STATE COMMISSION ASSESSMENT PANEL
A COMMITTEE OF THE STATE PLANNING COMMISSION

APPLICATION ON NOTIFICATION – CATEGORY 2

Applicant:	Rymilll Park Apartments P/L & Rymill Park Apartments Unit Trust c/- Future Urban Group
Development Number:	020/A081/17
Nature of Development:	Demolition of existing office building and the construction of a 16 level mixed use building (including mezzanine) comprising a ground floor restaurant, and 38 dwellings with associated common areas, car parking and servicing
Type of development:	Merit
Zone / Policy Area:	City of Adelaide - Capital City Zone
Subject Land:	2-6 Hutt Street, ADELAIDE
Contact Officer:	Brett Miller
Phone Number:	8343 2988
Start Date:	2 January 2018
Close Date:	15 January 2018

During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders St, Adelaide, during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).

Written representations must be received by the close date (indicated above) and can either be posted, hand-delivered or emailed to the State Commission Assessment Panel.

Any representations received after the close date will not be considered.

Postal Address:
The Secretary
State Commission Assessment Panel
GPO Box 1815
ADELAIDE SA 5001

Street Address:
Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders St
ADELAIDE SA 5000

Email Address: scapadmin@sa.gov.au

SOUTH AUSTRALIAN DEVELOPMENT ACT, 1993
REPRESENTATION ON APPLICATION – CATEGORY 2

Applicant:	Rymilll Park Apartments P/L & Rymill Park Apartments Unit Trust c/- Future Urban Group
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My name:_____

My phone number: _____

PRIMARY METHOD(s) OF CONTACT: Email address: _____

Postal address:_____

_____Postcode_____

You may be contacted via your nominated PRIMARY METHOD(s) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

My interests are:

- ☐ owner of local property
- ☐ occupier of local property
- ☐ a representative of a company/other organisation affected by the proposal
- ☐ a private citizen

The address of the property affected is _____ Postcode _____

The specific aspects of the application to which I make comment on are:

_____

_____

_____

_____

_____

_____

_____

Should the State Commission Assessment Panel conduct a public hearing for this Development Application:

I

- ☐ **wish to be heard in support of my submission**
- ☐ **do not wish to be heard in support of my submission**

(Please tick one)

By

- ☐ **appearing personally**
- ☐ **being represented by the following person:**

(Please tick one)

Date _____ Signature _____

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide SA 5001 or scapadmin@sa.gov.au.

DEVELOPMENT APPLICATION FORM

AUTHORITY: STATE COMMISSION ASSESSMENT PANEL

APPLICANT: RYMILL PARK APARTMENTS P/L & RYMILL PARK APARTMENTS UNIT TRUST

Postal Address: C / – FUTURE URBAN GROUP

GPO BOX 2403, ADELAIDE, SOUTH AUSTRALIA, 5001

OWNER: RYMILL PARK APARTMENTS PTY LTD

Postal Address: LEVEL 3, 31 EBENEZER PLACE

ADELAIDE, SOUTH AUSTRALIA, 5000

BUILDER: TO BE CONFIRMED

Postal Address:

Licence No:

CONTACT PERSON FOR FURTHER INFORMATION:

Name: MR CHRIS VOUNASIS

Telephone: (08) 8221 5511

Email: CHRIS@FUTUREURBANGROUP.COM

Mobile: 0447 029 088

EXISTING USE:

COMMERCIAL (OFFICE)

FOR OFFICE USE

Development No:

Previous Development No:

Assessment No:

☐ Complying	Application forwarded to DA
☐ Non-complying	Commission/Council on:
☐ Notification Cat 2	/ /
☐ Notification Cat 3	Decision:
☐ Referrals/Concurrence	Type:
☐ DA Commission	Date: / /

	Decision	Fees	Receipt No	Date
Planning:	YES			
Building:				
Land Division:				
Additional:				
Dev Approval:				

DESCRIPTION OF PROPOSED DEVELOPMENT: CONSTRUCT A 16 LEVEL, MIXED USE BUILDING

LOCATION OF PROPOSED DEVELOPMENT:

House No: 2 Lot No: 118 Road: HUTT STREET Town/Suburb: ADELAIDE

Section No (full/part): Hundred: ADELAIDE Volume: 5876 Folio: 101

LAND DIVISION:

Site Area (m²): Reserve Area (m²): No of Existing Allotments:

Number of Additional Allotments - (Excluding Road and Reserve): Lease: YES: ☐ NO: ☐

DOES EITHER SCHEDULE 21 OR 22 OF THE *DEVELOPMENT REGULATIONS 2008* APPLY? YES: ☐ NO: ☑

HAS THE *CONSTRUCTION INDUSTRY TRAINING FUND ACT 1993 LEVY* BEEN PAID? YES: ☐ NO: ☑

DEVELOPMENT COST (Do not include any fit-out costs): $27,000,000

I acknowledge that copies of this development application and any supporting documentation may be provided to interested persons in accordance with the *Development Regulations 2008*.

SIGNATURE: Dated: 14 DECEMBER 2017

ON BEHALF OF RYMILL PARK APARTMENTS P/L & RYMILL PARK APARTMENTS UNIT TRUST

PLANNING STATEMENT

16 LEVEL MIXED USE BUILDING

2 HUTT STREET, ADELAIDE

Prepared for:
Rymill Park Apartments P/L &
Rymill Park Apartments Unit Trust

Date:
13 December 2017

Proprietary Information Statement

The information contained in this document produced by Future Urban Group is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Future Urban Group undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

Document Control

Revision	Description	Author	Date
V1	Draft	CV/FB/MN	8 December 2017
V2	Final	CV	14 December 2017

CONTENTS

APPENDICES

1. INTRODUCTION

This planning statement relates to a proposal by Rymill Park Apartments P/L & Rymill Park Apartments Unit Trust to demolish the existing two storey office building on the south-eastern corner of the Hutt Street and East Terrace intersection, and to subsequently replace it with a 16 level, mixed use building (including mezzanine between ground and first floor levels).

The proposed building will contain:

- two levels of basement parking (the basement car park will contain 28 spaces);
- a restaurant on the ground floor level which has been designed to face Hutt Street and East Terrace;
- a communal dining, meeting, lounge, library and conference area on the mezzanine between the ground floor level and Level 1;
- two additional levels of parking between the mezzanine and Level 3 (these levels will combine to accommodate another 28 spaces)
- a storage enclosure on Level 2 which has been designed to accommodate up to, but not exceeding, 46 bicycles;
- two, one bedroom dwellings and three, two bedroom dwellings on Levels 3 and 4;
- three, two bedroom dwellings and one, three bedroom dwelling on Levels 5, 6, 7, 8 and 9;
- two, three bedroom dwellings on Levels 10, 11 and 12;
- a three bedroom dwelling on Level 13; and
- a four bedroom dwelling on Level 14.

In preparing this planning statement, we have:

- inspected the land in question and its surroundings;
- identified and reviewed what we consider to be the most pertinent provisions of the Adelaide (City) Development Plan ('the Development Plan');
- proceeded through the Pre-Lodgement Planning and Design Review process and reached a Pre-Lodgement Agreement;
- reviewed the following which form appendices to this planning statement:
  - Appendix 1 - Tectvs Architectural Design;
  - Appendix 2 - Traffic Impact Statement prepared by InfraPlan (dated 25 October 2017);
  - Appendix 3 - Waste Management Plan prepared by InfraPlan (dated 27 October 2017);
  - Appendix 4 - Sustainability Strategy Report prepared by D Squared (dated 31 October 2017);
  - Appendix 5 - Wind Report prepared by DR Partners (dated 30 November 2017);
  - Appendix 6 - Stormwater Plan prepared by DR Partners (dated 30 November 2017);
  - Appendix 7 - Acoustic Assessment prepared by Sonus (dated December 2017);
  - Appendix 8 – Building Services Report prepared by Lucid (dated 13 December 2017).

This planning statement contains our description of the land in question, its surroundings and the proposal, as well as our assessment of the proposal against what we consider to be the most pertinent provisions of the Development Plan.

2. PRE-LODGEMENT PLANNING AND DESIGN REVIEW PROCESS

The proposal evolved significantly and positively through five design review panel sessions and one desktop session plus Pre-Lodgement Panel meetings and numerous meetings with Adelaide City Council and DPTI.

A Pre-Lodgement Agreement has been reached with the Office of Design and Architecture (SA).

3. THE LAND

The land is located on the south-eastern corner of the Hutt Street and East Terrace intersection.

The land consists of one allotment only, legally described as Allotment 118 in Certificate of Title, Volume 5876 Folio 101, otherwise known as 2 Hutt Street, Adelaide.

The allotment to which we refer has a primary frontage of 20.74 metres to Hutt Street on its western side, a secondary frontage of 27.44 metres to East Terrace on its northern side, a tertiary frontage of 20.74 metres to Cleo Lane on its eastern side and an area of approximately 569.1 square metres.

Figure 1 *Subject Site and Locality.*

The land contains a two storey office building which has free and unrestricted rights of way over Cleo Lane.

4. THE LOCALITY

The locality displays a diverse character containing large expanses of open space to the north and east (Park Lands) low to medium rise development to the east and south and medium to high scale development to the west.

Rymill Park forms part of the Adelaide Park Lands and hosts many cultural events and festivals annually. It contributes significantly to the amenity of the subject site. The Park Lands extend to the east and between it and the subject site lies the City Living Zone (East Terrace Policy Area). This part of the City Living Zone contains a variety of dwellings fronting East Terrace and backing on to Cleo Lane. Rymill House (a State Heritage Place) forms a notable built form feature at the end of Cleo Lane. Dwellings between Rymill House and the subject site are predominately two to three storeys in height; however, a four-storey residential flat building exists to the east of the subject site. Vehicle access to garages associated with these dwellings and offices fronting Hutt Street (including the subject site) is provided via Cleo Lane.

Cleo Lane is a private lane of only 3 metres in width allowing left-in-left-out traffic movements. Currently, this width is not adequate to support two-way traffic movements. It is evident that some property owners along the eastern side of Cleo Lane have set back buildings by up to 3 metres, however as these setbacks are not continuous, Cleo Lane continues to function as a single width laneway. Through traffic to East Terrace is not possible.

East Terrace supports two-way traffic (which expands to four lanes at the intersection with Hutt Street). A bicycle lane exists along both sides of East Terrace, Bartels Road and Pirie Street. Parking along East Terrace, Bartels Road and Pirie Street is restricted (ticketed).

Whilst pedestrian footpaths exist along both sides of East Terrace, it is noted that the footpath adjacent to the northern boundary of the subject site is narrow, being only 1.4 metres (approximately) in width.

A variety of land uses exist along Hutt Street; however, they are predominantly commercial in nature ranging between one and five storeys. The northern portion of Hutt Street (north of Flinders Street) contains a mix of older buildings (not heritage listed) and more recent developments of varying heights between one and five storeys. Architecturally, within the immediate vicinity of the subject site there is a consistency in the use of brick, rendered cement, stone and glass materials, and curved building features. Bluestone also appears frequently in the area bound by East Terrace, Hutt Street and Flinders Street.

South of Flinders Street, buildings fronting Hutt Street are predominantly one and two storeys in height, however buildings located on corner sites are generally higher (up to 5 storeys). We note the Opus development under construction at 53-55 Hutt Street which is under construction and will be approximately 45m in overall height.

Hutt Street supports two lanes of traffic travelling in both a northerly and southerly direction. Street trees are reasonably evenly spread along both the eastern and western sides of Hutt Street. South of the intersection between Hutt Street and Flinders Street is a landscaped median strip including trees and low height shrubs.

A bicycle lane exists along both sides of Hutt Street with the west lane terminating at its intersection with Tucker Street.

Restricted (ticketed) on-street car parking exists along both the eastern and western sides of Hutt Street.

The locality to the west of the site has experienced recent development such as the 'Zen' apartment complex which is an 8 storey building. To Zen's west is the 'Art' Apartment complex which is a 14 level building.

A boutique hotel, (Clarion Hotel Soho) of 6 levels is located on the corner of Tucker Street and Flinders Street.

Two significant developments were also recently approved by the Development Assessment Commission on Pirie Street with heights of approximately 60m and 80m (293-297 Pirie Street and 262-266 Pirie Street, respectively). We understand that construction of 293-297 Pirie Street will commence early 2018. This development is located at the south-western edge of the Park Lands. To the north of this development at the intersection of East Terrace and Rundle Mall (292-300 Rundle Street) is a 60m high building that was also recently approved (through the Environment, Resources and Development Court). We understand that construction of this building will also commence in 2018.

The subject site is located adjacent to two major public transport routes, which are serviced by more than 15 routes along East Terrace, Hutt Street and Bartels Road. The nearest bus stops to the site are all within 230 metres, with the closest being within 50 metres. Other bus stops located along Grenfell Street are within 350 metres to 400 metres (5-7 minutes' walk), and will connect uses to most locations within Metropolitan Adelaide.

5. THE PROPOSAL

5.1 Overview

This planning report relates to a proposal by Rymill Park Apartments P/L & Rymill Park Apartments Unit Trust to demolish the existing two storey office building on the south-eastern corner of the intersection between Hutt Street and East Terrace, and to subsequently replace it with a 16 level, mixed use building (including mezzanine between ground and first floor levels).

5.2 Demolition

The existing office building will need to be demolished.

With that said, the demolition of the existing office building does not form part of this development application, as it is a form of development which does not require development plan consent.

Schedule 1A of the *Development Regulations 2008* attests to this.

5.3 Land Use Mix

The proposed development will comprise of a "shop" in the form of a restaurant at Ground Level, and "dwellings" in the form of apartments between Level 3 and Level 14. These uses are defined in Schedule 1 of the *Development Regulations 2008.*

5.4 Dwelling Density

The net density of this development equates to 667.7 dwellings per hectare[1].

According to the 30 Year Plan for Greater Adelaide, anything over 70 dwellings per hectare is high density.

5.5 Dwelling Composition

5.5.1 Level 3

Level 3 will accommodate a total of five dwellings, including two, one bedroom dwellings and three, two bedroom dwellings.

The composition of each dwelling on Level 3 is set out in Table 1.1 below.

Table 1.1 – *Composition on Level 3*

Dwelling	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
301	72 square metres	One	8.0 square metres	13.8 cubic metres	Yes
302	70 square metres	One	8.0 square metres	12.6 cubic metres	Yes
303	93 square metres	Two	11 square metres	21.1 cubic metres	Yes
304	108 square metres	Two	11 square metres	17.5 cubic metres	Yes

[1] The net density of this development was calculated by dividing the total number of dwellings within the proposed building (38) by the area of the land in hectares (0.05691).

305	95 square metres	Two	11 square metres	15.8 cubic metres	Yes

5.5.2 Level 4

Level 4 will accommodate a total of five dwellings, including two, one bedroom dwellings and three, two bedroom dwellings.

The composition of each dwelling on Level 4 is set out in Table 1.2 below.

Table 1.2 – *Composition on Level 4*

Dwelling	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
401	72 square metres	One	8.0 square metres	13.8 cubic metres	Yes
402	70 square metres	One	8.0 square metres	12.6 cubic metres	Yes
403	93 square metres	Two	11 square metres	21.1 cubic metres	Yes
404	108 square metres	Two	11 square metres	17.5 cubic metres	Yes
405	86 square metres	Two	11 square metres	15.8 cubic metres	Yes

5.5.3 Levels 5 to 9

Levels 5, 6, 7, 8 and 9 will each accommodate four dwellings (20 dwellings in total), including three, two bedroom dwellings (15, two bedroom dwellings in total) and one, three bedroom dwelling (five, three bedroom dwellings in total).

The composition of each dwelling on Levels 5, 6, 7, 8 and 9 is set out in Table 1.3 below.

Table 1.3 *Composition on Levels 5 to 9*

Dwellings	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
501, 601, 701, 801 and 901	83 square metres	Two	11 square metres	14.6 cubic metres	Yes
502, 602, 702, 802 and 902	111 square metres	Two	11 square metres	18.3 cubic metres	Yes
503, 603, 703, 803 and 903	151 square metres	Three	15 square metres	31.9 cubic metres	Yes
504, 604, 704, 804 and 904	86 square metres	Two	11 square metres	15.2 cubic metres	Yes

5.5.4 Levels 10 to 12

Levels 10, 11 and 12 will each accommodate two, three bedroom dwellings (six, three bedroom dwellings in total).

The composition of each dwelling on Levels 10, 11 and 12 is set out in Table 1.4 below.

Table 1.4 *Dwelling Composition on Levels 10 to 12*

Dwellings	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
1001, 1101 and 1201	191 square metres	Three	20 square metres	36.6 cubic metres	Yes
1002, 1102 and 1202	242 square metres	Three	29 square metres	46.3 cubic metres	Yes

5.5.5 Level 13

Level 13 will accommodate a three bedroom dwelling.

The composition of the only dwelling on Level 13 is set out in Table 1.5 below.

Table 1.5 *Dwelling Composition on Level 13*

Dwelling	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
Sub-Penthouse (1301)	358 square metres	Three	138 square metres	40.2 cubic metres	Yes

5.5.6 Level 14

Level 14 will accommodate a three bedroom dwelling as well.

The composition of the only dwelling on Level 14 is set out in Table 1.6 below.

Table 1.6 *Dwelling Composition on Level 14*

Dwelling	Floor Area	Bedrooms	Private Open Space	Storage	Satisfies Development Plan Requirements?
Penthouse (1401)	445 square metres	Four	145 square metres	53.5 cubic metres	Yes

5.6 Common Areas

Common areas are proposed throughout the building for use by future residents and their visitors. These areas and their uses are specified below:

- lobby space at ground level with seating area, artwork and an indoor garden;
- common lounge area at the mezzanine level, with catering/kitchen facilities, conference room, terrace, library, bathroom and storage facilities; and
- rooftop garden and seating area of 37 square metres in area at Level 3.

5.7 Siting

At ground level the proposed building will be setback 1.05 from Hutt Street and East Terrace and 4.2 metres from Cleo Lane. The building will be sited on the southern boundary.

The mezzanine level contains a terrace that will encroach over the Hutt Street and East Terrace footpaths.

Levels 1 and 2 will be built to the boundaries on all sides.

Levels 3 to 14 will be built to the boundaries except for the area accommodating the roof top garden and space above which provides a 4.3m setback to the southern boundary.

5.7 Floor to Ceiling Heights

The various floor to ceiling heights are captured within Table 1.7 below.

Table 1.7 *Floor to Ceiling Heights*

Level	Floor to Ceiling Height
Basement 2	2.65 metres
Basement 1	2.65 metres
Ground	3.6 metres
Mezzanine	2.8 metres
Levels 1 to 13	2.7 metres
Level 14	3 metres to 4.4 metres

5.8 Building Height

The proposed building will be 53.9 metres in height (excluding the lift overrun and solar panels).

5.9 External Materials

The proposal includes external materials as specified below:

- bronze and dark glass;
- panel concrete and profiled concrete;
- copper; and
- traditional Adelaide bluestone.

5.10 Access

Vehicular access to the subject site will be gained via Cleo Lane through a left in, left out movement on East Terrace. The proposed development is setback 3 metres from the eastern boundary, allowing Cleo Lane to support two-way traffic movements for approximately 20 metres, improving passing opportunities, and allowing simultaneous entry and exit movements into/out of Cleo Lane.

From Cleo Lane, two separate ramps permit vehicles access to either the basement car parking levels, or the above-ground car parking on Levels 1 and 2. The reversible ramp system will be single lane width, with access and egress being controlled by a signalling system.

Pedestrians access to the site will be gained via the main apartment entry from Hutt Street or through the restaurant sliding doors along Hutt Street and East Terrace.

5.11 Bicycle Parking

A secure enclosure for the occupants of the dwellings will be provided in the south-western corner of Level 2. The enclosure has been designed to accommodate up to, but not exceeding, 46 bicycles at any one time.

A rack for visitors will also be provided on the eastern side of the northern-most stairwell. The rack has been designed to accommodate up to, but not exceeding, six bicycles at any one time.

5.12 Car Parking

The proposed building will contain 56 line-marked spaces, including 44 'standard' spaces and 12 'small' spaces.

The number and type of spaces on each level of the proposed building is captured with Table 1.8 below.

Table 1.8 – *Number and Type of Spaces per Level*

Level	'Standard' Spaces	'Small' Spaces	Total
Basement 1	10	5	15
Basement 2	10	3	13

Level 1	12	1	13
Level 2	12	3	15

5.13 Stormwater

The proposal will re-use roof water for the purposes of irrigation of landscaping and green walls which will ensure their long-term sustainability. The community strata will be responsible for the maintenance and operation of the rainwater tank and system.

5.14 Waste

A Waste Management Plan for the proposed development has been prepared by InfraPlan Pty Ltd, and is included in Appendix 3.

The proposed development utilises a chute system with waste collected by a private waste contractor in an area adjacent to Cleo Lane.

Within each apartment there will be integrated bin systems providing segregated compartments to encourage the sorting of co-mingled recycling, non-recyclable waste and organic food waste streams. Residents will be required to transport their waste to a chute room located on each residential level. The chute will include a diverter, allowing residents to allocate their waste as either 'general' or 'recycling'. Waste will then travel down to the bin storage room on ground level, and distributed into each waste stream bin accordingly. Monitoring of the waste bins will be undertaken by building services, with full bins replaced as required. Organic waste will need to be deposited by residents directly to the bin storage area.

Commercial tenants will be required to manually transport all waste streams into their allocated commercial bins in the bin storage area.

Waste is proposed to be collected via Cleo Lane outside of peak periods (7:00am to 9:00am, and 3:00pm to 6:00pm). The waste collection vehicle will reverse into Cleo Lane from East Terrace, and park briefly within the waste collection area while the private contractor wheels out the filled bins from the bin storage area, loads the waste, then returns the empty bins.

All residential waste will be collected on a weekly basis, whereas commercial waste will be collected twice a week. Details of the collection days will be finalised with the café/restaurant tenant once confirmed.

The following bins will be provided for the proposed development, as per InfraPlan's estimated waste volume calculations:

Number and Type of Bins Provided	1,000L	660L	240L
General Waste	2 x Residential 2 x Commerical	1 x Residential	1 x Commercial
Recycling	2 x Residential 1 x Commerical	-	2 x Commercial
Organic	3 x Commercial	1 x Residential	1 x Residential

Total	10	2	4

Hard waste and e-waste will be stored in a 4.9 cubic metres area allocated within the bin storage room, and collected from the subject site by separate contractors on an "as needs" basis when privately arranged.

5.15 Landscaping

Landscaping forms a key component of the overall appearance of the proposed building. The following landscaped areas are proposed to be provided:

- an internal green wall which utilises the structural ramp carpark wall from behind the restaurant/café on Ground Level up to the communal areas at the Mezzanine Level;
- an internal "dry garden" to the residential entry from Hutt Street; and
- a communal rooftop garden at Level 3 including a communal dining area, integrated planter seating, decking, integrated arbour structure and a fire pit.

All landscaped areas are to be supported with adequate services to ensure their ongoing maintenance. It is proposed that the green wall will be provided with 0.7 litres of water per day, per square metre, and that maintenance inspection be carried out fortnightly and works carried out as required. The applicant will seek the advice of a green wall specialist to ensure that appropriate, durable and viable plant species are selected. For best performance, it has also been anticipated that additional LED lighting to a minimum of 3,500lx may be required to supplement natural lighting conditions.

It is also the intent of the applicant to improve the amenity of Cleo Lane by including additional landscaping and a green canopy over this space, however at this stage the design is only conceptual and will be pursued through a separate process with adjacent land owners and Council.

5.16 Letter Boxes

A communal letter box will be installed along the southern side of the Hutt Street entrance.

Occupants of the dwellings will therefore be able to retrieve their mail from within the proposed building.

5.17 Building Services

A Building Services Report has been prepared by Lucid Consulting Australia which is included in Appendix 8. In summary, Lucid has advised the following:

- a dedicated on-site transformer will be required to service the development. Subject to final estimated maximum demand calculations, the transformer will be 500kva rated;
- NBN Co have confirmed that their roll-out will have extended to this site by the anticipated completion date however should timing not be feasible the site has access to Telstra copper communications infrastructure;

- the site has access to a 150mm PVC sewer main in both East Terrace and Cleo Lane at the rear which is sufficient to service the site;
- a 50mm water meter will be required to service the development;
- a 150mm fire services connection is proposed to be derived from the proposed upgraded town main in East Terrace to serve the building's combined hydrant and sprinkler systems;
- the site has access to a 250mm low pressure gas mains in East Terrace and a 100mm low pressure gas mains in Hutt Street;
- the building will be provided with all necessary electrical, communication, fire, hydraulic, mechanical and vertical transportation services to function efficiently and in a sustainable manner.

