions of the BCA can demonstrate that compliance with the relevant performance requirements of the BCA can be achieved.

Arup consider that the general building structure will be designed in accordance with the requirements of the following Australian Standards:

- Australian Standard 1170.1 Dead and Live loads
- Australian Standard 1170.2 Wind Forces
- Australian Standard 1170.4 Earthquake Forces
- Australian Standard 3600 Concrete Structures
- Australian Standard 4100 Steel Structures

Management

The proposed development will comply with all relevant BCA requirements and Australian Standards. Commitment to this is included within the Draft Statement of Commitments.

6.21 Accessibility

Morris-Goding Accessibility Consulting have prepared an Access Report (**Appendix U**). This assesses the accessibility of the development against:

- Australian Standards (AS 1428.1, AS 1428.2, AS 1428.4, AS 1735.12)
- Building Code of Australia (BCA)
- Disability Discrimination Act (DDA)
- City of Sydney Access DCP (2004)

Assessment

Morris-Goding have reviewed the development to ensure that ingress and egress, paths of travel, circulation areas toilets and car parking comply with the relevant guidelines and standards.

In general they consider that the development has accessible paths of travel that are continuous throughout the buildings, and demonstrate a reasonable degree of accessibility. In addition, the proposed drawings indicate that compliance with the statutory requirements, pertaining to site access, common area access, accessible parking and accessible sanitary facilities can be achieved.

Management

In order for the development to meet the relevant statutory requirements Morris-Goding recommend a range of measures in relation to ingress and egress, paths of travel, car parking, lighting and signage to ensure the building complies with the relevant Australian Standards, building codes and City of Sydney Access DCP.

Lend Lease Development commit to implementing the recommendations of the Accessibility Report and this is reflected in the draft Statement of Commitments.

6.22 Air Quality

An air quality assessment was undertaken by Holmes Air Sciences in July 2008 (**Appendix AA**). It presents the results of a dispersion modelling study of the Cross City Tunnel ventilation stack and the potential for impacts associated with the proposed development at Darling Walk.

Assessment

The assessment concludes that there are no predicted exceedances of any air quality goals and very little change is likely in the behaviour of the plume under the influence of the proposed building configuration. In addition, it is considered that there will be no significant changes to the impacts on any existing surrounding buildings.

6.23 Construction Management

A Construction Management Plan, prepared by Bovis Lend Lease is included at **Appendix H**. The CMP includes the following management plans:

- Traffic and Pedestrian Management Plan
- Noise and Vibration Management Plan
- Waste Management Plan
- Stormwater, Erosion and Sediment Control
- Flora and Fauna Management
- Air Pollution Management
- Hazardous Materials Management

The proposed construction hours for the project are 7.00am-7.00pm Monday to Friday and 7.00am-5.00pm on Saturday. No construction activities will occur on Sunday or public holidays.

The CMP sets out the construction methodology for the project and includes a series of management plans to manage the potential environmental impacts of the project. Construction is of sequencing stages as follows:

- Site Establishment;
- Demolition (as per the Preferred Project Report);
- Bulk Excavation
- Basement Construction
- Structure

Assessment

The traffic and pedestrian impacts of the construction phase have been discussed at Section 6.7. The construction noise and vibration impacts have been discussed at Section 6.8 and the wind impacts have been discussed at Section 6.9. Stormwater impacts are discussed at Section 6.14.

Urban Tree Management have undertaken an Arboricultural Assessment of the trees within the Darling Walk site (**Appendix Z**). In total 109 trees are proposed for removal across the entire site and 52 will be retained and protected. In general they are predominantly young specimens, less than 15 years old and planted for amenity value and shading purposes. The removal of trees however will be undertaken in stages in accordance with the proposed stages of the development.

The removal of 12 trees is required to the west of the existing lake and around the childrens playground area as a result of the proposal works, as they are unable to be retained by the proposed design. Replacement trees and landscaping will however be provided. Details of these will be included within a separate Project Application for Public Domain works.

Excavation, construction activities and truck movements have the potential to generate dust and sediment run-off. To minimise and manage dust and sediment runoff Bovis Lend Lease will implement the following measures:

- dust control using water on site and street sweeping of Harbour Street as required;
- installation of cattle grids at the vehicle exits;
- use of tarpaulins over truck trailers and bogies to ensure containment of material during transit;
- all material removed from site to be sorted and disposed of in with the *Waste Minimisation Act 1995*;
- establishment of sedimentation and environmental controls to the site and surrounding stormwater system; and
- dewatering in accordance the Dewatering Management Plan (**Appendix N**).

BLL have prepared a waste management plan which seeks to achieve an 80% reduction/avoidance of material disposed to landfill. The Waste Management Plan is based on the principles of avoidance/reduce, re-use, recycle, treat dispose. The Waste Management Plan comprises the following elements:

- waste identification;
- recycling;
- minimisation;
- disposal;
- packaging minimisation;
- education and training; and
- performance measures, monitoring and reporting.