5.18 Environmental Sustainability

A Sustainability Strategy for the proposed development has been prepared by D Squared Consulting Pty Ltd, and is included in Appendix 4. Following is a summary of the key features to be included in the development:

- Water Efficiency:
  - water efficient fittings of a minimum 6 Star WELS rating for taps, 4 Star for WCs and 3 Star for showers;
  - selection of appropriate landscape planting to minimise irrigation water use;
  - provision of rainwater storage and re-use systems for landscape and green wall irrigation; and
  - provision of firefighting systems with a test water recycling facility.
- Transport:
  - provision of bicycle storage facilities for apartment residents and visitors, with a minimum of one secure rack provided per apartment and additional racks for visitors at ground floor level;
  - provision of end of trip facilities for the retail and commercial tenants, including secure bicycle racks and locker space; and
  - all apartment purchasers will be offered the option of the provision of an electric vehicle charge point at their car park space, to promote the de-carbonisation of Adelaide's transport network. Dependent upon the final size of PV array installed, a number of these points can be supplied with 100% renewable energy.
- Energy:
  - Active façade:
    - use of high performance double glazing with integrated and adjustable interstitial blinds, access to daylight, and natural ventilation of the apartments to reduce energy demands;
    - solar sensors will be included in the façade, and will automatically control the interstitial blind systems. Occupants will have the ability to manually override the automated control of the blinds as preferred; and
    - electro-chromic glass has been incorporated in strategic locations to provide additional privacy and solar load reduction.

- designing and certifying the apartments to achieve an energy performance at least 30% better than current Building Code minimum NatHERS rating of 6 Stars average, representing a dwelling average NatHERS Rating of 8 Stars;
- designing the tenancy and common areas to achieve an energy performance at least 30% better than a deemed to satisfy compliant space in accordance with the NCC/BCA Section J, JV3 methodology;
- electricity will be supplied via an inset (embedded) network, so that residents can benefit from the option of reduced electricity supply rates, and the ability to share renewable energy from the building solar PV array;
- air conditioning systems within the apartments will be zoned to functional areas (e.g. living rooms, bedrooms), and provided with automatic and manual controls. They will be inverter controlled and rated to the highest available Energy Star rating, and include the option to operate in fan mode providing low energy air circulation;
- provision of a “kill switch” to each apartment, which allows a one touch isolation of all lighting and air conditioning power when the apartment is vacant;
- provision of a 39kW roof mounted solar photovoltaic array. The array will be connected via the inset network so that it can benefit all residents and tenants in the development, but is sized to adequately provide renewable energy equivalent to 100% of the common area power needs, including car park ventilation;
- daylight control to lighting systems in common areas;
- use of energy efficient, LED lighting fittings;
- use of light coloured external finishes (in particular roof coverings) to reflect heat, reduce solar gain, and reduce the “heat island effect”;
- use of solar gas boosted hot water systems, gas hobs, and European Energy Label A category ovens for cooking throughout to reduce peak electricity demands, reduce the overall development carbon footprint, and provide an economical amenity for apartment owners;
- provision of a building energy management system with smart metering to automatically record and monitor the building's resource use and establish trends and profiles to assist with the ongoing control of energy use (this information will be made available on-line);
- as far as practicable, designing the car park levels to be naturally ventilated. In areas where access to natural ventilation is not possible, the car parking will be mechanically ventilated but with a system designed using an engineered approach, with variable speed drives and carbon monoxide automatic control, to reduce fan energy use by 80% when compared to a conventional system;
- providing apartment owners with retractable clothes racks in their apartments, to minimise electric clothes drier use. These facilities will also minimise the incidence of clothes drying on exposed balconies; and
- providing retail and commercial tenancy space air conditioning systems with an economy cycle control allowing 100% outside air to be used for free cooling purposes when external weather conditions allow.

- Indoor Environmental Quality:
  - using paints, sealants, adhesives, carpets, coverings and furniture which have low off-gassing properties (low VOC, low formaldehyde);
  - maximising access to daylight to all residential areas whilst minimising glare;
  - all dwellings will be fully naturally ventilated;
  - all common areas at ground level and above will be fully naturally cross ventilated; and
  - electro-chromic glass is provided to some glazing to improve occupant privacy.
- Construction Materials:
  - selecting locally sourced materials wherever viable;
  - selecting recycled and recovered materials wherever viable, particularly sourced from the local area to build in a recognition of the local area and heritage;
  - selecting materials with a comparatively low embodied energy/carbon profile e.g. timber in preference to steel, where practicable;
  - selecting building materials with a recycled material content e.g. thermal insulation, reinforcement bar, fly ash in concrete, recycled content floor coverings, where viable; and
  - using off site pre-fabrication techniques to reduce on site construction time, waste, and greenhouse gas emissions, wherever practicable.
- Landscaping and Biodiversity:
  - strategic use of landscape and green walls in common terrace areas, to reduce the “heat island” effect at podium level, and to introduce the notion of biodiversity; and
  - use of extensive green walls at ground and podium levels, to reduce the internal heat loads, improve common area air quality, and to promote the notion of biodiversity.

6. PROCEDURAL MATTERS

6.1 The Relevant Authority

The State Commission Assessment Panel ('SCAP') must assume the role of the relevant authority for two reasons.

First, the land is located within the area of the Corporation of the City of Adelaide. Second, the proposed building will cost more than $10 million to complete.

6.2 The Relevant Development Plan

The relevant version of the Development Plan for procedural and assessment purposes was gazetted and subsequently consolidated on Tuesday, 20 June 2017.

The land, under this version of the Development Plan, falls within the confines of the Capital City Zone and abuts, on its eastern side, East Terrace Policy Area 29 of the adjacent City Living Zone.

6.3 Kind of Development

According to Principles 38 and 39 of the Capital City Zone, the proposal involves a kind of development that is neither complying nor non-complying. It must, therefore, be assessed and subsequently determined on its merits by SCAP in its capacity as the relevant authority.

6.4 Category of Development

According to Principle 40 of the Capital City Zone, the proposal involves a Category 2 kind of development for two reasons.

First, the land is located adjacent to the City Living Zone. Second, the proposed building will, once completed, exceed 22 metres in height.

7. ASSESSMENT

Our assessment of the proposal is set out below.

7.1 Desired Character

The Capital City Zone is envisaged to be the economic and cultural focus of the State including a range of employment, community, educational, tourism and entertainment facilities. It is anticipated that an increased population within the Zone will complement the range of opportunities and experiences provided in the City and increase its vibrancy. The proposal will contribute to an increased population.

High-scale development is envisaged in the Zone with high street walls that frame the streets. However, an interesting pedestrian environment and human scale is encouraged at ground floor level through careful building articulation and fenestration, frequent openings in building façades, verandahs, balconies, awnings and other features that provide weather protection. The proposed building reflects a high-scale and the podium design and potential future works to Cleo Lane create both the interest and human scale that the desired character seeks to achieve – all in a manner that offers weather protection and significant public benefit to the local community.

In important pedestrian areas, buildings will be set back at higher levels above the street wall to provide views to the sky and create a comfortable pedestrian environment. We note that Hutt Street is identified as a secondary pedestrian area. In narrow streets and laneways, the street setback above the street wall may be relatively shallow or non-existent to create intimate spaces through a greater sense of enclosure. The design approach along all frontages is entirely consistent with the street presentation envisaged.

Non-residential land uses at ground floor level that generate high levels of pedestrian activity such as shops, cafés and restaurants is encouraged. At ground level, development will continue to provide visual interest after hours by being well lit and having no external shutters. Non-residential and/or residential land uses will face the street at the first floor level to contribute to street vibrancy. The proposed land uses at ground level and first floor level are consistent with the desired character.

It is important to note that the Development Plan was recently amended to provide a stronger focus on high design quality. The desired character encourages new development to be contextual, durable, inclusive, sustainable and amenable. In our opinion, the Pre-Lodgement Agreement reached is testament to the high design quality achieved. Specifically, the design:

- responds positively to its surroundings and the character of the area, taking advantage of the northern aspect over the Park Lands, the siting and scale of adjacent built form and the generous contribution to the public realm by increasing the width of Cleo Lane and (subject to a separate process) upgrading the physical appearance of the laneway at the proponent's expense;
- is fit for purpose, adaptable and long lasting being very conscious of the materials and finishes proposed and very mindful of existing development to the southeast with respect to overshadowing, overlooking and visual impact;
- integrates landscaping to provide high quality spaces for occupants of the building and the public which also assists in optimising security and safety both internally and into the public realm;
- integrates very high quality sustainable systems into the buildings to improve environmental performance and minimise energy consumption which reaches a new level for living in the City; and

- provides natural light and ventilation to all habitable spaces.

Importantly, the contemporary architecture proposed responds to the site's context and broader streetscape, while supporting optimal site development.

We note that the desired character seeks to reinforce the distinctive grid pattern of Adelaide through the creation of a series of attractive boulevards as shown on Concept Plan Figures CC/1 and 2. These boulevards are to provide a clear sense of arrival into the City and are to be characterised by buildings that are aligned to the street pattern, particularly at ground level. The site is located at the edge of the East Terrace boulevard and in our opinion the height, scale and design of the building will assist in providing the clear sense arrival that is sought by the Capital City Zone. The orientation of the development also maximises views to an important civic landmark (the Park Lands) whilst providing a distinct City edge which is explicitly envisaged for East Terrace.

In our opinion, Cleo Lane is a minor laneway. A sense of enclosure is envisaged for such laneways (i.e. a tall street wall compared to street width) and an intimate, welcoming and comfortable pedestrian environment. The height and scale of the building together with the design of the ground plane is totally consistent with this envisaged character.

In consideration of all the above, we are of the opinion that the proposal satisfies Objective 8 in that it represents development that contributes to the Desired Character of the Capital City Zone.

7.2 Height, Bulk and Scale

The subject site is located within a designated 22 metre height area within the Capital City Zone however PDC 21 of that Zone provides an opportunity to exceed this height if a development can meet certain conditions. PDC 21 provides:

> *"Development should not exceed the maximum building height shown in Concept Plan Figures CC/1 and 2 unless;*
>
> *(a) it is demonstrated that the development reinforces the anticipated city form in Concept Plan Figures CC/1 and 2, and*
>
> *(b) only if:*
>
> *(i) at least two of the following features are provided:*
>
> *(1) the development provides an orderly transition up to an existing taller building or prescribed maximum building height in an adjoining Zone or Policy Area;*
>
> *(2) the development incorporates the retention, conservation and reuse of a building which is a listed heritage place;*
>
> *(3) high quality universally accessible open space that is directly connected to, and well integrated with, public realm areas of the street;*
>
> *(4) universally accessible, safe and secure pedestrian linkages that connect through the development site as part of the cities pedestrian network on Map Adel/1 (Overlay 2A);*
>
> *(5) on site car parking does not exceed a rate of 0.5 spaces per dwelling, car parking areas are adaptable to future uses or all car parking is provided underground;*

(6) residential, office or any other actively occupied use is located on all of the street facing side of the building, with any above ground car parking located behind;

(7) a range of dwelling types that includes at least 10% of 3+ bedroom apartments;

(8) more than 15 per cent of dwellings as affordable housing.

(ii) plus all of the following sustainable design measures are provided:

(1) a rooftop garden covering a majority of the available roof area supported by services that ensure ongoing maintenance;

(2) a greenroof, or greenwalls / façades supported by services that ensure ongoing maintenance;

(3) innovative external shading devices on all of the western side of a street facing façade; and

(4) higher amenity through provision of private open space in excess of minimum requirements, access to natural light and ventilation to all habitable spaces and common circulation areas."

In our opinion, the proposed height of the building satisfies PDC 21. First, we believe the development reinforces the anticipated city form in Concept Plan Figures CC/1 and 2. It does so by being lower in height than existing and future buildings to its west (noting that there is potential for much higher buildings to be developed to the west and northwest in the future); higher than buildings to its east; and, comparable in height to recently approved development at 292-300 Rundle Street and 293-297 Pirie Street both of which are adjacent to the Parklands. When the Rundle Street, Pirie Street and 2 Hutt Street developments are considered together, they assist in framing and maximising views to the Parklands and East Terrace as desired in the Zone.

In addition, the following features are satisfied by the development:

- the development provides an orderly transition up to an existing taller building (numerous are found to the west). We note that this criterion does not associate an existing taller building within an adjoining Zone or Policy Area through the use of the word 'or', underlined and emphasised below:

  (b) (i) (1) the development provides an orderly transition up to an existing taller building ***or*** *prescribed maximum building height in an adjoining Zone or Policy Area*

- high quality universally accessible open space at first floor level is directly connected to, and well integrated with, the public realm of East Terrace. Further, the proponent has generously offered to increase the width of Cleo Lane by setting back the ground level and will contribute to a physical enhancement of the space for the betterment of the lane users;
- a range of dwelling types is provided of which more than 10% comprise of 3+ bedroom apartments;
- above ground car parking areas (floor to ceiling heights) are adaptable to future uses;

In our opinion, the development satisfies more than two features to meet the second test.

Furthermore, all of the following sustainable design measures will be provided (which have been assessed and verified in the DSquared report included in Appendix 4:

- rooftop gardens are proposed (Level 3 and Penthouse Level);
- a substantial internal green wall to the restaurant and common space above will be supported by services that ensure ongoing maintenance;
- whilst not external, an innovative shading device system will be provided along the western elevation;
- higher amenity through provision of private open space in excess of minimum requirements, access to natural light and ventilation to all habitable spaces and common circulation areas is provided.

In consideration of all the above, we are of the opinion that the proposal satisfies PDC 21.

In forming our views in relation to building height, we have been very mindful of Council Wide PDC 167 and Capital City Zone PDC 16 which both encourage development to demonstrate a significantly higher standard of design outcome in relation to qualitative policy provisions of the Development Plan. The Pre-Lodgement Agreement reached confirms that design excellence has been achieved particularly in relation to pedestrian amenity, activation, sustainability, public realm and streetscape contribution, site configuration, the desired future character of the area and impact on adjacent conditions.

The proposed development is also consistent with a number of the council wide provisions, including but not limited to:

- PDC 168 which seeks a high standard of design and reinforcing the grid layout and distinctive urban character of the City by maintaining a clear distinction between the Capital City and City Living Zones and the open landscape of the Park Lands Zone;
- PDC 169 which encourages the height and scale of development and the type of land use to reflect and respond to the role of the street it fronts as illustrated on Map Adel/1 (Overlay 1);
- PDC 170 which envisages an overall height, scale and massing of buildings that reinforces the desired character, built form, public environment and scale of the East Terrace streetscape as contemplated within the Capital City Zone; and
- PDC 172 which encourages buildings and structures to not adversely affect by way of their height and location the long-term operational, safety and commercial requirements of Adelaide International Airport. The height of the building does not penetrate the Obstacle Limitation Surface.

7.3 Building Appearance and Design

With reference to Section 5.5 of this Statement, the key quantitative apartment guidelines relating to apartment sizes, balcony areas, storage and floor to ceiling heights are satisfied and need not be assessed here. All areas exceed the minimum guidelines demonstrating one way in which the development achieves a high quality design.

The Capital City Zone seeks a high standard of architectural design and finish appropriate to the City's role and image as the capital of the State (see Zone PDC 6). Zone PDC 7 seeks to achieve a high standard of external appearance through:

- the use of high quality materials and finishes;
- providing a high degree of visual interest;

- ensuring lower levels are well integrated with, and contribute to a vibrant public realm; and
- ensuring any ground and first floor level car parking elements are sleeved.

In our opinion, the proposed design and appearance of the development satisfies Zone PDC 7 in that:

- robust and durable materials such as masonry, natural stone, prefinished materials are used that will minimise staining, discolouring or deterioration;
- no surfaces are painted above ground level;
- all facades are highly articulated, and the southern boundary wall incorporates design features that are expressed across other facades;
- the above-ground car parking levels are not visible and treated by an expression that relates to the tower element.

The design and appearance of the development has also been very cognisant of the ground plane and relationship/integration with both Hutt Street and Cleo Lane. All road frontages are attractive, active and pedestrian-oriented that adds interest and vitality to City streets and laneways in accordance with Zone PDC 8 and 9. The footpath width along East Terrace (and Hutt Street) will be increased as a result of the ground level setbacks to improve pedestrian comfort and safety. The Cleo Lane road width will also be increased to support two way vehicular movement and the ground level restaurant/café tenancy better utilises the street corner for outdoor dining experiences with a northern orientation. All frontages contribute to the comfort of pedestrians through the incorporation of a continuous shelter satisfying Zone PDC 10. With respect to Zone PDC 12 the podium height and design of the tower element is warranted in this particular instance to correspond with and complement the form of the existing adjacent apartment development to the east.

Overall, the façades of the building are strongly modelled and incorporate a vertical composition which reflects the proportions of existing frontages, and ensures that architectural detailing is consistent around corners and along all road frontages to provide a unified expression in accordance with Zone PDC 15.

Zone PDC 19 seeks a particular building form along East Terrace. It states:

> *"Development along the terraces should contribute to a continuous built form to frame the City edge and activate the Park Lands."*

The overall building form is comparable in height to recently approved development at 292-300 Rundle Street and 293-297 Pirie Street both of which are adjacent to the Park Lands. When the Rundle Street, Pirie Street and 2 Hutt Street developments are considered together, they assist in framing and maximising views to the Parklands and East Terrace as desired in the Zone.

7.4 Parking, Access and Traffic

InfraPlan have prepared a Traffic Impact Statement for the proposed development. InfraPlan correctly note that the Development Plan does not prescribe a minimum car parking rate for dwellings or non-residential land uses located within the Capital City Zone. Notwithstanding, car parking spaces have been provided to each apartment as follows:

- 1 carparking space for 1 bedroom apartments;

- 1 carparking space for 2 bedroom apartments;
- 2 carparking spaces for 3 bedroom apartments; and
- 3 carparking spaces for each penthouse apartment.

InfraPlan also confirm in their response that there is sufficient on-street car parking available within close proximity of the subject site to accommodate visitor demands.

A total of 46 bicycle parking spaces for residents will be provided on Level 2, accessible via lifts, and 6 visitor cycle parking spaces will be provided on site. In accordance with Table Adel/6, a total of 53 bicycle parking spaces (46 for residents and 7 for visitors/customers) are required for the proposed development. InfraPlan do not consider the shortfall of one bicycle parking space significant, and confirm that it can be recovered by existing or future on-street bicycle parking spaces in the vicinity of the subject site. In our opinion, the proposal therefore satisfies Transport and Access PDC 234.

In addition to the above, InfraPlan have also confirmed the following:

- the widening of Cleo Lane provided by the 3 metre rear setback will facilitate two-way movement, and therefore improve the existing functionality of the laneway and access arrangements for existing and future residents;
- no change will be made to the left-in-left-out arrangement to/from Cleo Lane;
- the proposed development will have negligible impact on the surrounding road network in terms of trips generated (2 additional trips in the morning peak and 3 in the afternoon peak);
- existing access to at grade carparks from Cleo Lane will be replaced by two single lane ramps providing access to the basement and upper parking levels;
- use of the two single lane ramps will be controlled by a signalling system which will allow one-way, reversible movements. Guiding principles for designing such a signalling system are specified in the Traffic Impact Statement and shall be reviewed at the detailed design stage;
- waste is to be collected from a waste storage area on ground level outside of peak collection times (as specified in the Section 5.14) with the waste collection vehicle to reverse into Cleo Lane, and drive out in a forward direction (satisfying PDC 241);
- all bicycle parking provision shall be in compliance with AS2890.3 – Bicycle Parking; and
- the proposed carpark design was assessed and found to be in general compliance with Australian Standards. Any deviation from standards have been identified by InfraPlan and mitigation measures recommended to improve compliance (satisfying PDC 251 and PDC 261).

Overall, InfraPlan support the overall car parking, traffic and access arrangements and we are comfortable with the overall approach in the context of the relevant provisions of the Development Plan.

7.5 City Living Zone Interface

In our opinion, Zone PDC 23 is the key interface provision that applies to the proposal.

The proposal is not located on the southern side of Gouger Street - Angas Street therefore PDC 24 does not apply. PDC 25 also does not apply as the proposal is not *"directly adjacent to the City Living, Main Street (Adelaide) and Adelaide Historic (Conservation) Zone boundaries…."*.

This is a clumsy provision which is only applicable to sites that are adjacent to the City Living, Main Street (Adelaide) and Adelaide Historic (Conservation) Zone boundaries. Upon our review of the zone maps, there are actually no sites within the Capital City Zone which are adjacent to all of these other Zone boundaries.

Notwithstanding, the intent of PDC 25 is encapsulated within PDC 23 which is relevant and states:

> *"Development should manage the interface with the City Living Zone or the Adelaide Historic (Conservation) Zone in relation to building height, overshadowing, massing, building proportions and traffic impacts and should avoid land uses, or intensity of land uses, that adversely affect residential amenity".*

PDC 23 seeks to manage the interface with the City Living Zone by:

- appropriately locating a higher building at the corner of Hutt Street and East Terrace. The adjacent eastern property contains a four storey wall and service yard adjacent to Cleo Lane. In addition, properties further south along Cleo Lane have garages, or in some cases two storey buildings sited on the Lane boundary. The scale and form of these 'laneway buildings' is such that limited views to the proposed building will be obtained from the small private open spaces to their rear;
- not resulting in any unreasonable overshadowing upon properties within the City Living Zone;
- creating two distinct tower elements which successfully breaks up the mass of the building to give the impression of two slender building forms;
- mitigating overlooking towards the City Living Zone through the orientation and design of the floor plans. We note that the existing office building to the south of the subject site would result in a higher degree of overlooking with upper level east facing windows looking directly into rear yards of East Terrace properties;
- all traffic associated with the proposal is concentrated towards the northern end of Cleo Lane which will be wider as a result of the development improving access and egress for all Cleo Lane properties contained within the City Living Zone.

Whilst others may argue that the height of the development may not respect the low to medium scale context of the City Living Zone we consider in the particular circumstances of this proposal, the location of the site at the northern edge of the interface; the adjacency to the Park Lands; the fact that the site is only one of three remaining development sites in the Capital City Zone with a northern orientation to the Park Lands; the prominent corner site characteristics of the land; and, the improvement to the conditions in Cleo Lane for other users, accords with the overall intent and purpose of the Development Plan.

In our opinion, the proposed building height and scale would not be appropriate further south adjacent to the core of the City Living Zone.

7.6 Crime Prevention

The following provisions are considered relevant in assessing the proposed development's ability to alleviate crime.

Environmental

PDC 82 *Development should promote the safety and security of the community in the public realm and within development. Development should:*

(a) promote natural surveillance of the public realm, including open space, car parks, pedestrian routes, service lanes, public transport stops and residential areas, through the design and location of physical features, electrical and mechanical devices, activities and people to maximise visibility by:

i. orientating windows, doors and building entrances towards the street, open spaces, car parks, pedestrian routes and public transport stops;

ii. avoiding high walls, blank facades, carports and landscaping that obscures direct views to public areas;

iii. arranging living areas, windows, pedestrian paths and balconies to overlook recreation areas, entrances and car parks;

iv. positioning recreational and public space areas so they are bound by roads on at least two road frontages or overlooked by development;

v. creating a complementary mix of day and night-time activities, such as residential, commercial, recreational and community uses, that extend the duration and level of intensity of public activity;

vi. locating public toilets, telephones and other public facilities with direct access and good visibility from well-trafficked public spaces;

vii. ensuring that rear service areas and access lanes are either secured or exposed to surveillance; and

viii. ensuring the surveillance of isolated locations through the use of audio monitors, emergency telephones or alarms, video cameras or staff eg by surveillance of lift and toilet areas within car parks.

(b) provide access control by facilitating communication, escape and path finding within development through legible design by:

i. incorporating clear directional devices;

ii. avoiding opportunities for concealment near well travelled routes;

iii. closing off or locking areas during off-peak hours, such as stairwells, to concentrate access/exit points to a particular route;

iv. use of devices such as stainless steel mirrors where a passage has a bend;

v. locating main entrances and exits at the front of a site and in view of a street;

vi. providing open space and pedestrian routes which are clearly defined and have clear and direct sightlines for the users; and

vii. *locating elevators and stairwells where they can be viewed by a maximum number of people, near the edge of buildings where there is a glass wall at the entrance.*

(c) *promote territoriality or sense of ownership through physical features that express ownership and control over the environment and provide a clear delineation of public and private space by:*

i. *clear delineation of boundaries marking public, private and semi-private space, such as by paving, lighting, walls and planting;*

ii. *dividing large development sites into territorial zones to create a sense of ownership of common space by smaller groups of dwellings; and*

iii. *locating main entrances and exits at the front of a site and in view of a street.*

(d) *provide awareness through design of what is around and what is ahead so that legitimate users and observers can make an accurate assessment of the safety of a locality and site and plan their behaviour accordingly by:*

i. *avoiding blind sharp corners, pillars, tall solid fences and a sudden change in grade of pathways, stairs or corridors so that movement can be predicted;*

ii. *using devices such as convex security mirrors or reflective surfaces where lines of sight are impeded;*

iii. *ensuring barriers along pathways such as landscaping, fencing and walls are permeable;*

iv. *planting shrubs that have a mature height less than one metre and trees with a canopy that begins at two metres;*

v. *adequate and consistent lighting of open spaces, building entrances, parking and pedestrian areas to avoid the creation of shadowed areas; and*

vi. *use of robust and durable design features to discourage vandalism.*

PDC 83 *Residential development should be designed to overlook streets, public and communal open space to allow casual surveillance.*

The Development Plan encourages buildings which are designed to reduce opportunities for crime. In our opinion, the proposed development achieves the intent of the relevant crime prevention provisions in that:

- significant glazing and lighting to the Ground Floor Level will ensure visibility to/from the street at all times;
- inclusion of an active use at Ground Level, which may also extend into the evening hours will provide activity adjacent to road frontages and the Park Lands;

- promoting natural surveillance of the public realm (Hutt Street, East Terrace and Cleo Lane) plus the Park Lands from upper level balconies and windows, communal terrace and roof top garden;
- enabling direct sightlines between Hutt Street and the apartment entry;
- avoiding opportunities for concealment;
- providing secure and controlled entrances to the residential levels and car park levels by key card or remote control;
- controlling visitor access via an intercom system to promote territoriality and a sense of ownership through the clear delineation between public and private areas;
- the use of robust and durable design features to discourage vandalism;
- built form and signage clearly defining private and public areas;
- increasing the width of Cleo Lane which will provide a safer and more accessible environment for all users of the lane;
- increasing the width of the East Terrace footpath to provide a safer and more comfortable pedestrian environment and experience;
- ensuring waste collection occurs via Cleo Lane outside of peak periods (7:00am to 9:00am, and 3:00pm to 6:00pm). We note that the waste collection vehicle will reverse into Cleo Lane from East Terrace, and park briefly within the designated parking area which will still allow other vehicles to use Cleo Lane.

7.7 Landscaping

PDC 208 *Landscaping should incorporate local indigenous species suited to the site and development, provided such landscaping is consistent with the desired character of the locality and any heritage place.*

PDC 209 *Landscaping should be provided to all areas of communal space, driveways and shared car parking areas.*

As outlined in Landscaping PDC 207, landscaping should be selected to conserve water, form an integral part of the development, and be used to foster human scale, define spaces, and generally enhance visual amenity.

The proposed development has achieved this through the inclusion of a green wall over the Ground and Mezzanine Levels, a roof garden on Level 3, and an internal garden to the residential entry. The landscaping will contribute to additional amenity, and will be supported by services to ensure ongoing maintenance.

The proponents offer to upgrade Cleo Lane with landscaping will also contribute in a positive manner to the adjacent City Living Zone which in its existing state be best described as a service lane.

7.8 Environmental

7.7.1 Waste

The relevant provisions relating to waste encourage development to store waste in dedicated areas for on-site collection and the sorting of recyclable materials and refuse. In addition, odours associated with waste should be minimised.

As detailed in Section 5.14, a Waste Management Plan has been prepared by InfraPlan, and is included in Appendix 3. We have formed the opinion that the proposed waste arrangements will achieve the relevant provisions of the Development Plan in that:

- a dedicated bin storage room will be provided at Ground Level;
- general waste, recyclables, and organic waste are to be separately stored in each apartment and the bin storage room; and
- the waste collection vehicle will reverse into Cleo Lane, and temporarily park within the 3 metre setback from the eastern boundary of the subject site whilst waste bins are emptied.

The bin storage room has been designed to mitigate odour, and located a sufficient distance from other sensitive land uses to ensure they will not be impacted by any smells associated with the waste. Further, the frequent collection of waste is also anticipated to prevent odours building.

In relation to construction waste, a Construction Environment Management Plan will be prepared in due course to finalise these arrangements. A standard condition of consent typically formalises such an arrangement.

Respecting the above, we have formed the opinion that the waste arrangements are appropriate for the subject site.

7.7.1 Services

With reference to Section 5.17 of this Statement we have formed the opinion that the proposed development has made for provisions for the supply of water, gas and electricity and for the satisfactory disposal and potential re-use of sewage and waste water in accordance with PDC 132 and PDC 135.

We also note that all service structures, plant and equipment are designed to be an integral part of the development and are suitably screened from public spaces or streets satisfying PDC 133.

7.7.1 Energy Efficiency

The energy efficiency provisions of the Development Plan encourage development to:

- provide adequate thermal comfort for occupants and minimise the need for energy use for heating, cooling and lighting (PDC 106);
- promote naturally ventilated and day lit buildings to minimise the need for mechanical ventilation and lighting systems (PDC 107);

- reduce energy through appropriate building and window orientation, adequate thermal mass including night time purging to cool thermal mass, insulation, maximising natural ventilation, appropriate material selection and use of innovative technologies (PDC 108, PDC 109 & PDC 114).

We do not intend to repeat the extensive features listed under Section 5.18 however the following matters reinforce the environmental performance of the building:

- use of high performance double glazing with integrated and adjustable interstitial blinds, access to daylight, and natural ventilation to all apartments and corridors to reduce energy demands;
- solar sensors will be included in the façade, and will automatically control the interstitial blind systems. Occupants will have the ability to also manually override the automated control of the blinds (if they wish);
- electro-chromic glass has been incorporated in strategic locations to provide additional privacy and solar load reduction;
- designing and certifying the apartments to achieve an energy performance at least 30% better than current Building Code minimum NatHERS rating of 6 Stars average, representing a significant and unprecedented dwelling average NatHERS Rating of 8 Stars in the City of Adelaide;
- designing the tenancy and common areas to achieve an energy performance at least 30% better than a deemed to satisfy compliant space in accordance with the NCC/BCA Section J, JV3 methodology;
- offering all apartment purchasers, the option of an electric vehicle charge points at their car park space, in order to promote the de-carbonisation of Adelaide's transport network. Dependent upon the final size of PV array installed, a number of these points can be supplied with 100% renewable energy;
- air conditioning systems within the apartments will be zoned to functional areas (e.g. living rooms, bedrooms), and provided with automatic and manual controls. They will be inverter controlled and rated to the highest available Energy Star rating, and include the option to operate in fan mode providing low energy air circulation;
- provision of a "kill switch" to each apartment, which allows a one touch isolation of all lighting and air conditioning power when the apartment is vacant;
- provision of a 39kW roof mounted solar photovoltaic array connected via the inset network so that it can benefit all residents and tenants in the development, but is sized to adequately provide renewable energy equivalent to 100% of the common area power needs, including car park ventilation;
- daylight control to lighting systems in common areas and use of energy efficient, LED lighting fittings;
- use of light coloured external finishes (in particular roof coverings) to reflect heat, reduce solar gain, and reduce the "heat island effect";
- use of solar gas boosted hot water systems, gas hobs, and European Energy Label A category ovens for cooking throughout in order to reduce peak electricity demands, reduce the overall development carbon footprint, and provide an economical amenity for apartment owners;

- provision of a building energy management system with smart metering to automatically record and monitor the building's resource use and establish trends and profiles to assist with the ongoing control of energy use (this information will be made available on-line);
- providing apartment owners with retractable clothes racks in their apartments, to minimise electric clothes drier use which will also minimise the incidence of clothes drying on exposed balconies; and
- providing retail and commercial tenancy space air conditioning systems with an economy cycle control allowing 100% outside air to be used for free cooling purposes when external weather conditions allow.

The energy efficiency of the development reinforces the high design quality of the building which exceeds the expectations of the Development Plan.

7.7.1 Wind

A Wind Impact Assessment was undertaken by DR Partners which is included in Appendix 5. DR Partners has considered the interaction between the prevailing winds and the building morphology of the area.

With respect to westerly winds, the Hutt Street footpath is shielded by the proposed canopy along East Terrace and Hutt Street. There are also a number of several medium rise buildings and buildings are under construction that further mitigate the impact at lower levels.

In relation to northerly winds (including north-easterly and north-westerly), DR Partners note that the open character of the Park Lands and will tend to funnel down Hutt street however downwash from the proposed tower will be disrupted by the indented balconies, protruding surface features and the street level canopy which will also offer pedestrians protection.

In regard to Cleo Lane, winds are shielded at low level by surrounding buildings and downwash on the eastern façade is disrupted by the indented balconies, protruding surface features and the potential future works within Cleo Lane.

Overall, given the level of pedestrian activity and the minor to negligible wind impact, we have formed the opinion that the development achieves the relevant provisions of the Development Plan relating to wind impact.

7.7.1 Noise

A noise assessment has been undertaken by Sonus which is included in Appendix 7. The assessment considers:

- the noise from traffic and street activity on surrounding roads into the development; and,
- the noise emanating from car parking, mechanical plant and rubbish collection associated with the proposed development to other noise sensitive land uses.

The proposed development includes a restaurant at ground level. The assessment of noise associated with the restaurant has been excluded as the operator is unknown at this particular stage and whether the proposed operation has any potential to impact noise sensitive land uses in the vicinity.

The assessment has been based on noise logging conducted at a location representative of the existing noise environment at the site between the 27th and 28th of November 2017.

Sonus has identified that the key noise issue for the site is associated with the impact of traffic at the intersection of Hutt Street, East Terrace, Bartels Road and Pirie Street upon the amenity of the development. Accordingly, Sonus recommends that particular features of the building construction will adequately protect occupants against the intrusion of traffic noise.

In relation to other matters, Sonus has advised that:

- waste collection should not occur after 10.00pm or before 7.00am Monday to Saturday or before 9.00am on a Sunday or Public Holiday;
- the assessment criteria associated with the mechanical plant is expected to be practically achieved without significant acoustic treatment;
- car park noise levels will not be noticeably different to the much greater number of vehicles on East Terrace.

Having regard to the above, the relevant provisions relating to noise are satisfied.

7.7.1 Stormwater

DR Partners has consulted the Adelaide City Council in relation to stormwater management. A copy of their correspondence is provided in Appendix 6. In summary, Council has advised that since the impervious area of the site remains unaltered that no on-site detention of stormwater is required.

Major flood events (1 in 100 year ARI event) will be catered for by overland flow paths discharging to the surrounding streets. Floor levels will be set above back of existing footpath levels in accordance with council requirements.

Notwithstanding, the proposal will re-use roof water for the purposes of irrigation of landscaping and green walls which will ensure their long term sustainability. The community strata will be responsible for the maintenance and operation of the rainwater tank and system.

7.7.1 Overshadowing

Council Wide PDC 174 encourages development in a non-residential Zone that is adjacent to land in the City Living Zone, Adelaide Historic (Conservation) Zone or North Adelaide Historic (Conservation) Zone to minimise overshadowing on sensitive uses by ensuring:

- north-facing windows to habitable rooms of existing dwellings in the City Living Zone, Adelaide Historic (Conservation) Zone or North Adelaide Historic (Conservation) Zone receive at least 3 hours of direct sunlight over a portion of their surface between 9.00am and 3.00pm on 21 June;

- ground level open space of existing residential buildings in the City Living Zone, Adelaide Historic (Conservation) Zone or North Adelaide Historic (Conservation) Zone receive direct sunlight for a minimum of 2 hours between 9.00am and 3.00pm on 21 June to at least the smaller of the following:
  - » half of the existing ground level open space;
  - » 35 square metres of the existing ground level open space (with at least one of the area's dimensions measuring 2.5 metres).

The shadow diagrams demonstrate that the proposed development will satisfy PDC 174. Furthermore, the shadow diagrams presented during the design review process demonstrated that the impact of the proposed development compared to a building of 22m in height was negligible in the context of PDC 174.

7.7.1 Overlooking

Council Wide PDC 66 encourages medium to high scale residential or serviced apartment development to be designed and sited to minimise the potential overlooking of habitable rooms such as bedrooms and living areas of adjacent development. The design of each apartment floor plan is such that the potential for overlooking into the City Living Zone will be minimised. The greatest potential for overlooking may occur from east facing balconies however it is important to recognise the following:

- the adjacent residential flat building does not contain west facing habitable room windows;
- habitable room windows of other dwellings to the south are located greater than 15m (measured horizontally) from the east facing balconies; and
- there are existing structures or trees located in rear yards of dwellings backing onto Cleo Lane that would screen any views that may occur.

We also note that the open space area located to the western side of the adjacent apartment building is a common service area and not 'private' as such.

All habitable room windows and balconies are set-back from boundaries with adjacent sites of at least three metres to provide an adequate level of amenity and privacy and to not restrict the reasonable development of adjacent sites in accordance with Council PDC 67. Whilst the communal roof garden is located on the southern boundary it is important to note that this space would otherwise be the car park roof deck. In our opinion, this space is unlikely to restrict the reasonable development potential of the adjacent site. The design of the garden space offers privacy screening and landscaping along the boundary.

Overall, we are satisfied that the design of the development minimises the potential for overlooking particularly to existing dwellings contained within the adjacent City Living Zone.

7.9 Affordable Housing

The Affordable Housing Overlay applies to the proposal. The Overlay is not mandatory, and given the intent to deliver high quality owner occupier apartments at a price point well beyond the affordable housing price threshold, affordable housing will not be provided in this particular development.

8. CONCLUSION

We have concluded from our assessment of the proposal it represents both planning and design excellence. In support of our conclusion, we wish to highlight that:

- a Pre-Lodgement Agreement has been reached with the Government Architect reinforcing the high design quality of the development;
- the proposal satisfies the conditions to qualify for the height proposed;
- apartment sizes, balcony areas, storage and floor to ceiling heights exceed the minimum guidelines;
- apartments will be designed and certified to achieve an energy performance at least 30% better than current Building Code minimum NatHERS rating of 6 Stars average, representing a significant and unprecedented dwelling average NatHERS Rating of 8 Stars in the City of Adelaide;
- overall car parking, traffic and access and waste collection arrangements are acceptable;
- the location of the site relative to dwellings contained within the City Living Zone is such that no detrimental interface issues result from the development;
- the conditions within Cleo Lane from a traffic and access perspective will improve with the development;
- the amenity in Cleo Lane will improve if adjacent land owners and Council support the proponent to upgrade the laneway;
- the development will provide a safe environment;
- the development has been designed in a way that will not result in any unreasonable overlooking, overshadowing, wind, noise or traffic impacts; and
- roof water will be re-used for irrigation of landscaping and green walls which will ensure their long term sustainability

Accordingly, we have formed the opinion that Development Plan Consent should be granted.

APPENDIX 1. TECTVS ARCHITECTURAL DESIGN

APPENDIX 2. TRAFFIC IMPACT STATEMENT

APPENDIX 3. WASTE MANAGEMENT PLAN

APPENDIX 4. SUSTAINABILITY STRATEGY

APPENDIX 5. WIND REPORT

APPENDIX 6. STORMWATER PLAN

APPENDIX 7. ACOUSTIC ASSESSMENT

APPENDIX 8. BUILDING SERVICES REPORT

Rymill


East Tce
East Tce
Pirie St
Hutt St
Cleo Lane


East Tce
East Tce
Pirie St
2 Hutt St
Hutt St
Cleo Lane

Located on the edge of the city, Rymill Park Apartments become the centre of future city living.

The proposed expression of the residential apartment tower is sculptural, slender, and sensitive to site. Natural curves greet nature with a high level of amenity extending to the public realm.

Proposal Summary

The proposed development is for a 16 storey building of 53.9m in height.

This includes two levels of basement parking, two levels of above ground parking and a main residential structure comprised of twelve stories.

The permeable ground floor comprises a restaurant space, while the mezzanine level has a dedicated and generous resident lounge with outdoor terrace overlooking the parklands.

A private roof garden for use by residents is also included on level three.

Critical Information Summary

Summary

The development site is located at 2 Hutt St, Adelaide. The development comprises 3 frontages, including Hutt St, East Tce and Cleo Lane, and faces the Rymill parklands on East Tce.

The current proposal package includes a detailed site and contextual analysis, with design elaboration including proposed plans, visualisations and development yields.

Team

Maras Group, Cambridge Group, Tectvs, Future Urban Group, DSquared, Infraplan, DR Partners, Tract, Harcourts,

Description

The proposed development comprises a 16 storey building of 53.9m in height. This includes two levels of basement parking, two levels of above ground parking and a main residential structure comprised of 12 storeys.

The permeable ground floor comprises a restaurant space, while the mezzanine level has a dedicated and generous resident lounge with outdoor terrace overlooking the parklands.

A private roof garden for use by residents is also included on level three.

Yield

- 4 x one bedroom apartments
- 21 x two bedroom apartments
- 11 x three-bedroom apartments
- 1 x three-bedroom sub-penthouse
- 1 x four-bedroom penthouse
- 56 Car parks
- Storage for 46 bicycles
- 6 Bike spaces for guests

Details

- Targeted Development
- Four levels of parking (including two basement levels)
- Laneway integration
- Widening and greening of Cleo Lane (into the proposal's site)
- Widening of Hutt Street and East Tce footpaths (into the proposal's site)
- Contribution to the public realm and place
- Dedicated greening Strategy, including roof top garden and greenwall
- Commitment to sustainability (8 NatHers star rating)
- Commitment to a high quality design outcome

Site Area

580m^2 (approximately)
53.9m high

Street Frontages

Hutt St, East Tce, Cleo Lane

Site: Context

Site: Context

Planning Controls

Building & Height

In our opinion, the proposal satisfies the over height criteria for the following reasons:

• The development reinforces the anticipated city form by being lower in height than existing and future buildings to its west; higher than buildings to its east; and, comparable in height to recently approved developments which when considered together, assist in framing the Parklands and East Tce as desired in the Zone.

The development satisfies the following features:

• The development provides an orderly transition up to an existing taller building (numerous are found to the west). This criteria does not associate an existing taller building within an adjoining Zone or Policy Area.

• High quality universally accessible open space is provided at ground level and is well connected/integrated with the public realm of Bartels Road/East Tce. Further, the proponent has generously offered to increase the width of the footpath adjacent Bartels Road and also Cleo Lane by setting back the ground level and will contribute to a physical enhancement of the space;

• A range of dwelling types is provided of which more than 10% comprising of 3+ bedroom apartments;

• All of the following sustainable design measures are provided:

• Two separate rooftop gardens are proposed (Level 3 and Penthouse Level);

• A substantial internal greenwall which will be supported by services to ensure ongoing maintenance;

• Inclusion of an innovative shading device system along the western elevation (albeit not external);

• Higher amenity through provision of private open space which exceeds the minimum requirements, access to natural light and ventilation to all habitable spaces and common circulation areas is provided.

In addition, Capital City Zone PDC 23 is the relevant interface provision that applies to the proposal. The proposal seeks to manage the interface with the City Living Zone by:

• Appropriately locating a higher building at the corner of Hutt Street and East Tce as the scale and form of the 'laneway buildings' adjacent to Cleo Lane are such that limited views to the proposed building will be obtained from the small private open spaces to their rear;

• The proposed height does not result in any unreasonable overshadowing upon properties within the City Living Zone;

• With respect to massing and building proportions, the building form is characterised by two distinct elements which successfully break up the mass of the building and creates two slender building proportions;

• The reduction of the perceived scale of the top levels of the built form contributes towards an improved transition;

• The design of the floor plans mitigates overlooking towards the City Living Zone;

• All traffic associated with the proposal is concentrated towards the northern end of Cleo Lane which will be wider as a result of the development improving access and egress for all Cleo Lane properties.

Proposal
Lodged/Approved Development

Site: Context

Planning Controls

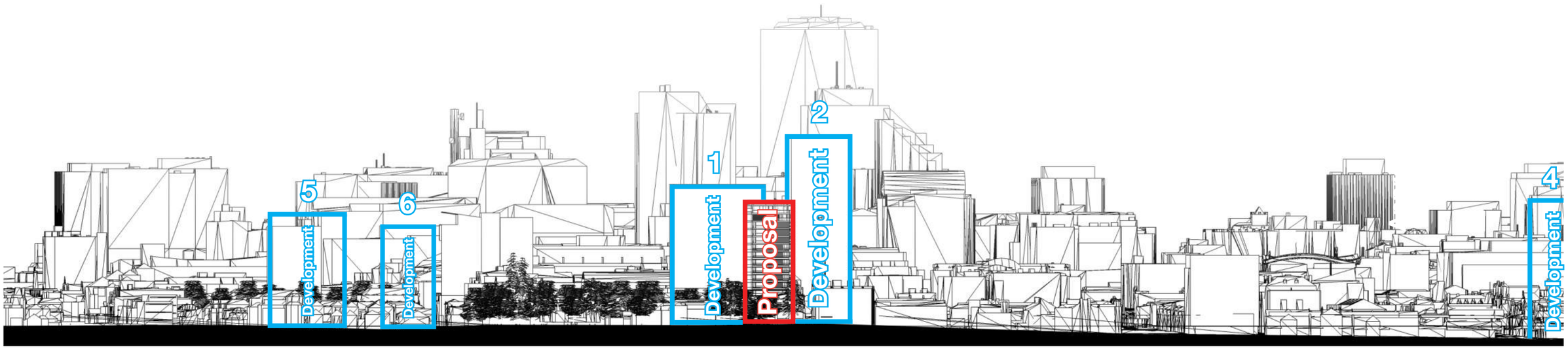
Building & Height

The proposal is for a building of 53.9m in height.

We cite the following lodged/approved developments as an indication of context:

1. 293-297 Pirie Street – 60m residential tower
2. 262-266 Pirie Street – 80m residential tower
3. 248-253 East Terrace – 8 storeys
4. 292-300 Rundle Street – 60m tower
5. 45-49 Hutt Street – 40m Development
6. 53-55 Hutt Street – 46m Development

Proposal
Lodged/Approved Development



East Elevation

West Elevation

Site: Context

Place

A Mix of Styles and Types

The Hutt Street and East Terrace surrounds exhibit both a contemporary and historical mix of styles and types.

Of particular notice are how multiple buildings in the area utilise curves to present a softer, more naturalistic, gestural form. A postmodern style that references iconic cultural forms and historical motif is more widespread amongst the contemporary built-context.

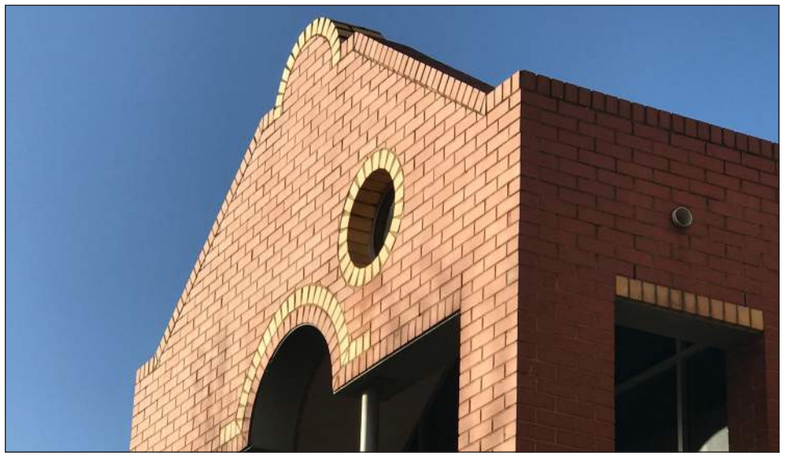
Materiality consists largely of stone, brick, rendered cement and glass.

Site: Context

Place

Key Landmarks

The site at 2 Hutt Street is rich with precedents. From the historic Rymill House; whose stonework curves soften to suit its context, to it's neighbour at 16 Hutt Street; postmodern and proud, to Rymill Park; drawing on the picturesque and the ornamental. All of these precedents speak to the proposal developing a softer, curved form.



Rymill House - Heritage + Materiality

Rymill Park - Nature + Picturesque Classicism

16 Hutt Street - Material Expression + Cultural Motif

Site: Context

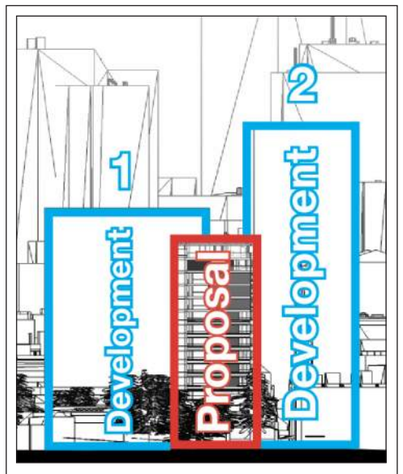
Place

Re-pointing the Community Wall

The community block that comprises Hutt Street, East Terrace and Flinders Street features blue stone prominently on it's Southern Side. Our proposal is to 're-point' the community wall and begin to extend the stone to the North-West corner. The aim is to better integrate the new development into the built-community, whilst recognizing the power of referencing cultural and tectonic histories.

Site: Context

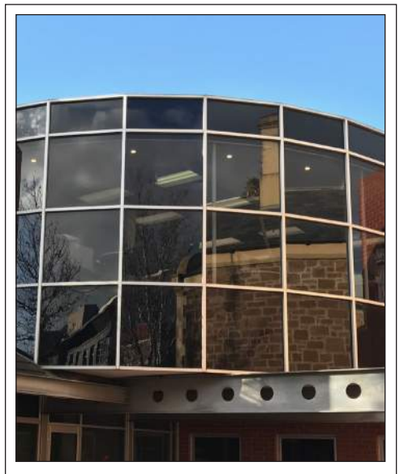
Key Points



Future Heights

We note future heights in the surrounding area are likely to be taller than the proposed development.

1



Curves

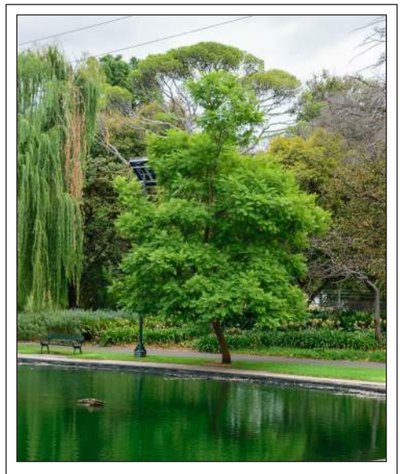
Contemporary buildings near the proposal often adopt curved elements.

2

Materiality

Stonework is commonplace in the area.

3



Place

The amenity and greenery of Rymill Park has scope to be extended into the city.

4

Re-pointing the Community Wall

The community block that comprises Hutt Street, East Terrace and Flinders Street features blue stone prominently on it's Southern Side. Our proposal is to 're-point' the community wall and begin to extend the bluestone to the North-West corner.