Management

To mitigate potential construction impacts the proponent commits to implement the following management plans.

- Traffic and Pedestrian Management Plan
- Noise and Vibration Management Plan
- Waste Management Plan
- Stormwater, Erosion and Sediment Control
- Flora and Fauna Management
- Air Pollution Management
- Hazardous Materials Management

Lend Lease Development will establish a Construction Liaison Committee with all neighbouring stakeholders to provide a forum for neighbours to discuss issues, project progress and special activities.

7.0 Draft Statement of Commitments

In accordance with Part 3A of the EP&A Act the following are the commitments made by Lend Lease Development (LLD) to manage and minimise potential impacts arising from the Darling Walk development.

7.1 Construction Management

LLD commits to implementing the following plans during the construction phase:

- Traffic and Pedestrian Management Plan
- Noise and Vibration Management Plan
- Waste Management Plan
- Stormwater, Erosion and Sediment Control Management Plan
- Flora and Fauna Management plan
- Dewatering Plan
- Air Pollution Management Plan
- Hazardous Materials Management Plan

7.2 Contamination

LLD commits to:

- Remediation of the site where required, and implementation of a Remedial Action Plan. A separate development application for remediation has been lodged by LLD to the Sydney Harbour Foreshore Authority.
- Implementation the Acid Sulphate Soils Management Plan.

7.3 Environmental Sustainability and Amenity

LLD commits to:

- Achieving a minimum 5 star Australia Building Greenhouse Rating (ABGR) for the building and a minimum 5 Green Star buildings Council of Australia – Office Design v2 rating.
- Implementing the ESD measures detailed in the ESD Report.
- Undertaking an external noise assessment at Construction Certificate stage, to ensure external noise emissions from the mechanical plant comply with the relevant standards.

7.4 Car Parking

LLD commits to:

- Preparing and implementing a Car Park Management Plan that specifies the charging rates, signage and conditions of use for the public car park.
- Preparing a Green Commuter Strategy which will include initiatives to reduce private car use and encourage public transport use, cycling and car pooling. The Green Commuter Strategy will be prepared prior to building occupation.

7.5 Utilities and Infrastructure

LLD commits to:

- Diverting or bridging over infrastructure and services to the satisfaction of relevant authorities, where required.
- Providing easements in favour of Sydney Water to allow access to infrastructure and services within the site.

7.6 Wind

- LLD commits to the provision of densely foliated vegetation and/ or impermeable balustrades within the rooftop gardens. This will implemented prior to building occupation.

7.7 Archaeology

- LLD commits to implementing the recommendations of the Casey & Lowe Non-Indigenous Archaeological Assessment.
- LLD commits to implementing program of aboriginal archaeological sub-surface testing as recommended by Comber Consulting.

7.8 Consultation

- LLD commits to establishing a Construction Liaison Committee with representation from neighbouring stakeholders to provide a forum for neighbours to discuss issues, project progress and special activities.
- LLD commits to continued liaison with relevant authority (as described in Section 4) to obtain all necessary approvals.

7.9 BCA and Accessibility

- The proposed development will comply with all relevant BCA requirements and Australian Standards.
- LLD commit to implementing the recommendations of the Accessibility Report.

8.0 Conclusion

The proposed development seeks approval for the construction of two commercial buildings that include ground floor retail uses and a kids theatre at Darling Walk.

The proposed development is consistent with Concept Plan for Darling Walk and the objectives of the Darling Harbour Development Plan. The development will deliver a minimum 5 star Australia Building Greenhouse Rating and will incorporate co-generation, rainwater harvesting and sewer mining technologies.

The development will contribute to the reactivation of Darling Walk as a vibrant precinct, with an increase daily working population, new retail spaces and enhanced public domain. The redeveloped site will also contribute to the activation of the Harbour Street frontages by providing retail spaces and commercial office lobbies.

The development will result in improved pedestrian connections between Darling Harbour and the CBD and establish a new CBD gateway at the southern end of Darling Harbour. An upgraded and new Bathurst Street pedestrian bridge will be integrated into the northern building providing improved access into Darling Harbour. A major new east-west Civic Connector and north-south promenade will provide improved public access to and from the CBD. The Civic Connector will also create a new 20m wide view corridor to the CBD.

The proposed buildings will be a high architectural standard that will improve the built form quality at Darling Walk. The building design provides a high quality internal amenity through an internal atrium and glazed facade the delivers natural light to each floor. The glazed facades also allow for passive surveillance of the public domain.

The proposed development will have minimal adverse environmental impacts. The potential construction impacts will be effectively managed by the measures outlined in the construction management plan. The redevelopment will rejuvenate Darling Walk as a high amenity and accessible precinct.

It is submitted that the proposed development be granted consent under Part 3A of the EP&A Act.