5

Site: Perspective

1 **Rundle Street**
Looking South

2 **Rymill Park**
Looking South-West


3 Hutt Street
Looking North
LANE
KEEP LEFT


4 Bartels Road
Looking West
REFUGE ISLAND
TICKETS

Design Response
Precedents

Rymill Place speaks to both the parklands and the city. We aim for the building to work at the scale of ‘touch and feel’, where a rich materiality plays off artistic curves.

We draw on past influences such as Seidler and Nervi, but introduce new references through a formal approach, guided by a contribution to public space, public art and public life.

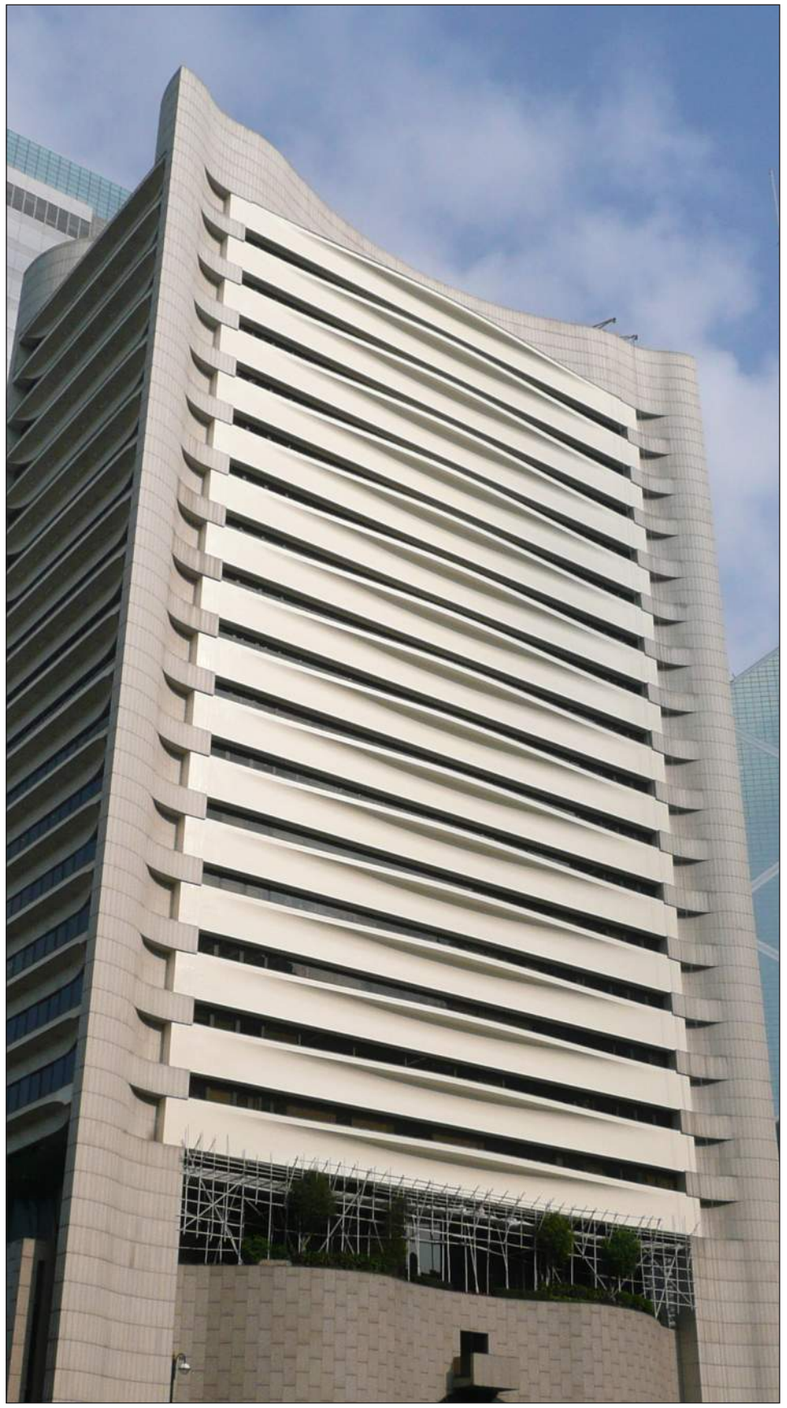
Seidler Offices and Apartments entry curves, Sydney

Design Response: Precedents

Structure

Concrete

We cite the references of Nervi and Seidler in giving expression to concrete.

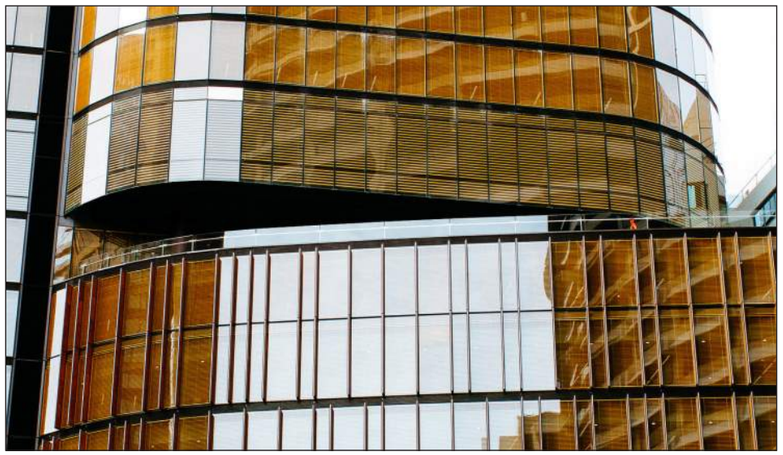


Design Response: Precedents

Form

200 George Street, Sydney, NSW - FJMT

The curved glass curtain wall and interstitial blinds of 200 George Street soften a tall structure effectively.

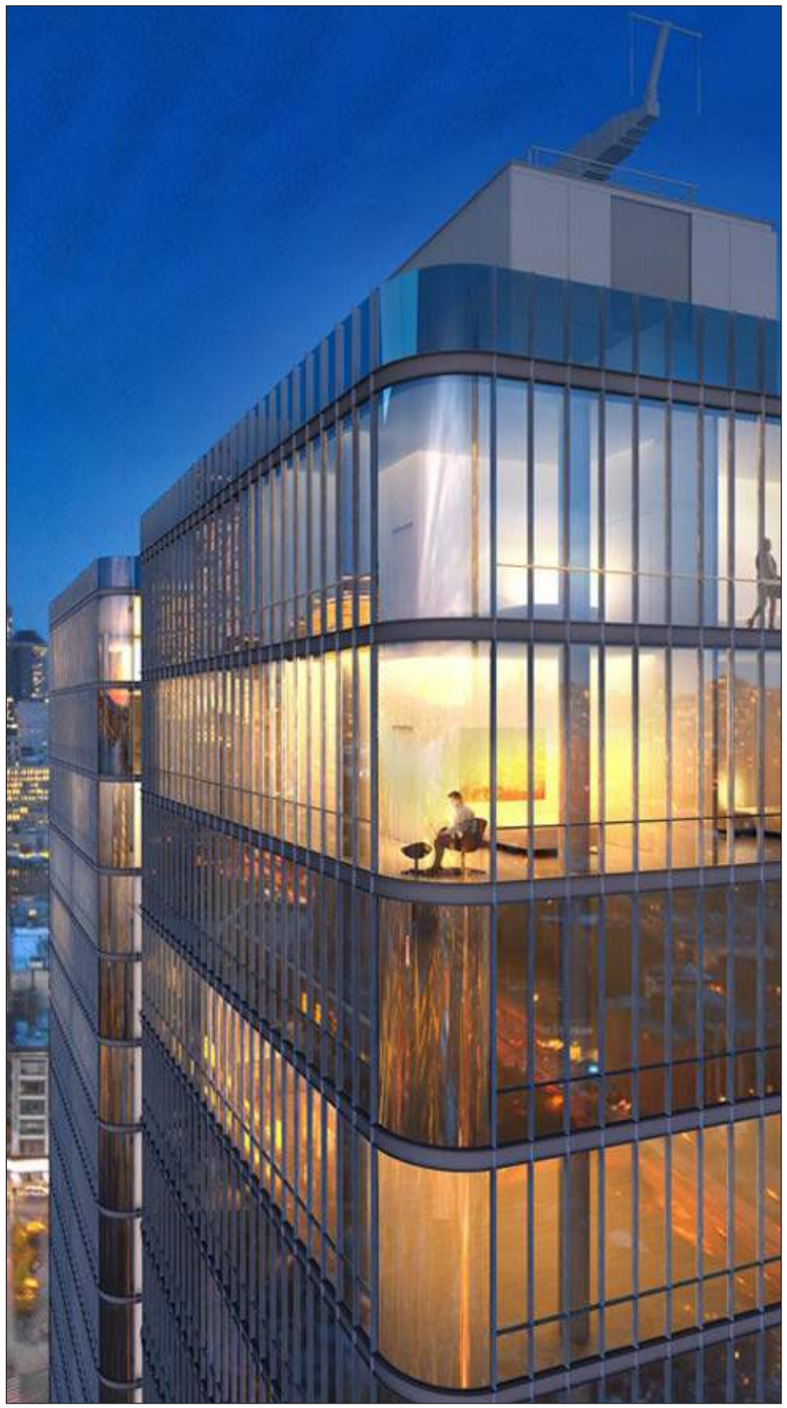


Design Response: Precedents

Skin

SOHO, New York, Renzo Piano

The Glass Wall of Renzo Piano's SOHO creates minimal distance to the outside whilst controlling light effectively within.



Design Response: Precedents

Interface

Lobby/Entrance

Green walls speak to the parklands and activate the proposed lobby and ground floor tenancy, whilst artwork adopts a materiality that integrates itself into the overall building.

Design Response: Precedents

Amenity

Restaurant - Ground Floor

The ground floor restaurant is anticipated to be a sophisticated space drawing on an abundance of natural light. The double-height greenwall behind the bar area will provide a lush and unique feature for the space, as well as reflect the views to parklands adjacent the development.

Design Response: Precedents

Amenity

Private Lounge - Mezzanine

We believe that residents would respond to the warmth and richness provided by the generosity of the resident lounge, while the associated terrace creates an outdoor space to take in city and parkland views.

Design Response: Precedents

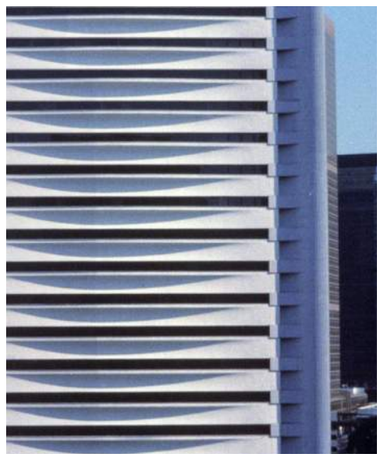
Interior

Apartment Amenity

A strong relationship to both the city and the parklands develops through expansive views and balcony-living, while attention to detail and high end materiality speak to high-end living.

Design Response: Precedents

Key Points



Structure

The structural curves of the Hong Kong club soften the facade

1

Form

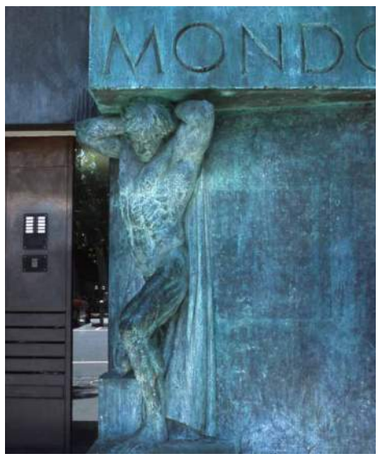
A curved and articulated form softens a tall structure and enhances the architecture expression

2

Skin

The glass wall creates minimal distance to the outside whilst controlling light effectively within.

3



Interface

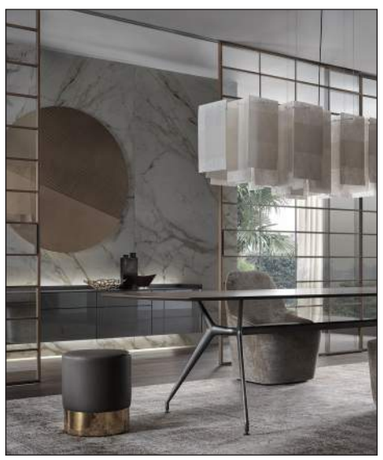
The building will be accessible to the public realm at the ground level, with high quality finishes and public art producing amenity.

4

Amenity

Greenwalls enhance the public realm, while warm and sophisticated spaces provide generosity to the restaurant and resident lounge.

5



Interior

Providing a rich material experience across all levels of the development.

6

Design Response:
Proposal

The building form is characterised by two distinct elements which successfully break up the mass of the building to create two slender building proportions.

A landscape approach that extends the parklands towards the urban context, with high quality, universally accessible open space provided at ground level, combined with a large curvilinear terrace reaching out towards the parklands and a proposed separate rooftop garden.

Design Response: Proposal

Long-range Views to the Building

Views

Long range views to the building position it within context and scale.

1 **Rundle Street**
Looking South

2. **Hutt Street**
Looking North-East

Design Response: Proposal

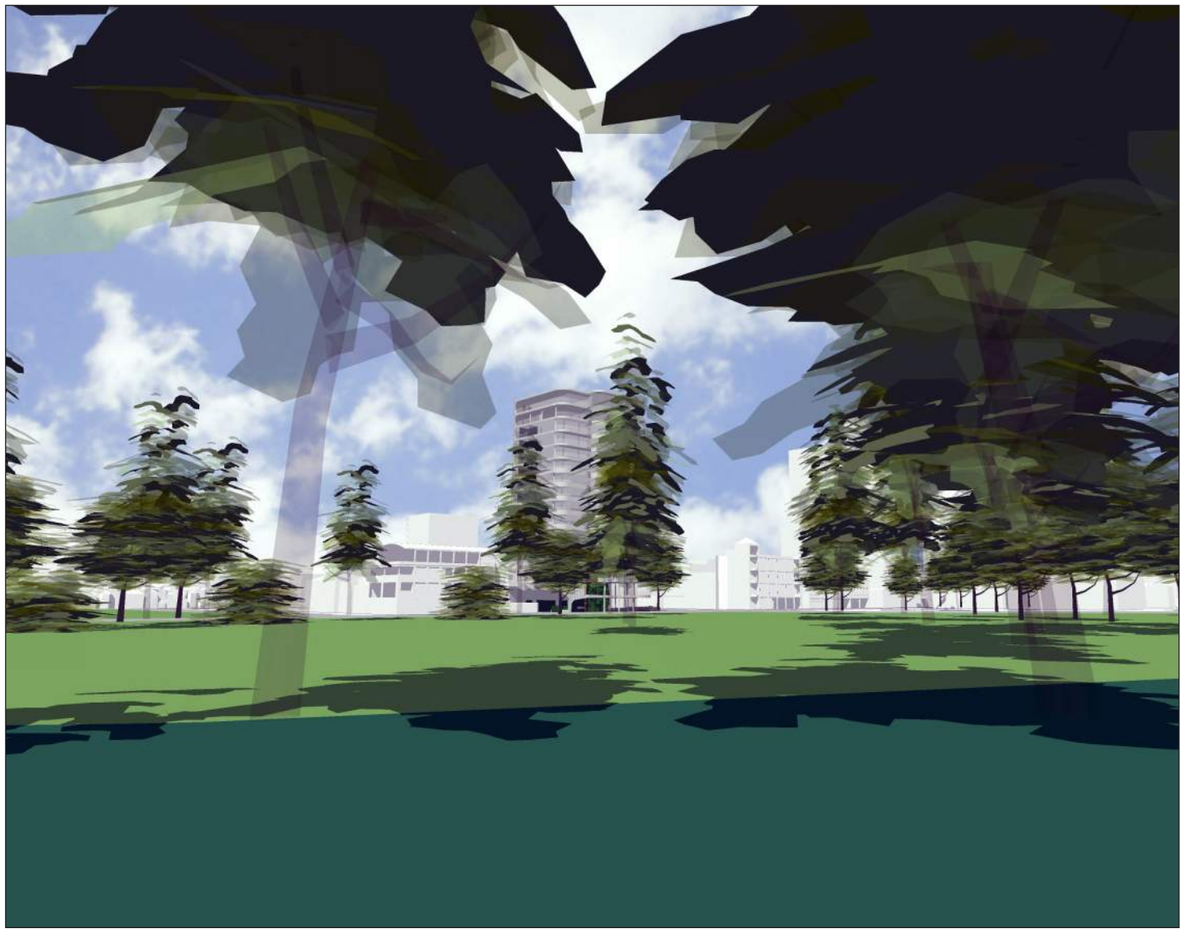
Long-range Views to the Building

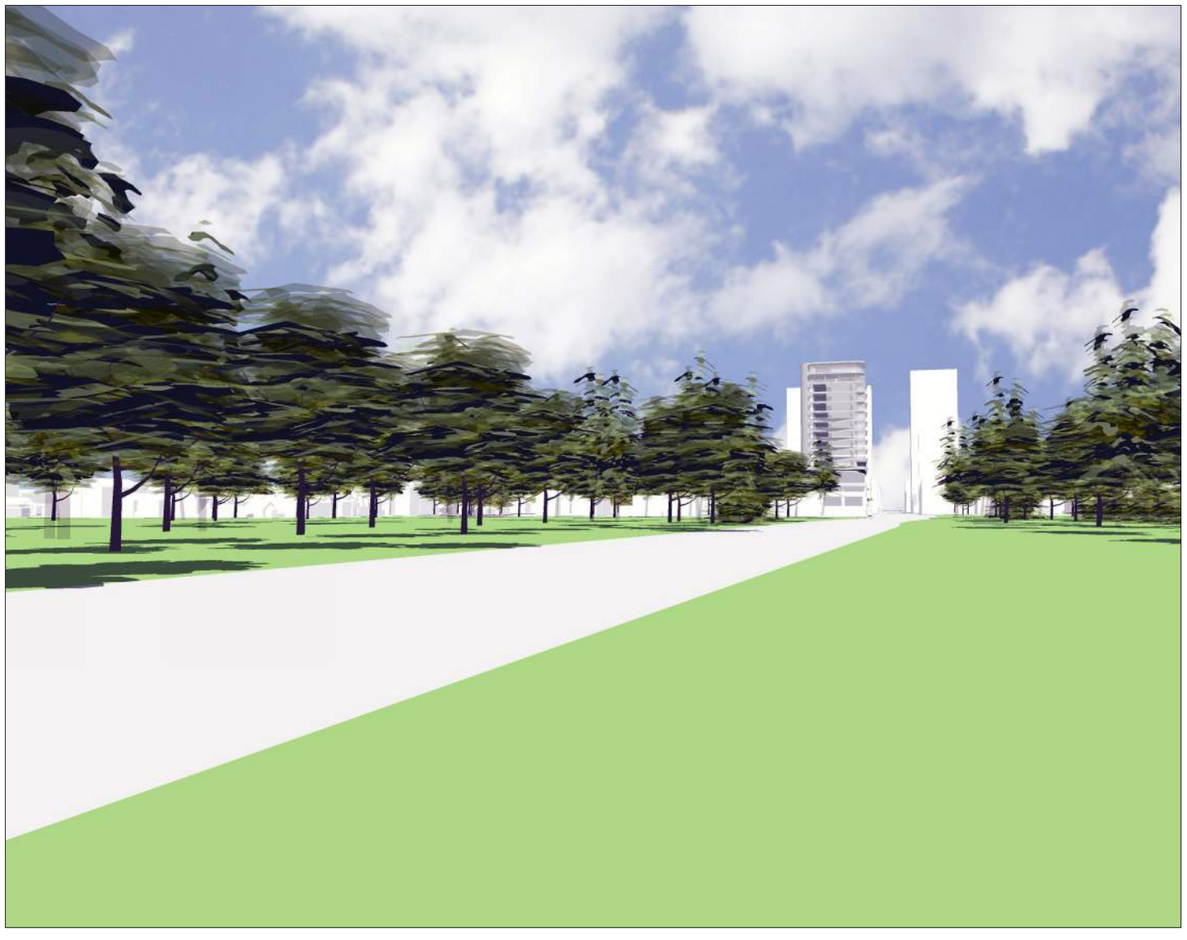
Views

Long range views to the building position it within context and scale.

3. **Rymill Park**
Looking South-West

4. **Bartels Road**
Looking West





Design Response: Proposal

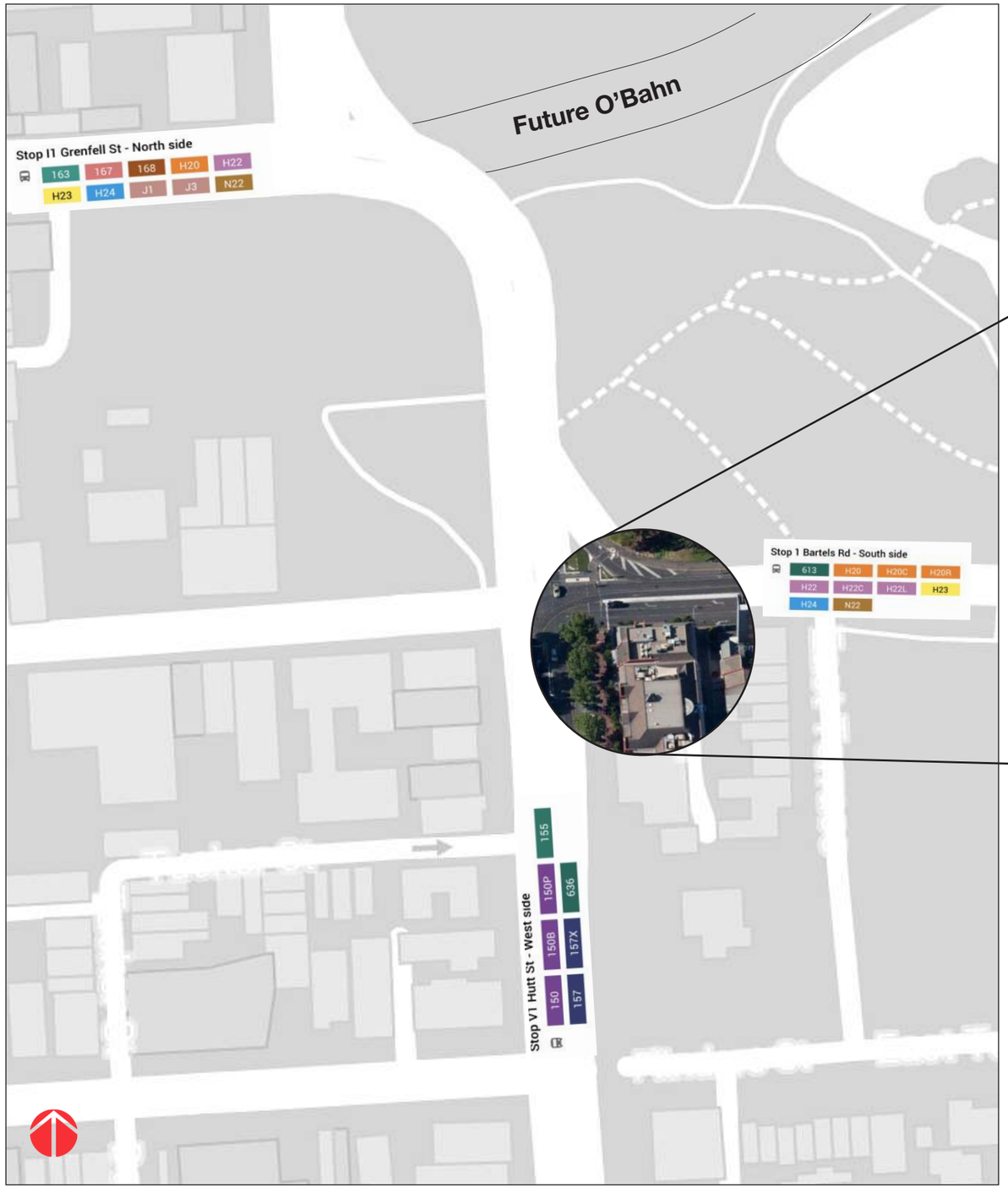
Access

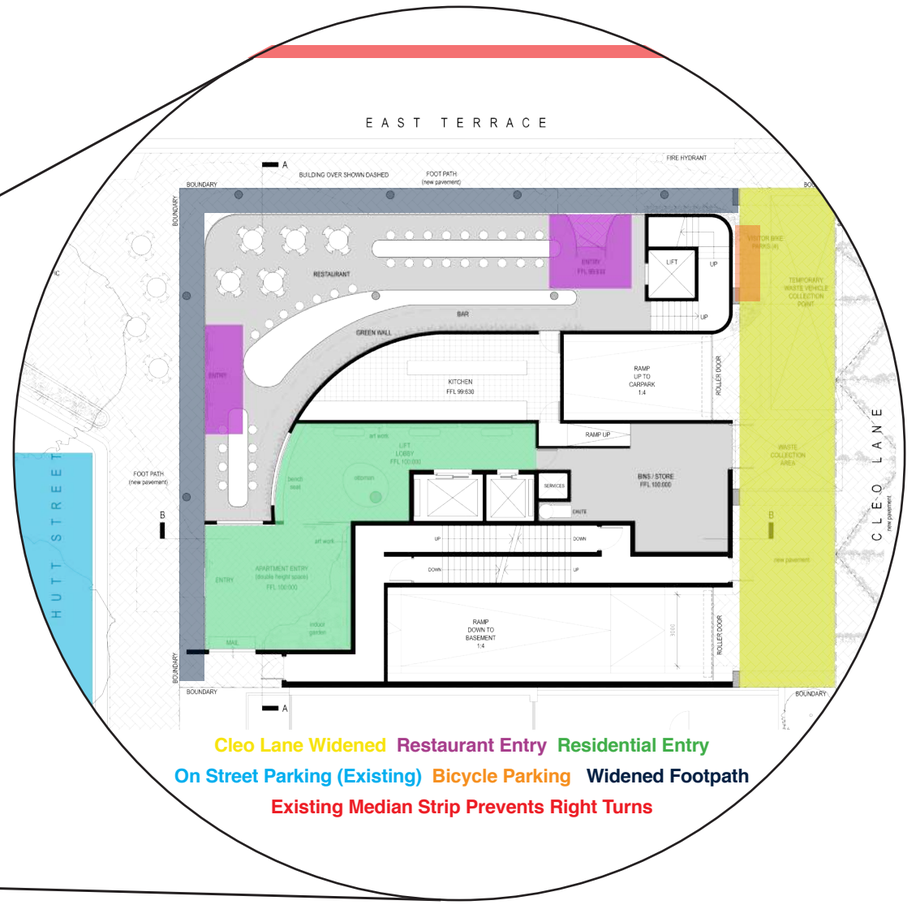
Widening Cleo Lane

The development acknowledges the site constraints and offers the widening of Cleo Lane onto the development site to assist with potential access issues.

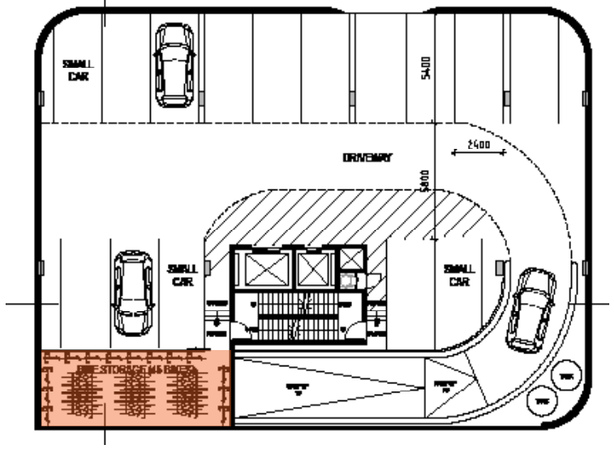
Additionally, footpaths on both East Tce and Hutt Street will be widened onto the development site. Relocation of a Stobie pole on East Terrace is also required.

We note the storage space for 46 resident bicycles on Level 2 of the development + 6 visitor bike parks at ground level.





Level 2 - Bicycle Storage



Design Response: Proposal

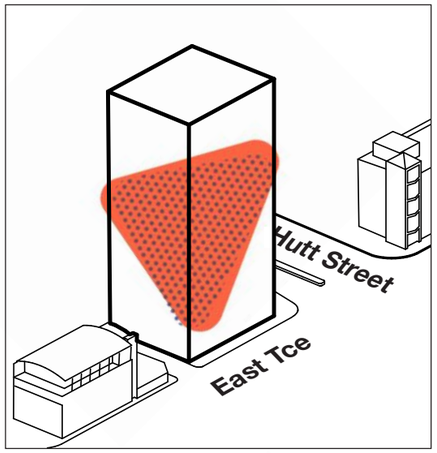
Design Principles & Development

Key Principles

The proposal has undergone a rigorous design development process to articulate and refine the built form to achieve a high quality design outcome.

1. Scale

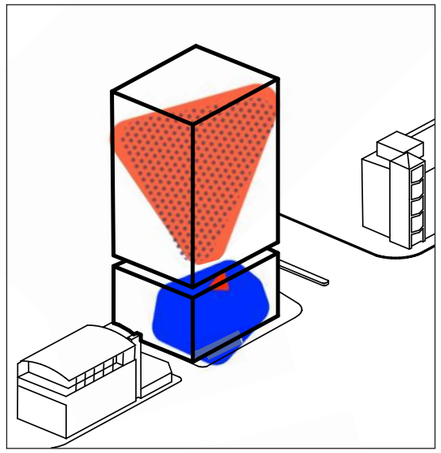
Yield



2. Podium

The commercial is articulated from the residential, whilst breaking down the overall massing.

The ‘break’ line in the podium corresponds to neighbouring buildings.

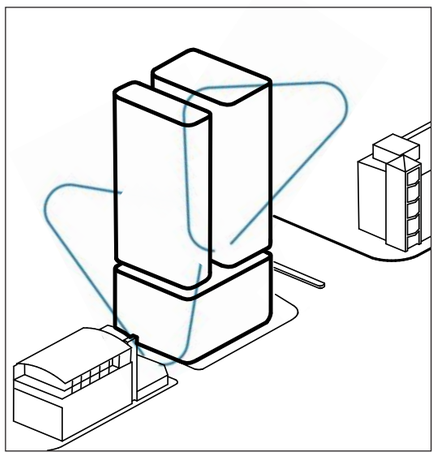


7. Activate

Public art and green walls are added, plus Cleo lane gains a green canopy.

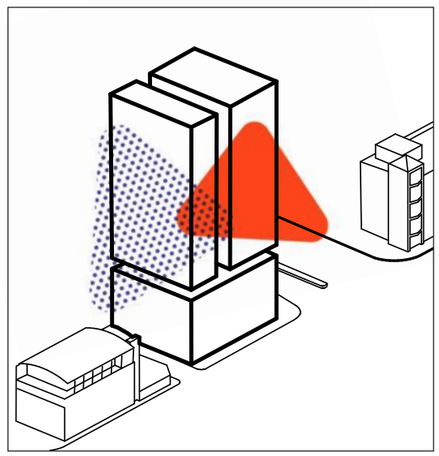
3. Soften

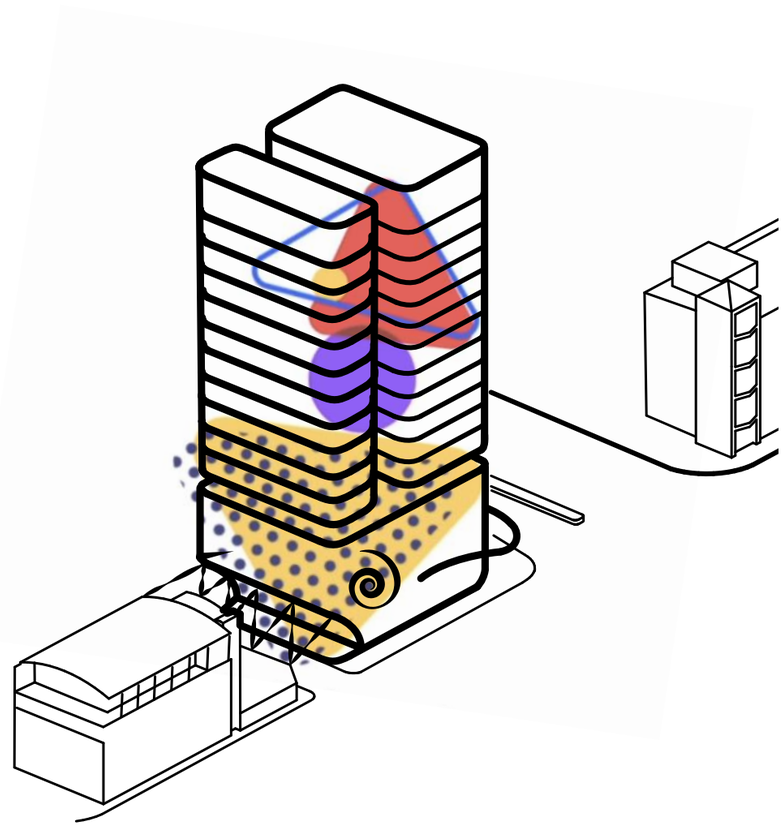
Curved beams are introduced to produce a classical and natural form that responds to its Rymill Park surrounds.



4. Split

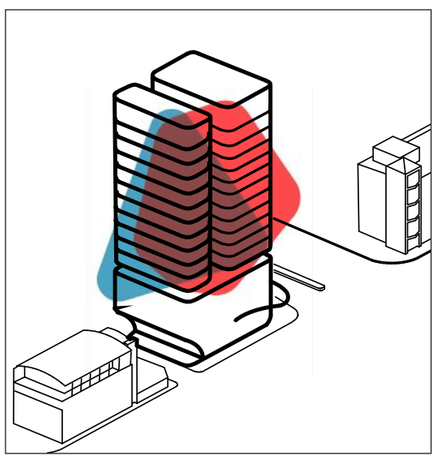
The building form is ‘split’ into two distinct elements which successfully break up the mass of the building to create two slender building proportions.





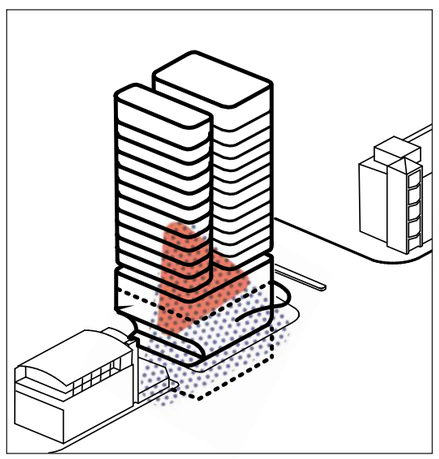
5. Articulate

Cleo lane is widened and a sweeping curve greets East Terrace and Hutt Street.



6. Concealed Parking

Two levels of basement parking compliment two levels of parking within the building.



Design Response: Proposal

Public Realm Contribution

Cafe/Laneway/Urban Realm

A series of strategies and tactics aim to improve urban amenity.

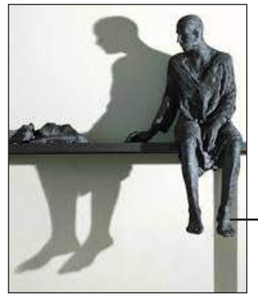
Restaurant

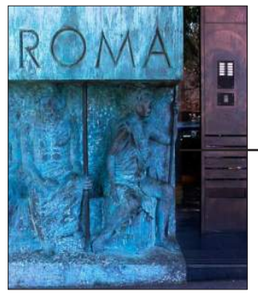
Laneway

Widened Footpaths

Public Art Study

Hutt Street - Residential Entry



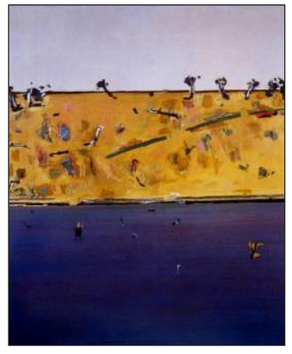


Greenwall - Plant Selections

Greenwall - Precedents

Foyer - Precedents

Residential Foyer & Lobby - art shown indicatively only



Design Response: Proposal

Greening Strategy

Activation

A landscape approach that extends the parklands towards the urban context, with high quality universally accessible open space provided at ground level, combined with a rooftop garden on Level 3.

The proposal features multiple green spaces including:

- Community rooftop garden (Level 3)
- Green canopy and planting in Cleo Lane
- Internal greenwall in both the restaurant space (substantial), resident lounge and residential entry, which will be supported by services to ensure ongoing maintenance
- Internal dry garden to residential entry
- Street tree protection and maintenance

Technical Information

2-Storey Greenwall

Internal green walls in both the commercial areas and residential entry will provide a striking visual statement as well as reducing air pollutants, improving acoustics and cooling air temperature, improving energy efficiency.

A standard recommendation of 0.7 litres of water per day / m2 and that maintenance inspections occur fortnightly with works carried out as required has been factored into the ongoing requirements of the green wall. It is anticipated that for best performance, additional LED lighting to minimum of 3,500lx may be required to supplement natural lighting conditions.

Species selection will be detailed in collaboration with a green wall specialist supplier to ensure viable species are used

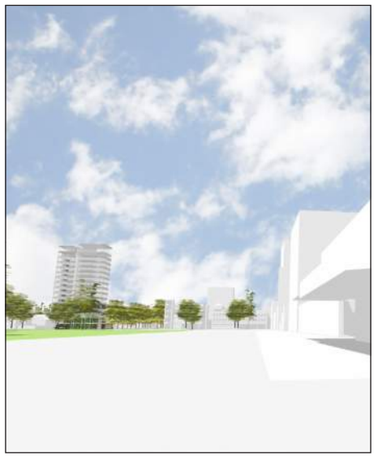
Street Tree Protection

Existing street trees will be assessed using AS 4790-2009 Protection of Trees on Development Sites. Two large existing street trees adjacent to the property Platanus x acerfolius London Plane.

They will need to be protected in accordance with AS 4790-2009 during construction and will need to be watered to Adelaide City Councils current maintenance schedule.

Design Response

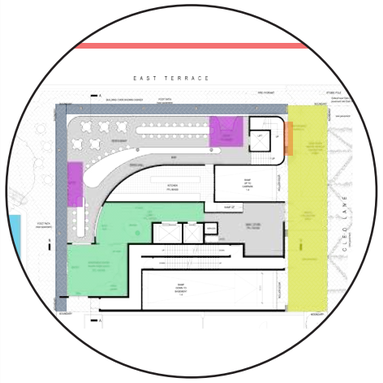
Key Points



Long-range views

Long range views to the building position it within context and scale.

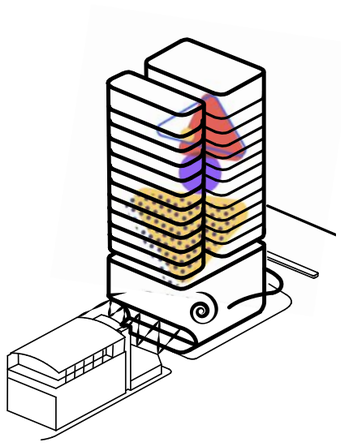
1



Access

The development acknowledges the site constraints and offers the widening of both Cleo Lane and footpaths onto the development site to assist with potential access issues.

2



Design Principles

The proposal has undergone a rigorous design development process to articulate and refine the built form to achieve a high quality design outcome.

3

Public Realm

A series of strategies and tactics aim to improve urban amenity.

4

Greening Strategy

A landscape approach that extends the parklands towards the urban context, with high quality universally accessible open space provided at ground level, combined with a rooftop garden on Level 3.

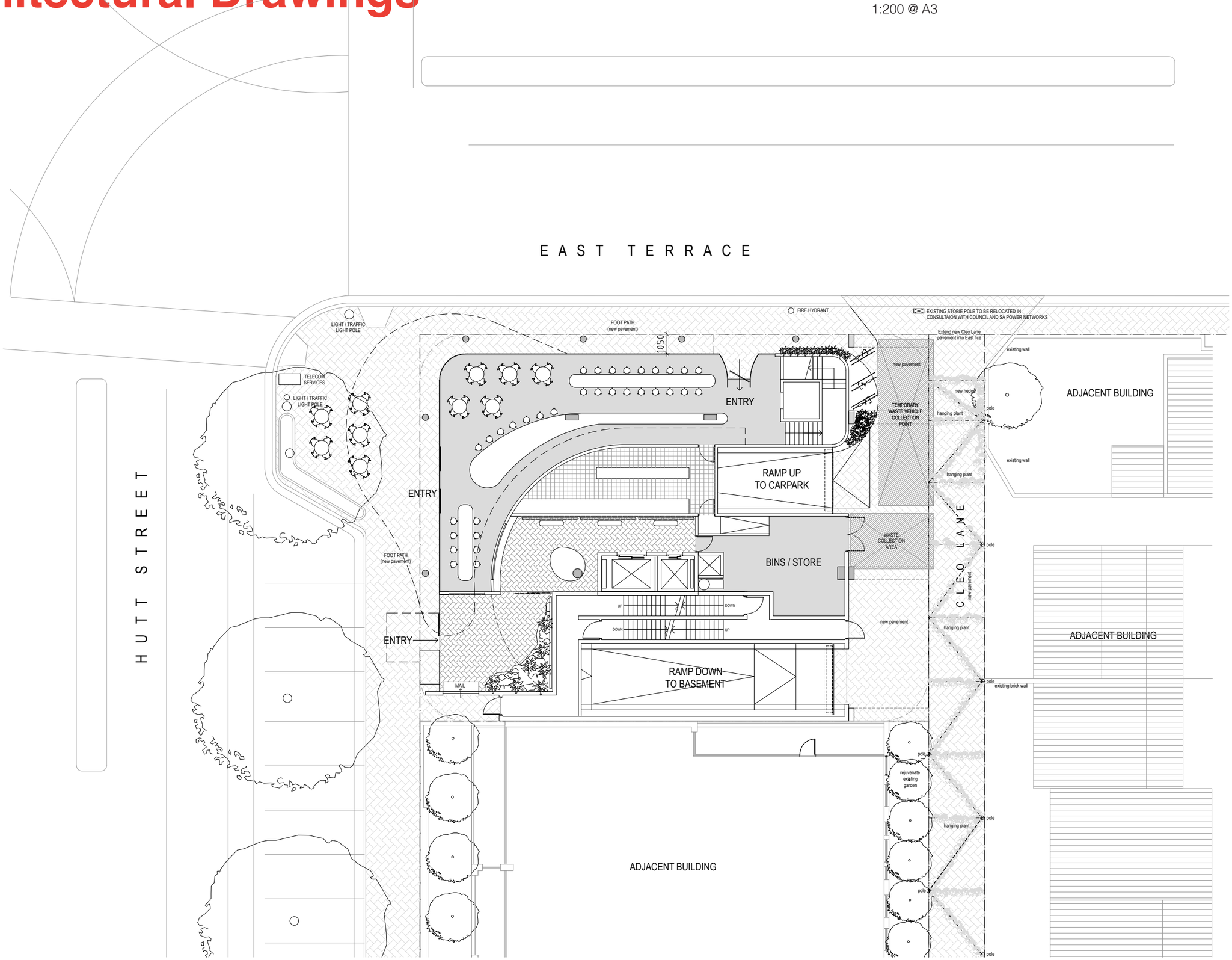
5

Architectural Drawings

Architectural Drawings

Plans

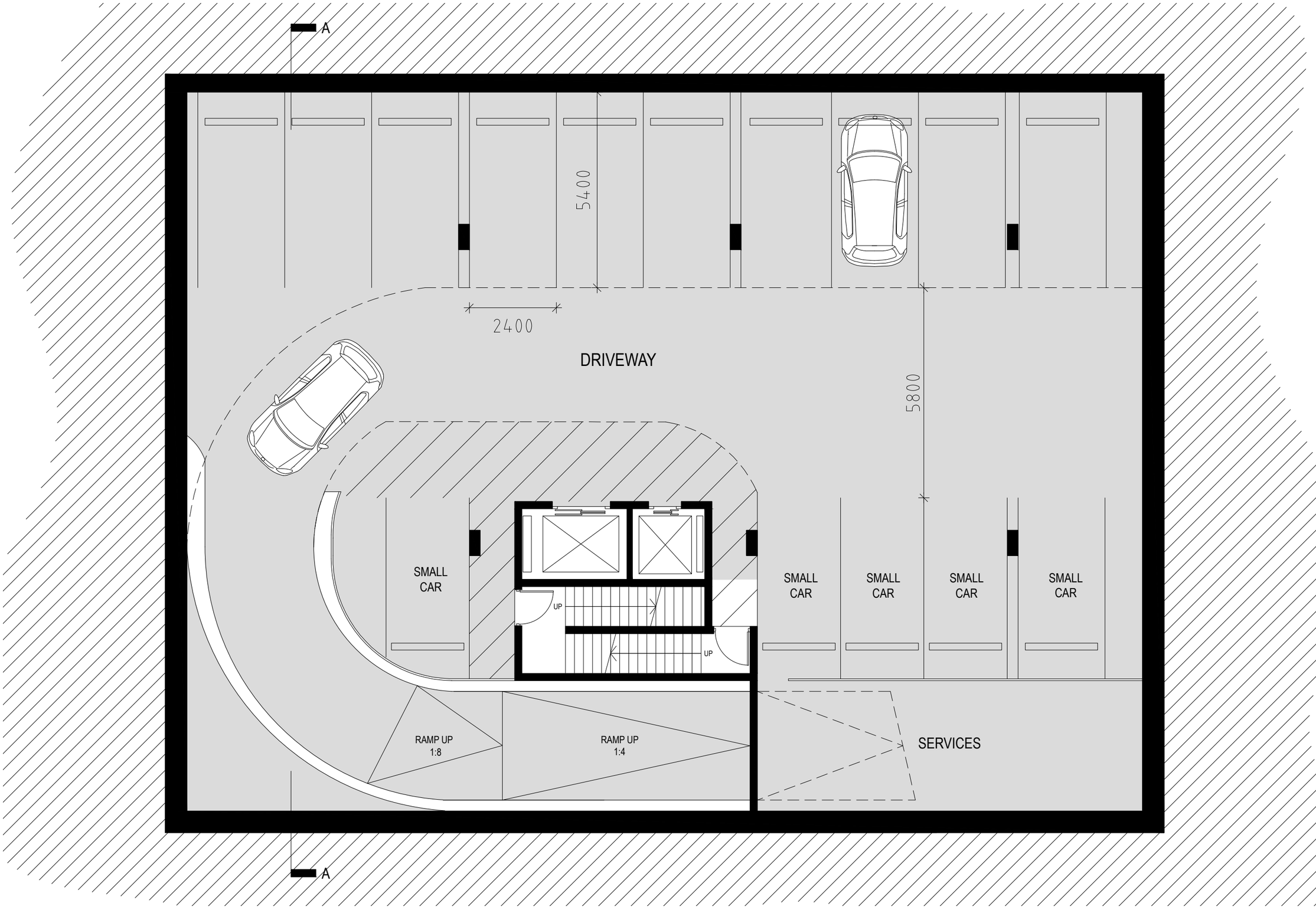
Site Plan
1:200 @ A3



Architectural Drawings

Plans

Basement 2 - Carpark
1:100 @ A3

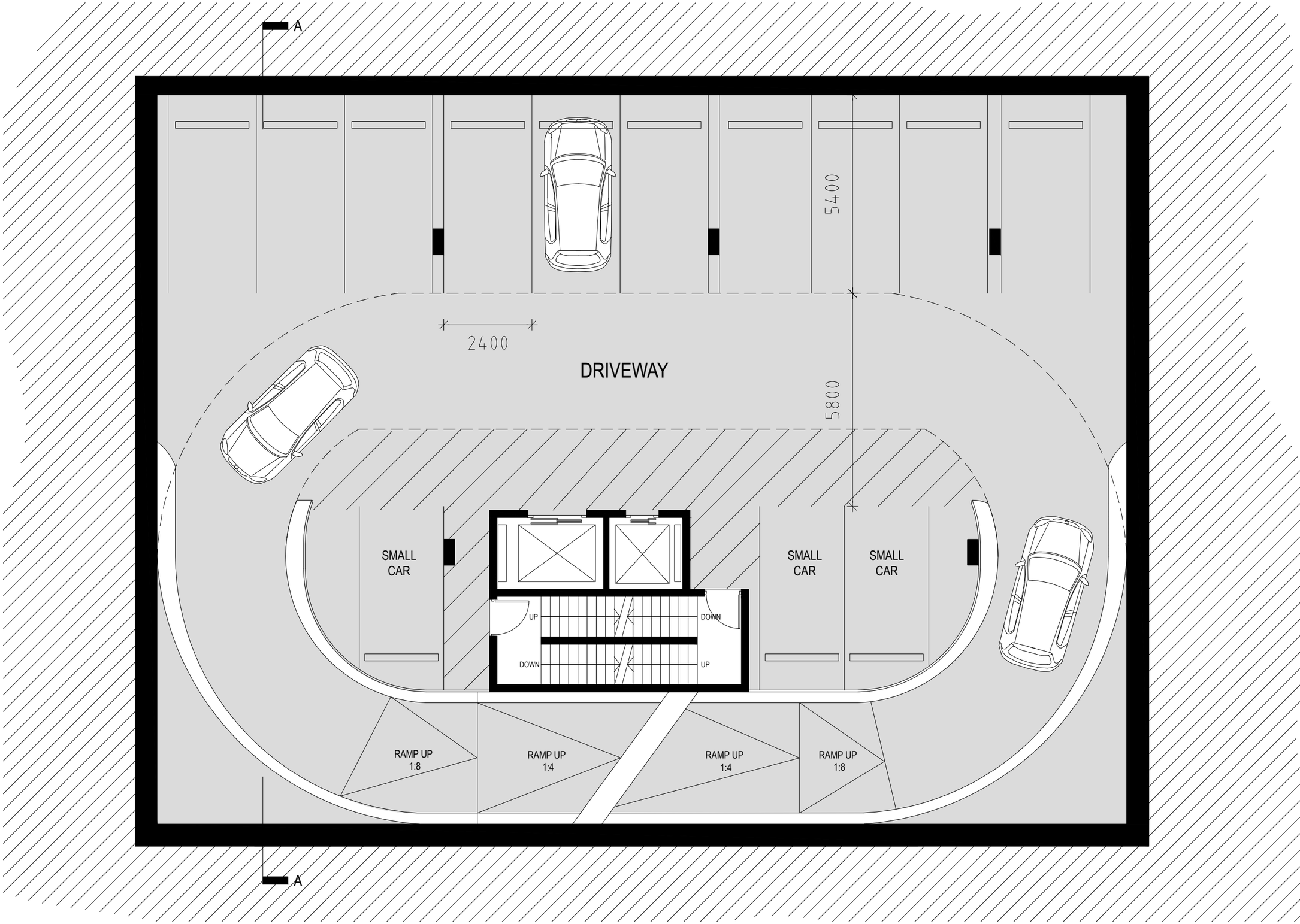


L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

Architectural Drawings

Plans

Basement 1 - Carpark
1:100 @ A3



L14
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L10-12
L5-9
L4
L3
L2
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M
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B1
B2

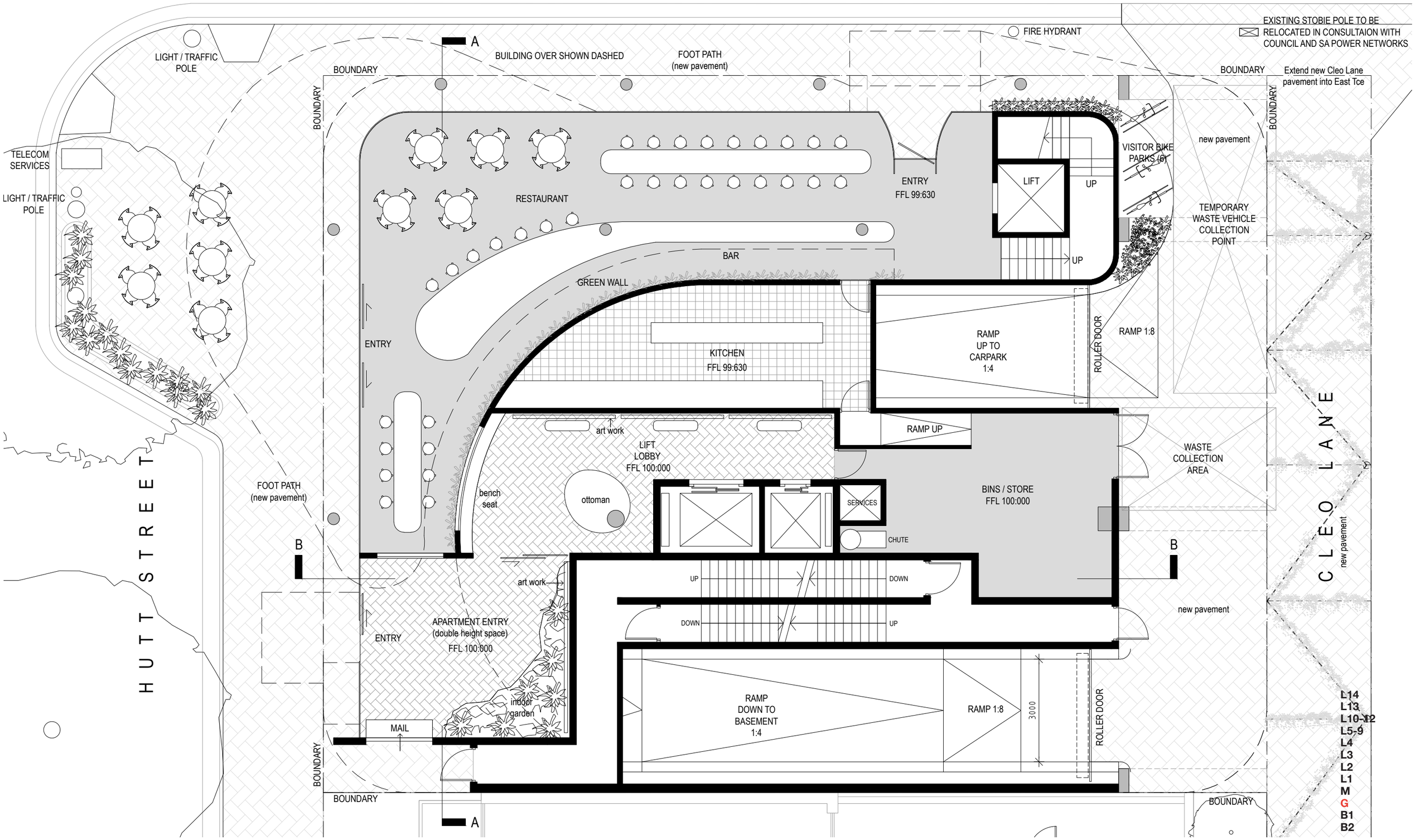
Architectural Drawings

Plans

Ground Level - Restaurant & Amenity

1:100 @ A3

EAST TERRACE

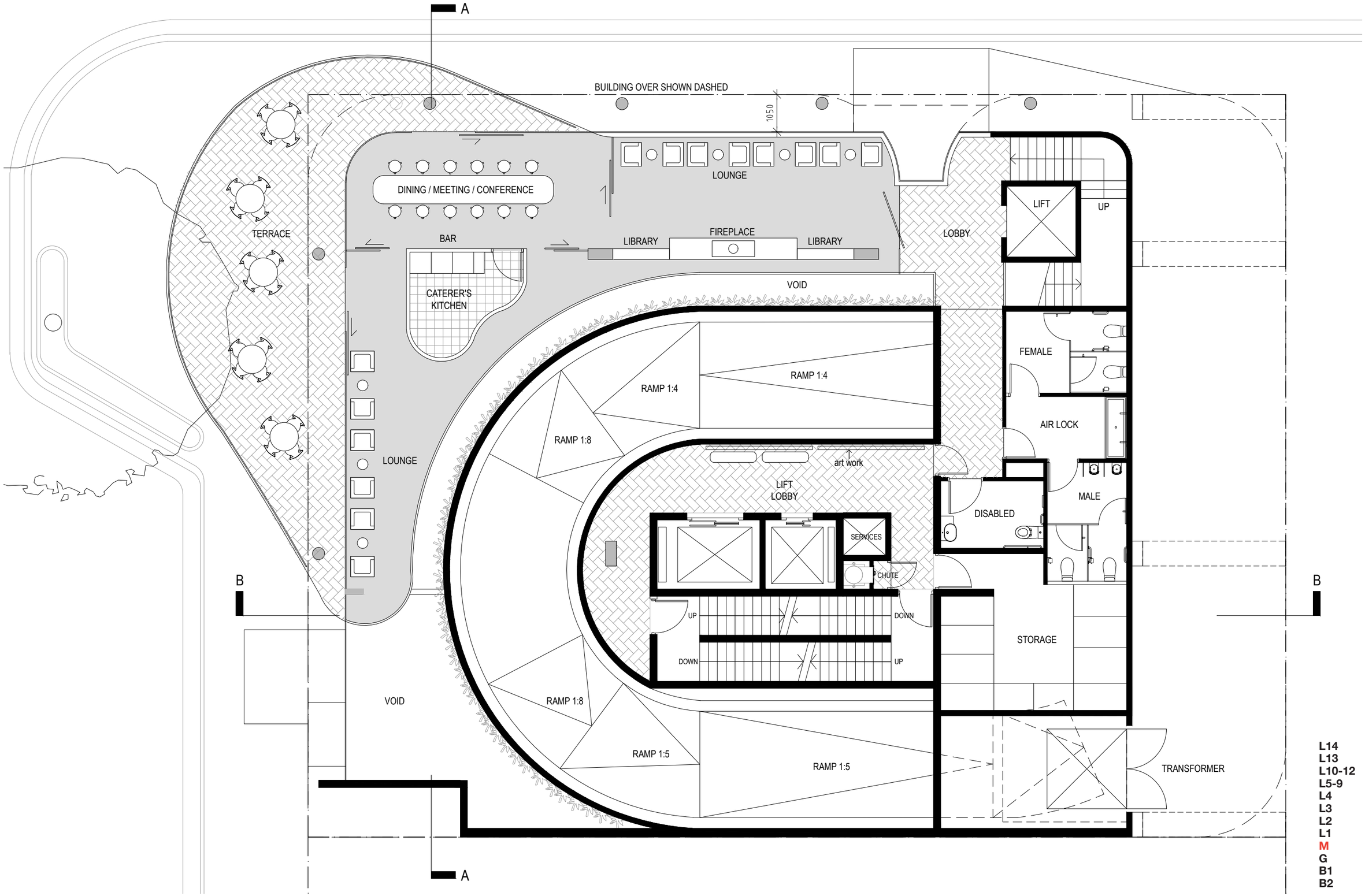


Architectural Drawings

Plans

Mezzanine - Resident Lounge, Terrace, Roof Garden & Amenity

1:100 @ A3

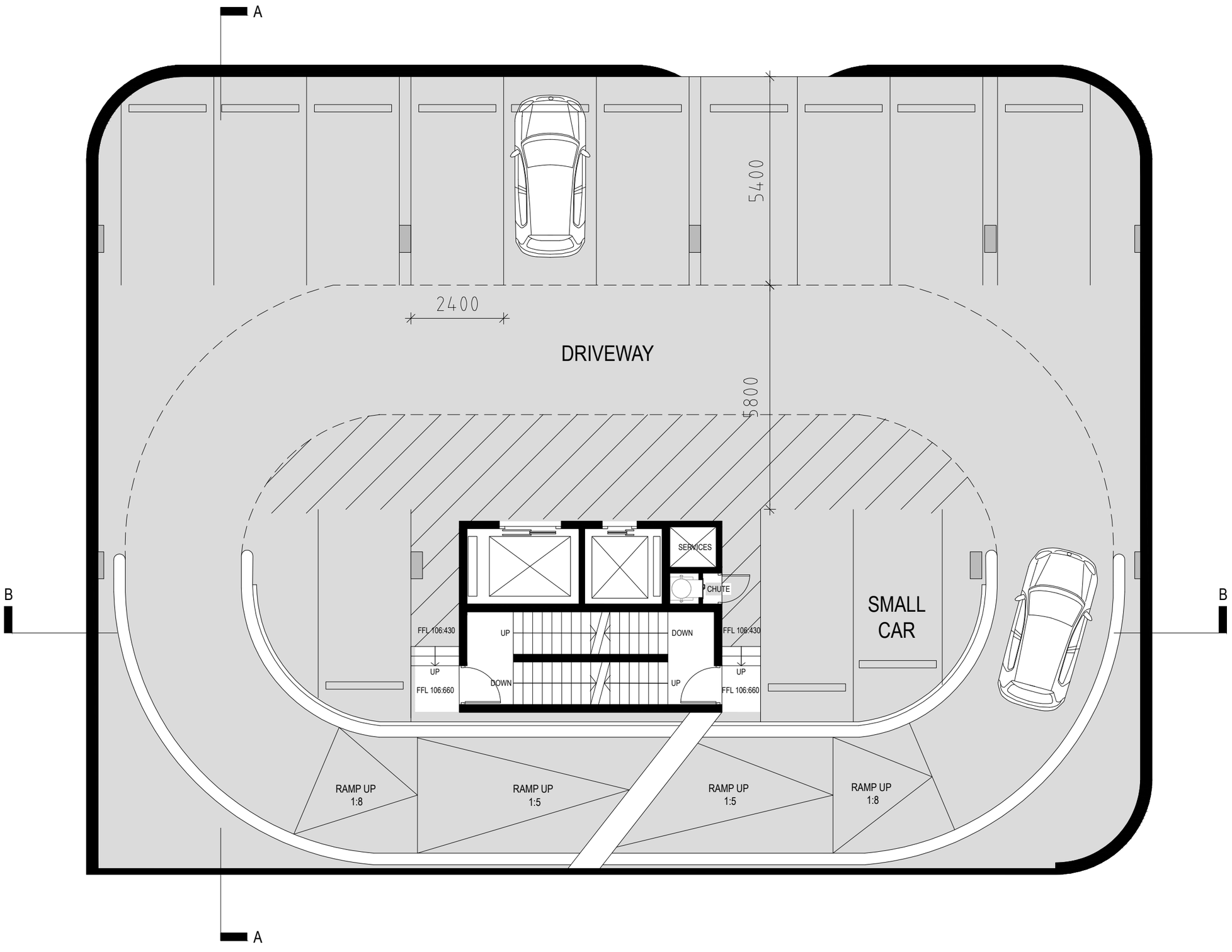


L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

Architectural Drawings

Plans

Level 1 - Carpark
1:100 @ A3

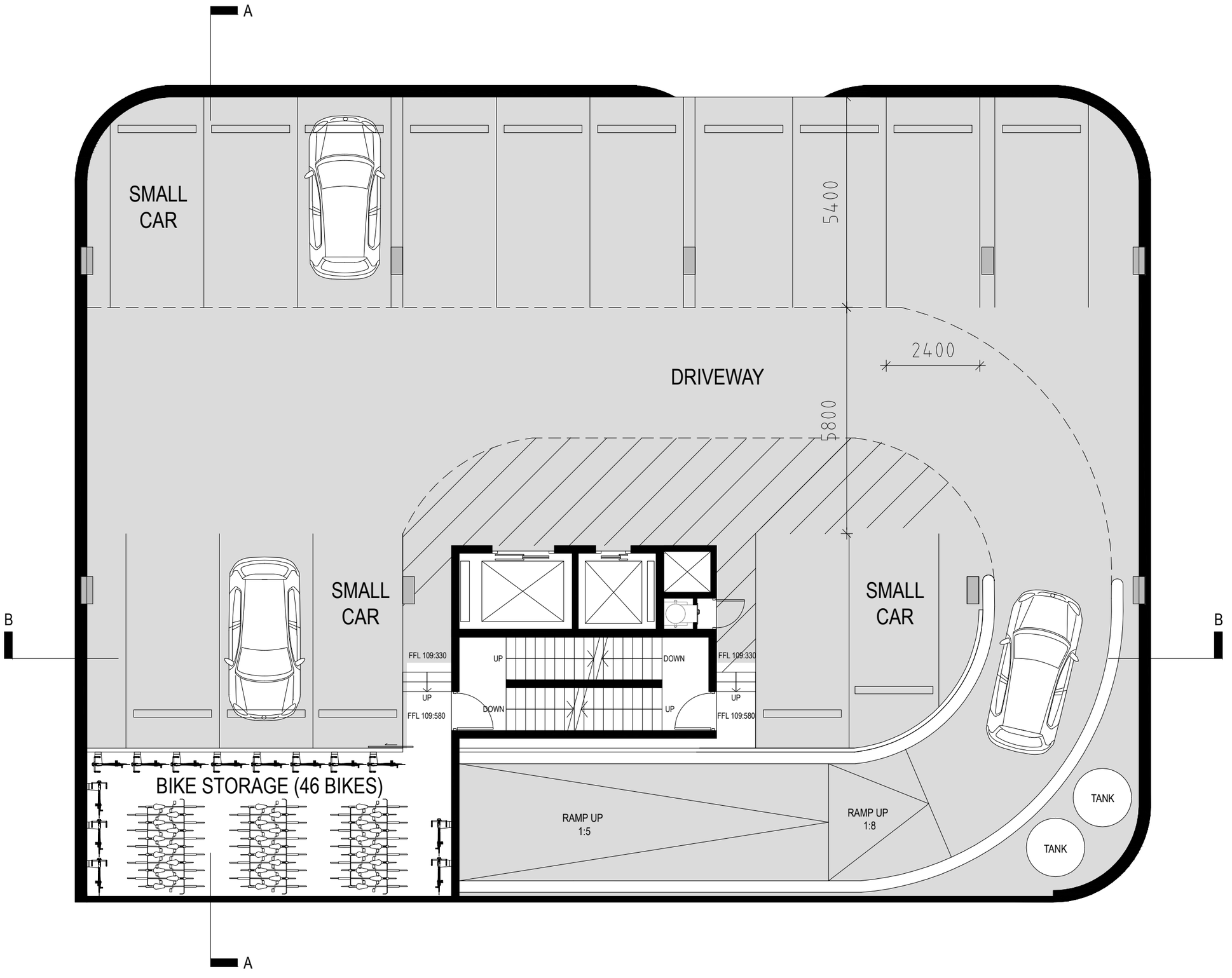


L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

Architectural Drawings

Plans

Level 2 - Carpark
1:100 @ A3



L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
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B1
B2

Architectural Drawings

Plans

Level 3 - Residential
1:100 @ A3

APARTMENT 302	
Total	- 70 sqm
Living	- 62 sqm
Terrace	- 8 sqm
Beds	- 1
Baths	- 1.5

APARTMENT 303	
Total	- 93 sqm
Living	- 82 sqm
Terrace	- 11 sqm
Beds	- 2
Baths	- 2

APARTMENT 304	
Total	- 108 sqm
Living	- 97 sqm
Terrace	- 11 sqm
Beds	- 2
Baths	- 2

APARTMENT 301	
Total	- 72 sqm
Living	- 64 sqm
Terrace	- 8 sqm
Beds	- 1
Baths	- 1.5

APARTMENT 305	
Total	- 95 sqm
Living	- 75 sqm
Terrace	- 11 sqm
Court	- 9 sqm
Beds	- 2
Baths	- 2

ROOF GARDEN - 37 sqm

A

B

B

A

TERRACE
LIVING
KITCHEN
DINING
MASTER BED
L'DRY/ PWD
ENS.
ROBE
ENTRY
BED 2
BATH / L'DRY
TERRACE
SITTING
LIVING
KITCHEN
DINING
ROBE
MASTER BED
ENS.
GALLERY
DINING
LIVING
KITCHEN
TERRACE
R
BED 2
LAUNDRY
BATH
ROBE
MASTER BED
ENS.
ROBE
ROBE
ENS.
PWD
L'DRY
MASTER BED
KITCHEN
ENTRY
LOBBY
SERVICES
CHUTE
FFL 113.030
UP
DOWN
FFL 112.810
FFL 113.030
translucent glass
ENTRY
KITCHEN
DINING
LIVING
TERRACE
ROBE
L'DRY
ROBE
TERRACE
DINING
LIVING
SERVICES
ROOF TOP GARDEN
COURT
BED 2
BATH
ENS.
MASTER BED

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

Architectural Drawings

Plans

Level 4 - Residential

1:100 @ A3

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

Architectural Drawings

Plans

Level 5-9 - Residential

1:100 @ A3

APARTMENT	502 / 602 / 702 / 802 / 902
Total	- 111 sqm
Living	- 100 sqm
Balcony	- 11 sqm
Beds	- 2
Baths	- 2

APARTMENT	503 / 603 / 703 / 803 / 903
Total	- 151 sqm
Living	- 136 sqm
Balcony	- 15 sqm
Beds	- 3
Baths	- 2

APARTMENT	501 / 601 / 701 / 801 / 901
Total	- 83 sqm
Living	- 72 sqm
Balcony	- 11 sqm
Beds	- 2
Baths	- 2

APARTMENT	504 / 604 / 704 / 804 / 904
Total	- 86 sqm
Living	- 75 sqm
Balcony	- 11 sqm
Beds	- 2
Baths	- 2

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
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B1
B2

Architectural Drawings

Plans

Level 10-12 - Residential
1:100 @ A3

APARTMENT	1001 / 1101 1201
Total	- 191 sqm
Living	- 171 sqm
Balcony(s)	- 20 sqm
Beds	- 3
Baths	- 2

APARTMENT	1002 / 1102 1202
Total	- 242 sqm
Living	- 213 sqm
Balcony(s)	- 29 sqm
Beds	- 3
Baths	- 3

PERIMETER BEAM LEVEL 10 ONLY

A
B
TERRACE
DINING
LIVING
KITCHEN
MASTER BED
ENS.
ROBE
BED 3
ROBE
PWD
BATH
BUTLER'S PANTRY
ENTRY
LAUNDRY
BED 2
ROBE
ENS.
LOBBY
SERVICES
CHUTE
UP
DOWN
DOWN
UP
SERVICES
MASTER BED
TERRACE
ROBE
ENTRY
TERRACE
DINING
LIVING
KITCHEN
WINE STORE
PANTRY
LAUNDRY
STUDY
LIBRARY / GALLERY
PWD
ROBE
TERRACE
ENS
BED 3
ROBE
ROBE
ENS.
BED 2

L14
L13
L10-12
L5-9
L4
L3
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M
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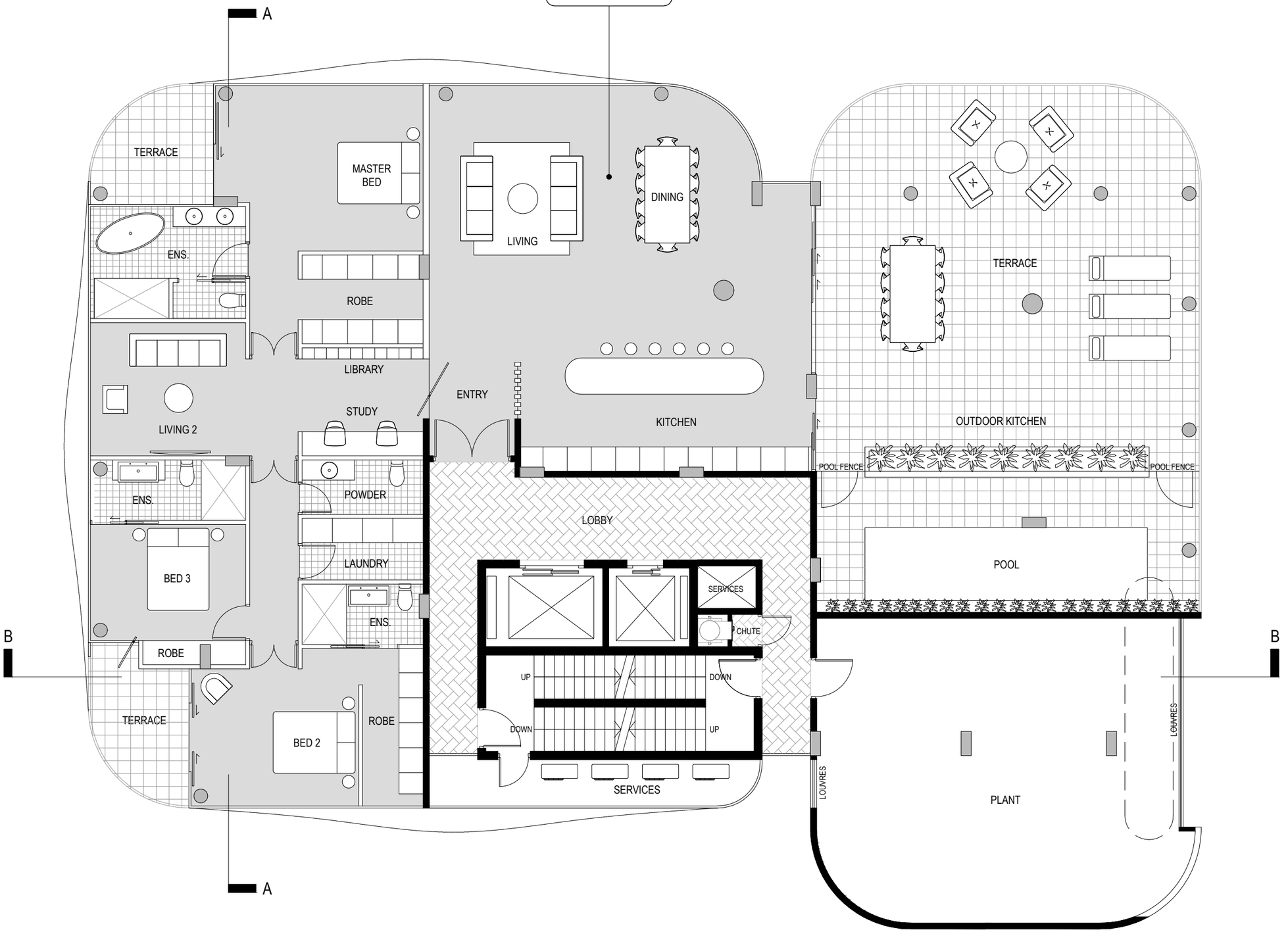
B1
B2

Architectural Drawings

Plans

Level 13 - Sub-Penthouse
1:100 @ A3

APARTMENT	1301
Total	- 358 sqm
Living	- 220 sqm
Balcony(s)	- 138 sqm
Beds	- 3
Baths	- 3.5



L14
L13
L10-12
L5-9
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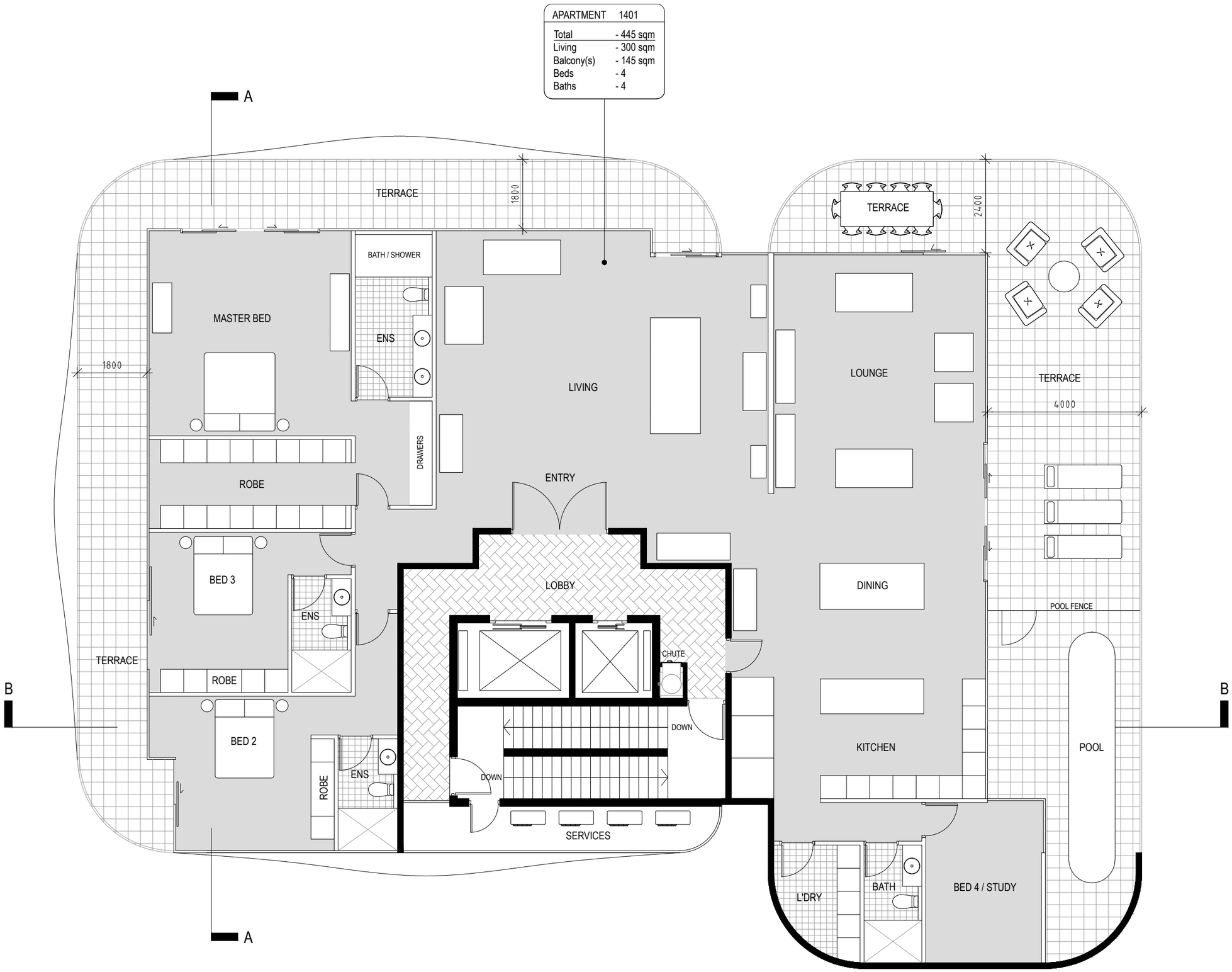
B2

Architectural Drawings

Plans

Level 14 - Penthouse

1:



L14
L13
L10-12
L5-9
L4
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L2
L1
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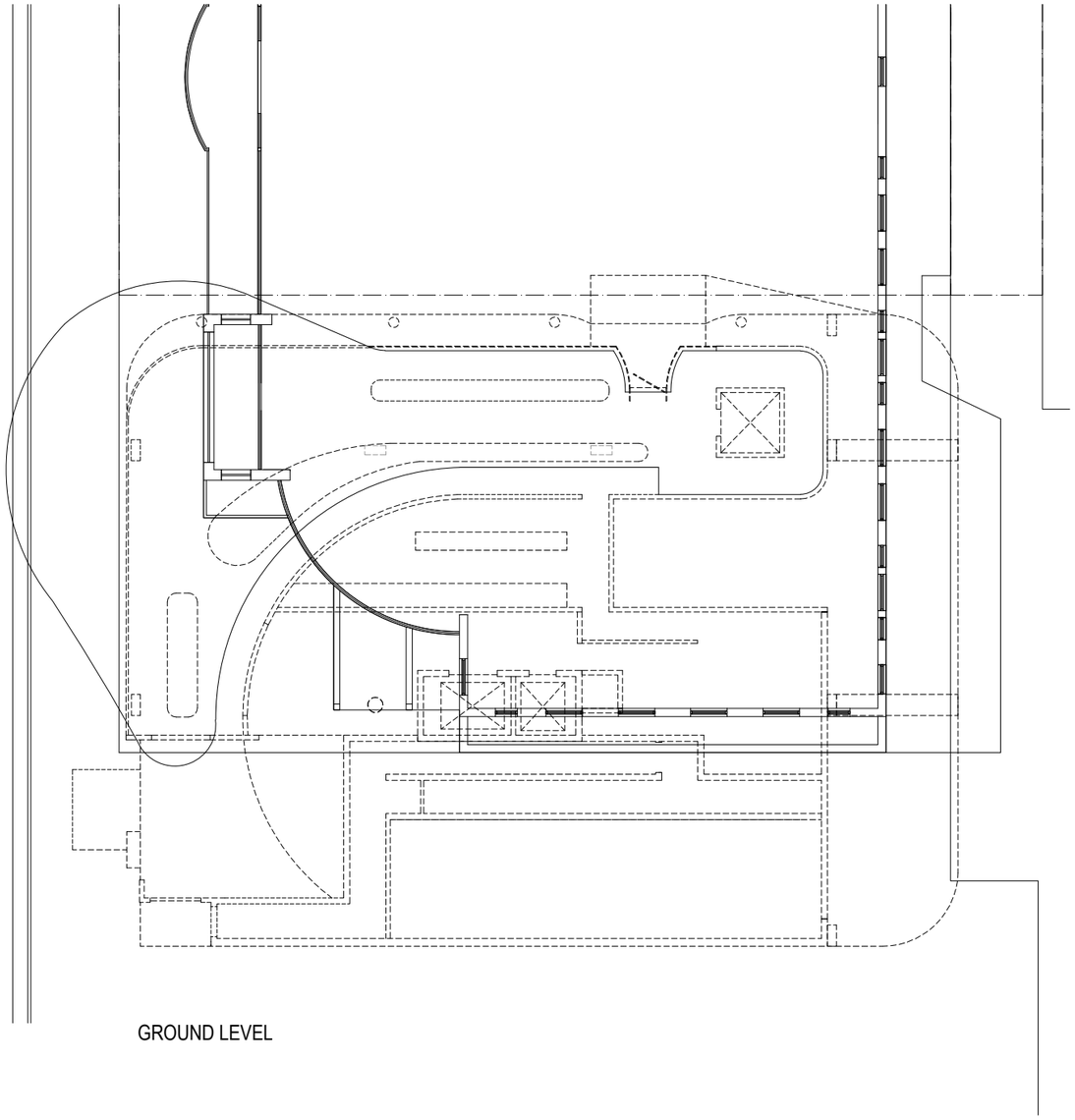
B1
B2

Architectural Drawings

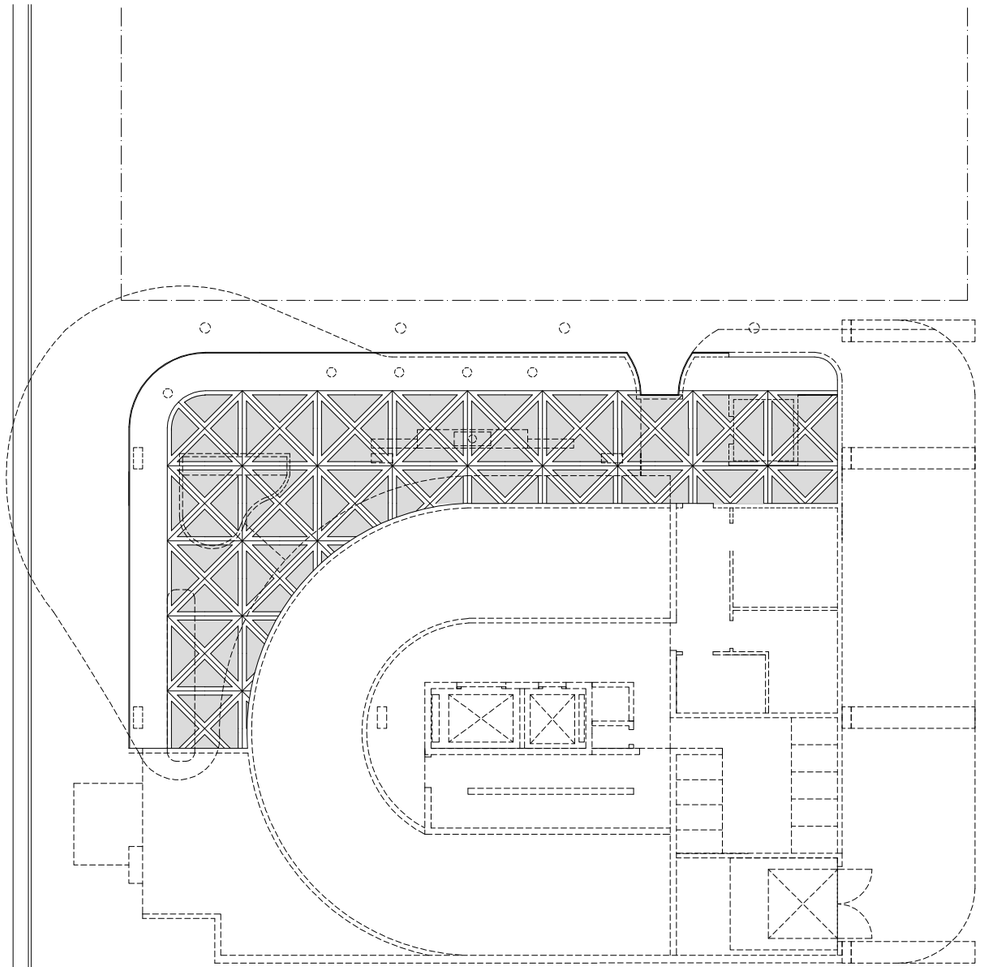
Plans

Ceiling Plans - Ground + Mezzanine

1:200 @ A3



GROUND LEVEL



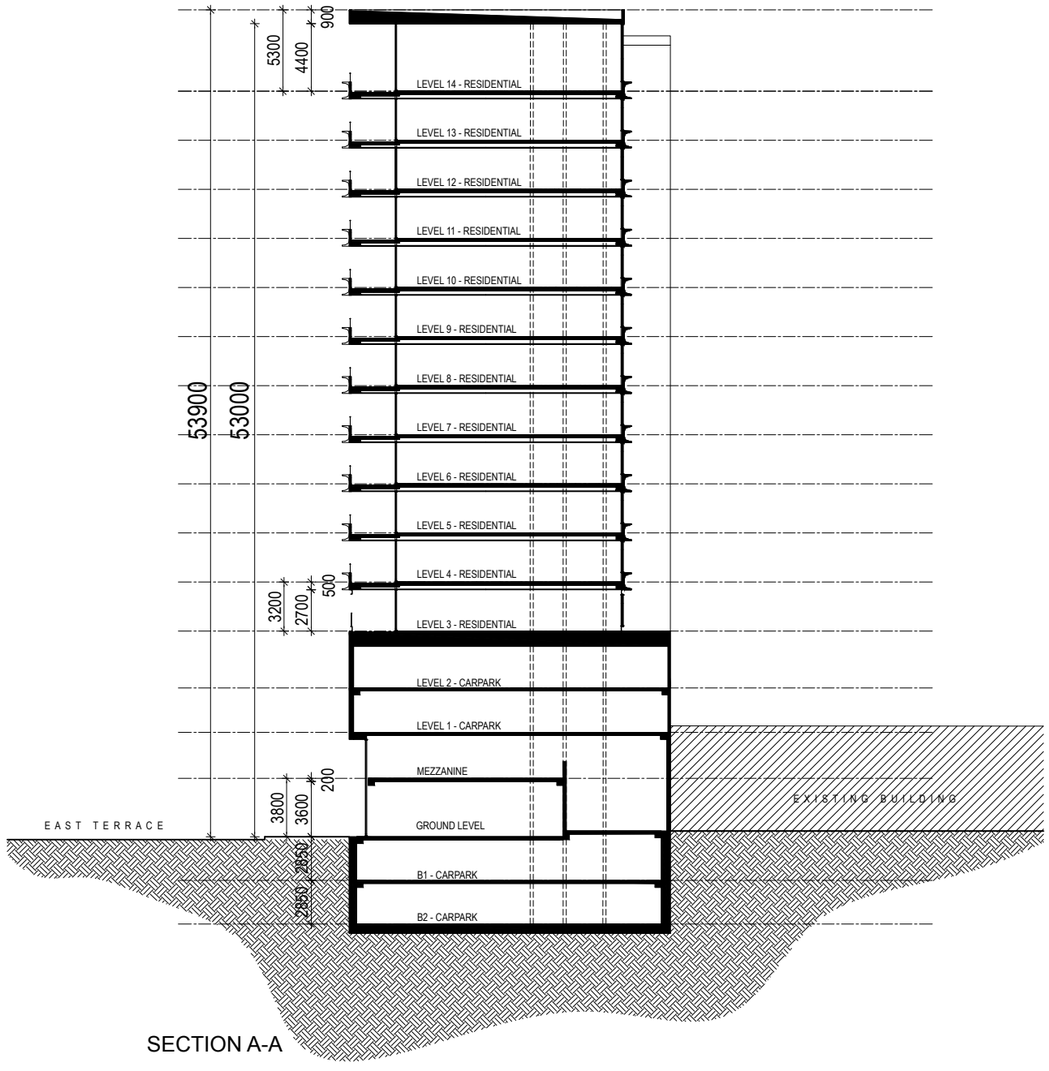
MEZZANINE

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

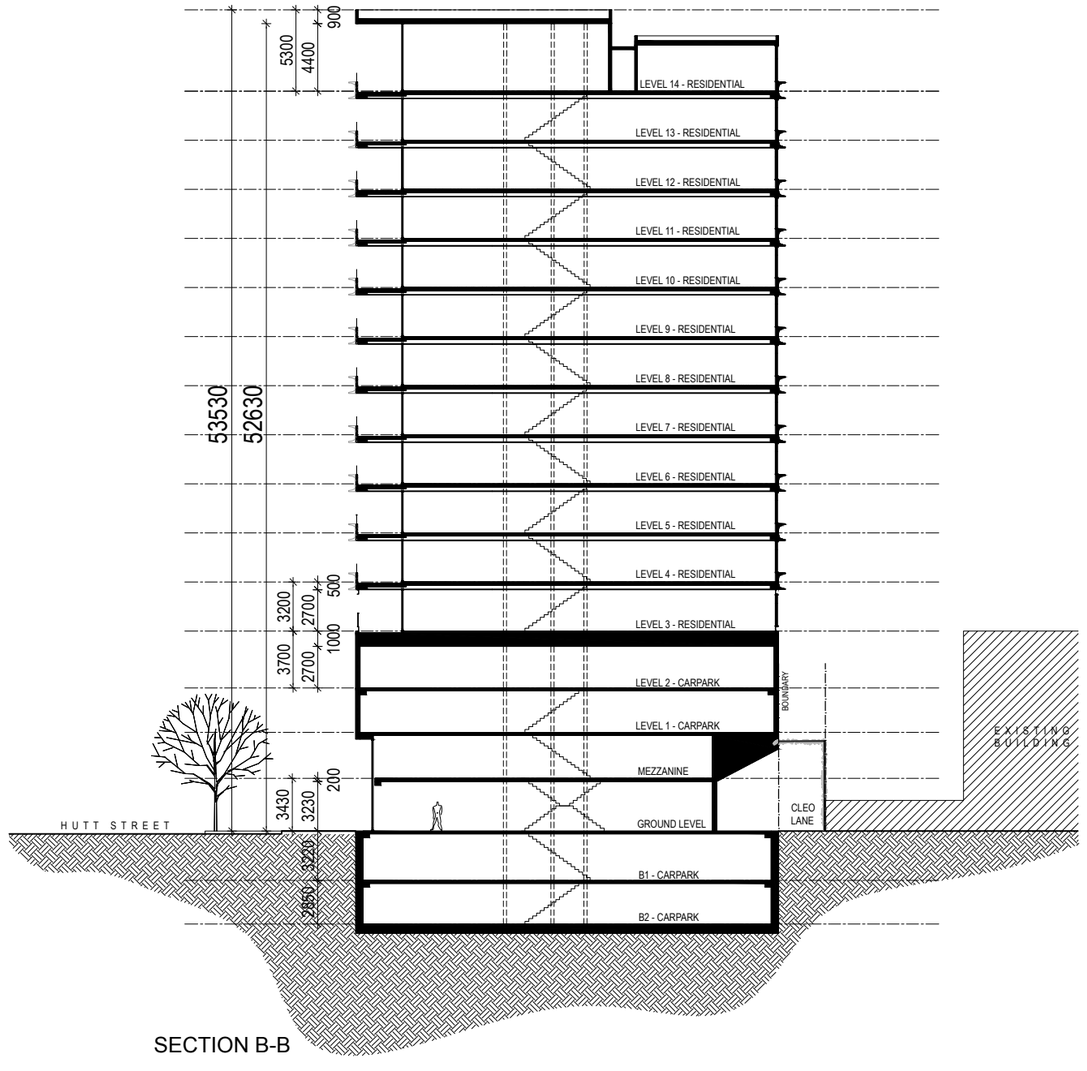
Architectural Drawings

Sections

Section AA & Section BB
1:400 @ A3



SECTION A-A



SECTION B-B

Architectural Drawings

Elevations

North & East Elevations
1:500

Architectural Drawings

Elevations

South & West Elevations
1:500

South Elevation 1:500

West Elevation 1:500

Design Visualisation

Design Visualisation

Perspective One

Looking South-East
East Terrace

Design Visualisation

Perspective Two

Looking North-East
Hutt Street

Design Visualisation

Perspective Three

Looking North
Cleo Lane

Design Visualisation

Perspective Four

Looking South-West
East Terrace

Design Visualisation

Night View

Looking South-East
East Terrace

Design Studies

Design Studies: Footpath

Interface

Hutt Street Entrance
Residential Interface

Design Studies: Footpath

Interface

Hutt Street & East Terrace Interface

An interface approach that extends the parklands towards the urban context, with high quality universally accessible open space provided at ground level, matched with contextual materiality.

Vehicle Entrance
Cars enter and exit via a widened Cleo Lane off East Terrace

Scarpa Screen
Copper screens add warmth and detail to pedestrian entries

Significant Green Wall
A significant green wall wraps around the Northern and Western interior walls at both the ground and mezzanine level

Design Studies: Landscape

Cleo Lane

Amenity & Interface Upgrades

Cleo lane is proposed to undergo improvements in amenity, access and utility. Significantly, the development widens Cleo Lane, taking space from the proposal, to enable improved traffic flow. A green canopy greets new plantings and visitor bicycle parking.

Visualisations

Planting

Wisteria sinensis
Chinese Wisteria

Liriope muscari
Royal Purple Lily-turf

Kniphofia 'Winter Cheer'
Red Hot Poker

Catharanthus roseus
Madagascar Periwinkle

Arthropodium cirratum
New Zealand Rock Lily

Cleo Lane is a shared laneway used to access adjacent properties.

The development includes a resurfaced laneway with amenity planting that will provide an improved entry experience to the proposed apartment building and adjacent properties.

Materiality of the laneway will be carefully considered to ensure a practical and robust surface that will withstand the public/ private nature of usage.

Paved surfaces will be a hard-wearing granite or similar to complement the standard public realm material palette used in the city.

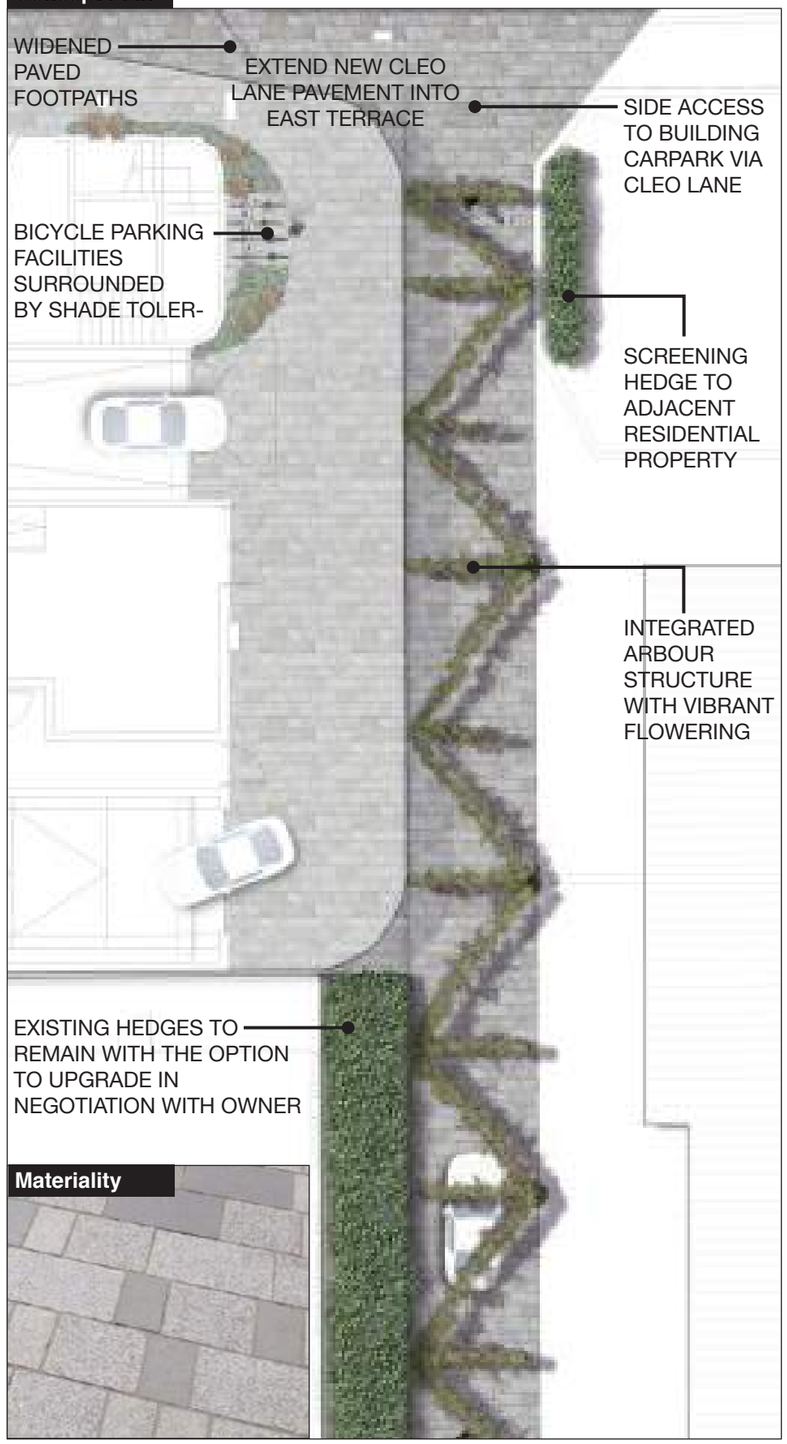
Overhead planting will be trained along wires and at a height suitable to allow light trucks to enter the lane without impediment.

Planting will be irrigated from a meter in the proposed development and managed as a part of the building strata. This will ensure the viability of the proposed planing.

Overhead planting will be a Wisteria Sinenis or similar hardy deciduous vine with lower level planting to be hardy verge planting of lomandra or dianella varieties.

Finishes to the laneway will be negotiated with adjacent landowners and Adelaide City Council to ensure an appropriate design response and integration with the public realm.

Concept Plan



Design Studies: Landscape

Roof Garden + Resident Foyer

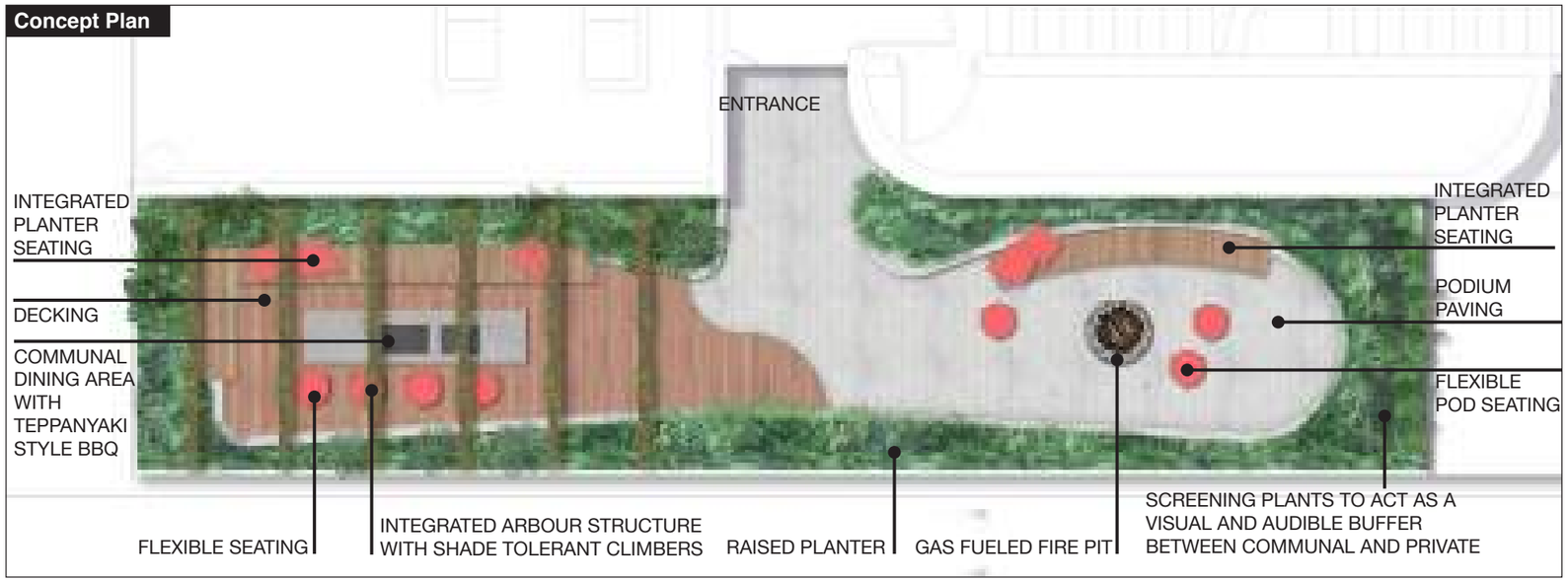
Amenity for Residents

A rooftop garden with BBQ and fire pit facilities along with a rock garden in the main residential entrance foyer adds further amenity for the residents of the development.

The addition of these green spaces provides further extension of the parklands into the development and the city and provides greening on the city at a street level scale.

Roof Garden - Level 3

Concept Plan



Precedents




Planting

Liriope muscari 'Royal Purple'
Royal Purple Lily-turf

Catharanthus roseus
Madagascar Periwinkle

Dichondra argentea 'Silver Falls'
Dichondra Silver Falls

Hebe buxifolia
Box Leaved Hebe

Arthropodium cirratum
New Zealand Rock Lily

Arthropodium cirratum
New Zealand Rock Lily

Resident Foyer - Ground Level

Concept Plan

Precedents


Planting

Scleranthus biflorus
Twinflower Knawel

The indoor foyer garden contains a formalised arrangement of differing sized pebbles and rocks to create dry landscape with mounded areas covered with shade tolerant groundcovers to provide a green highlight.

All ground covers will require a minimum 150mm depth of growing media and a drainage layer for irrigation. Garden bed can be mounded to reduce garden bed depth below finished surface level.

Design Studies: Construction

Feature Spandrels

Curved Beams

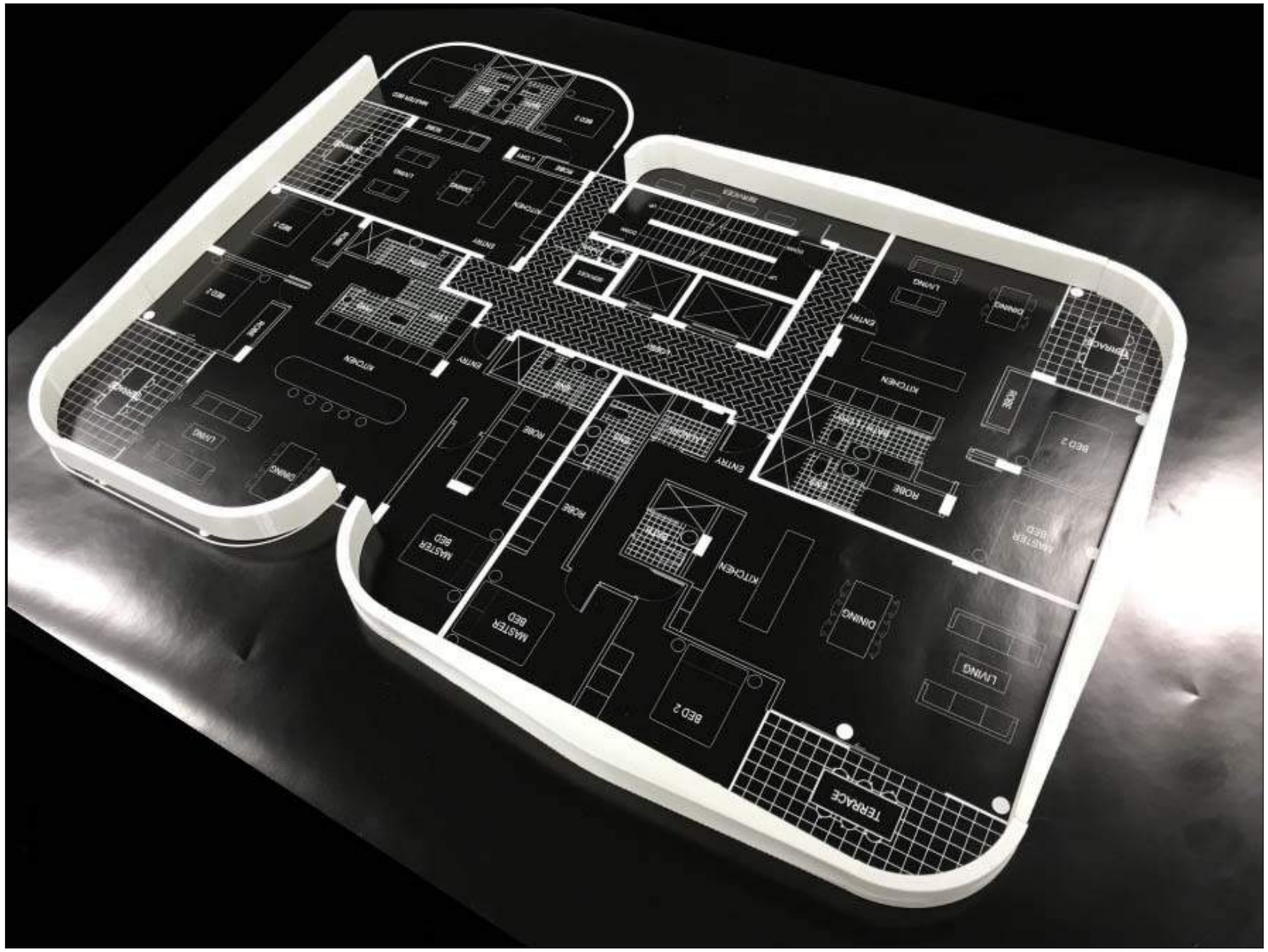
The building form is characterised by profiled beams which are emphasize the horizontal nature of the building and give expression to the spandrels. The building is further expressed into two distinct elements which successfully break up the mass of the building to create two slender building proportions.

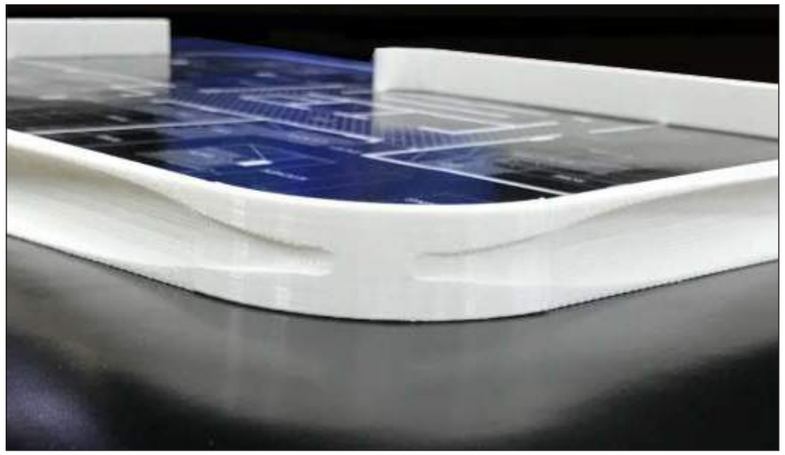
Design Studies: Construction

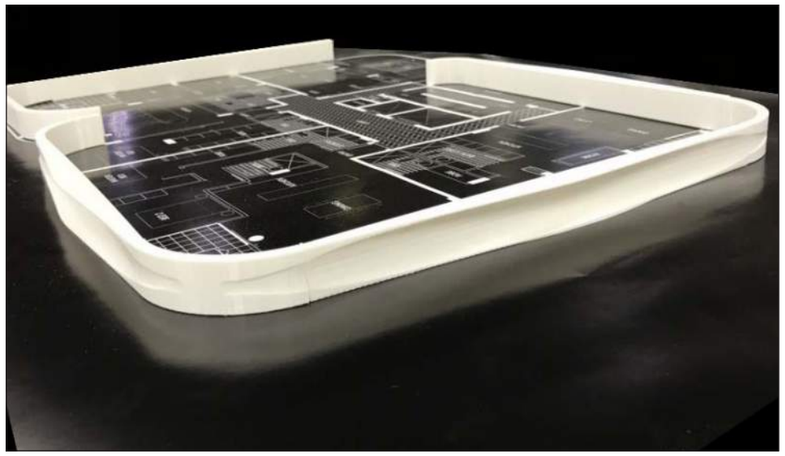
Feature Spandrels

3D Modeling of Curved Beams

A comprehensive and detailed study was undertaken to resolve the modeling of the feature spandrel beams. The 3D modeled beams were presented to the design panel.







Design Studies: Construction

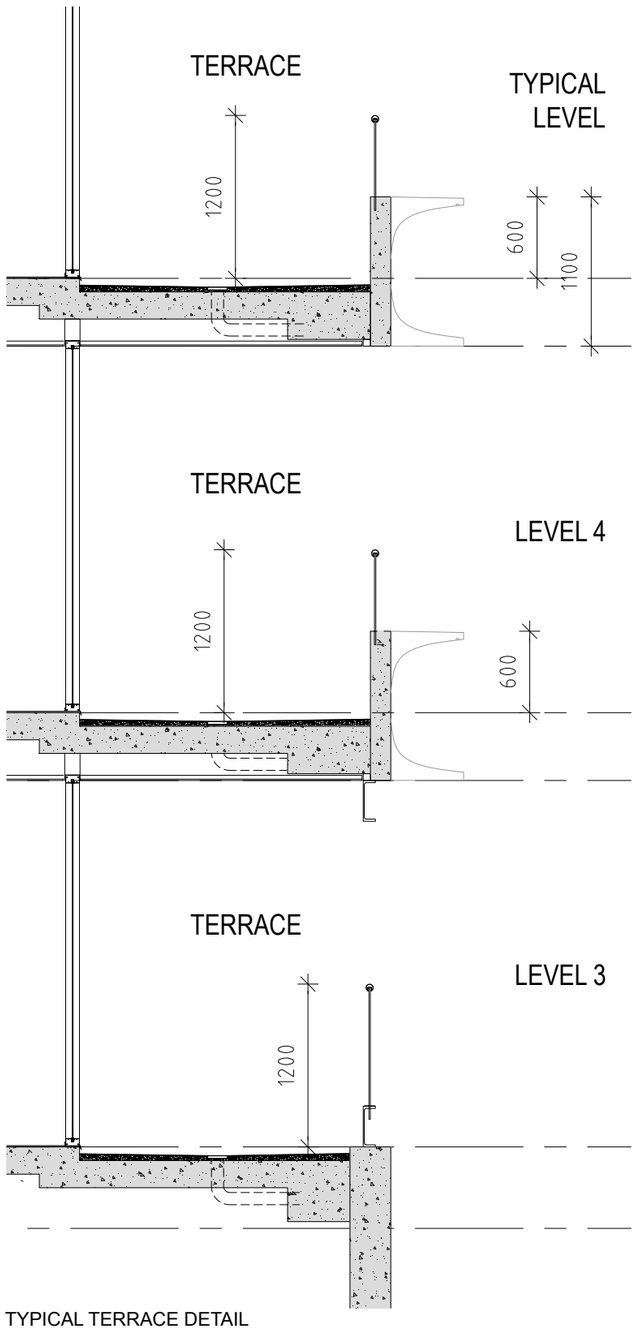
Feature Spandrels

Facade System

Particular attention has been given to the architectural expression of the main construction elements to achieve a high quality design outcome.

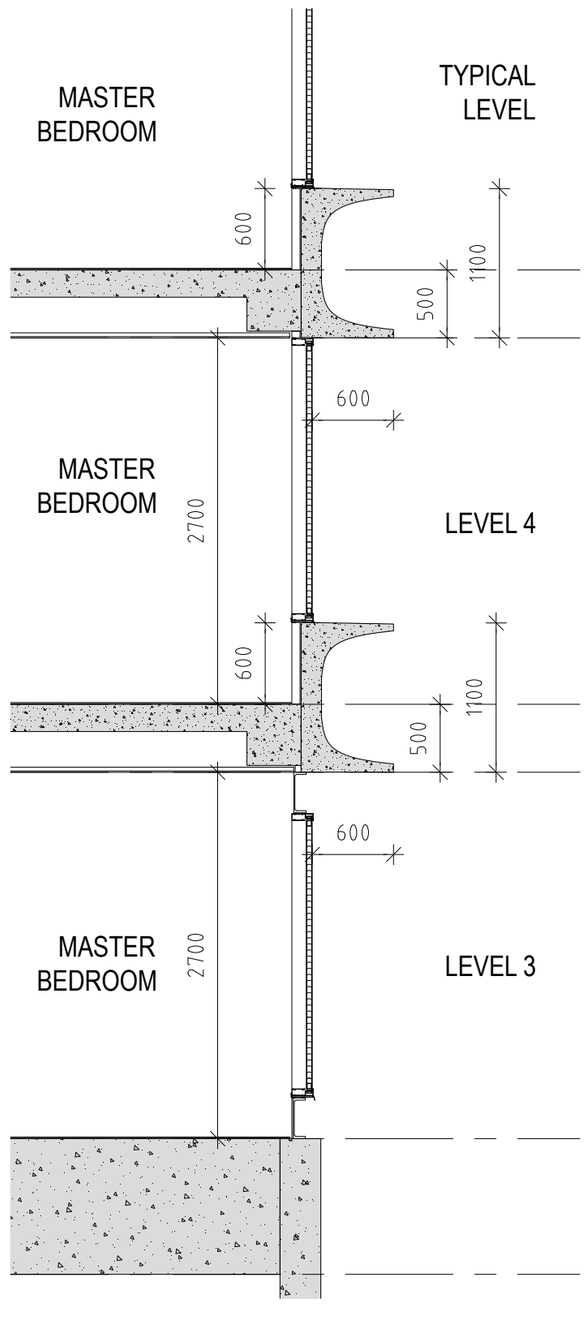
Curved beams provide an elegant, almost classical shape around the building (locations are pictured below), whilst promoting a residential expression to the building.

Balcony Details



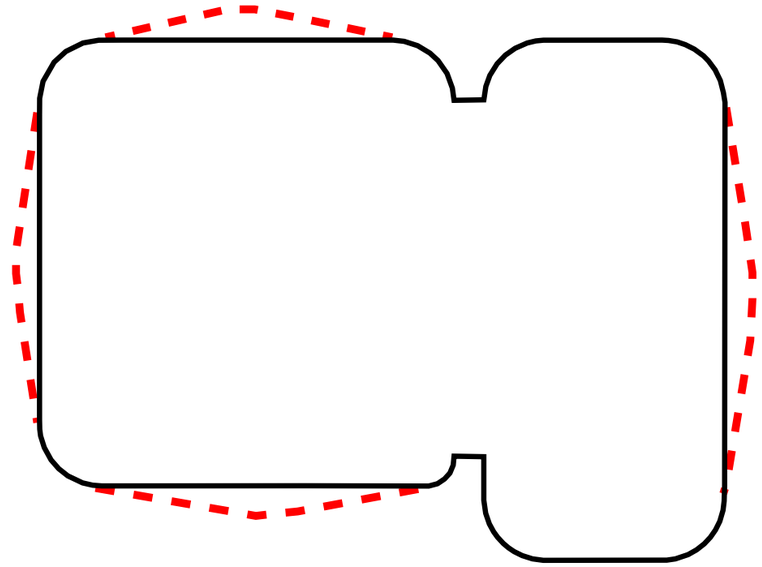
TYPICAL TERRACE DETAIL

Beam Details

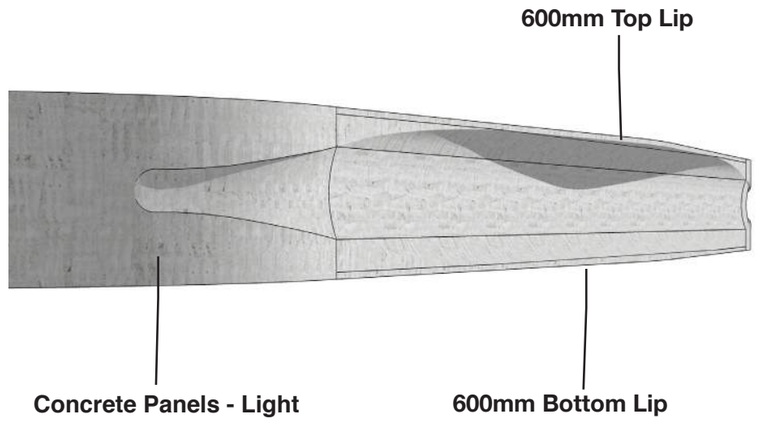


TYPICAL BEDROOM DETAIL

Beam Locations



Beam Visualisation



Design Studies: Construction

Penthouse, Blinds/Glazing & Air-conditioning

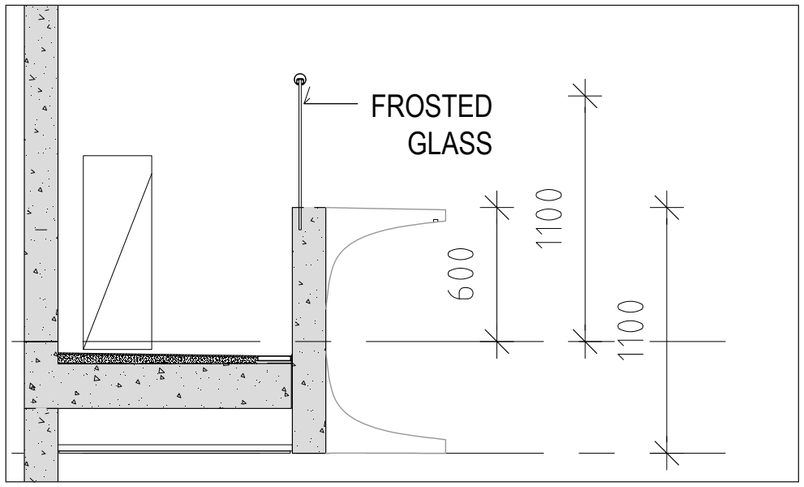
Details

Integration of the detailing of the penthouse levels, the interstitial blind units and glazing to the built in furniture, as well as the concealment of the service balcony A/C units have all been carefully considered.

Penthouse

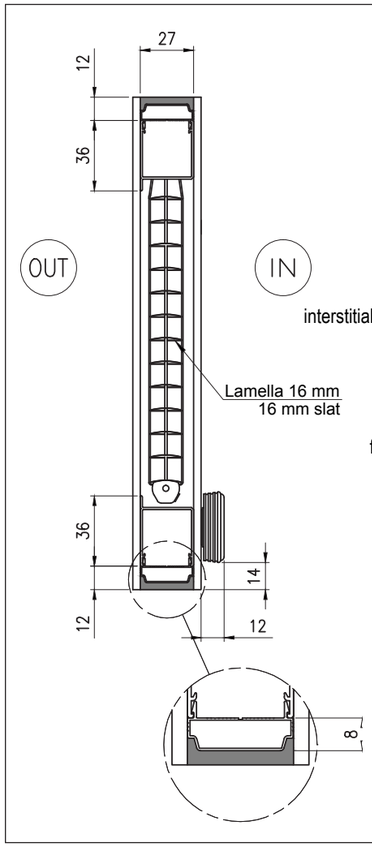
The penthouse & sub-penthouse have a reduction of the perceived scale of the top levels of the built form.

Air Conditioning

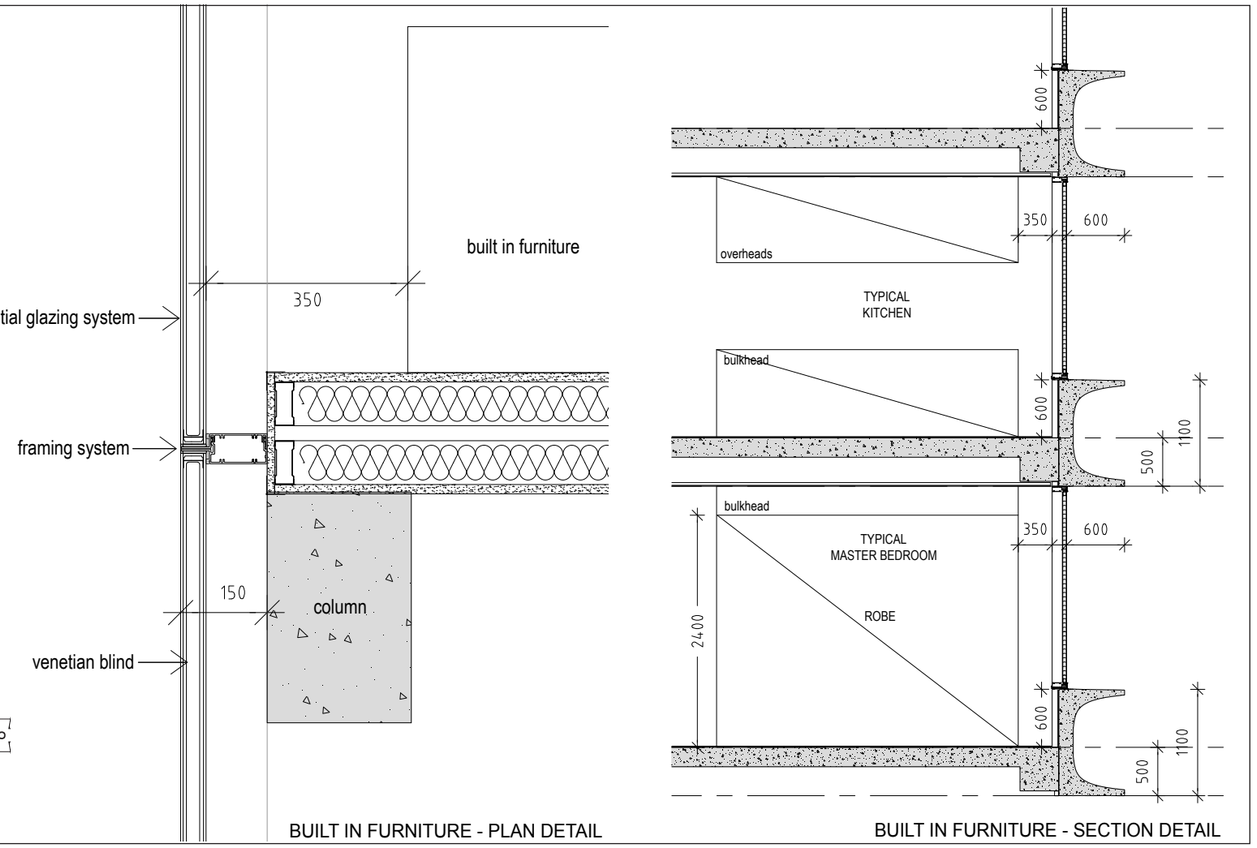


Blinds / Glazing

Interstitial Blinds



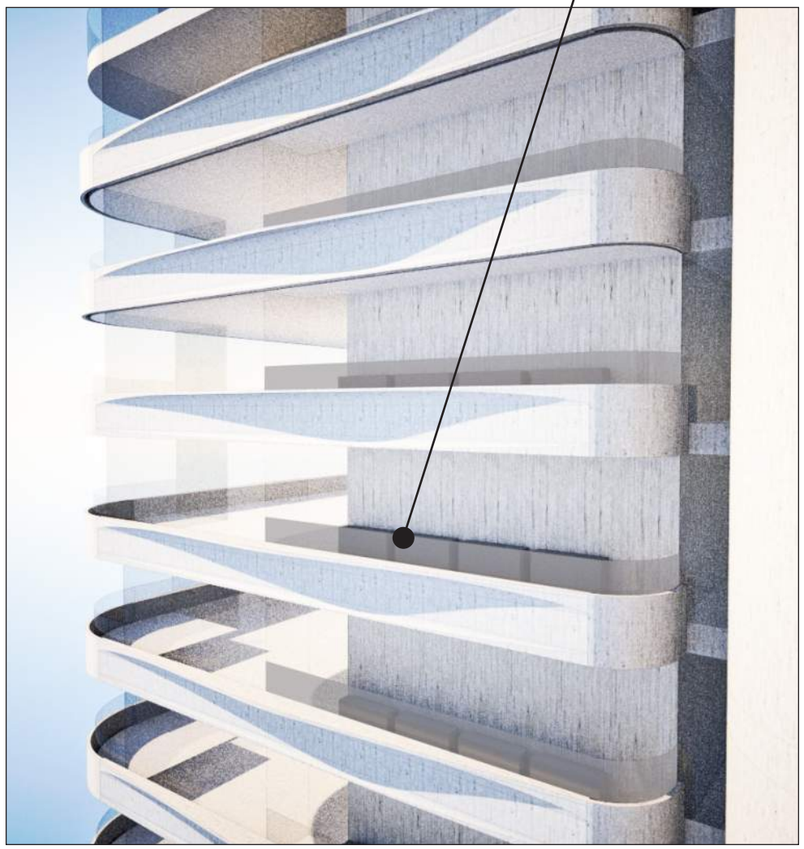
Built Elements to Glazing



BUILT IN FURNITURE - PLAN DETAIL

BUILT IN FURNITURE - SECTION DETAIL

Air Conditioning
Concealed behind balconies

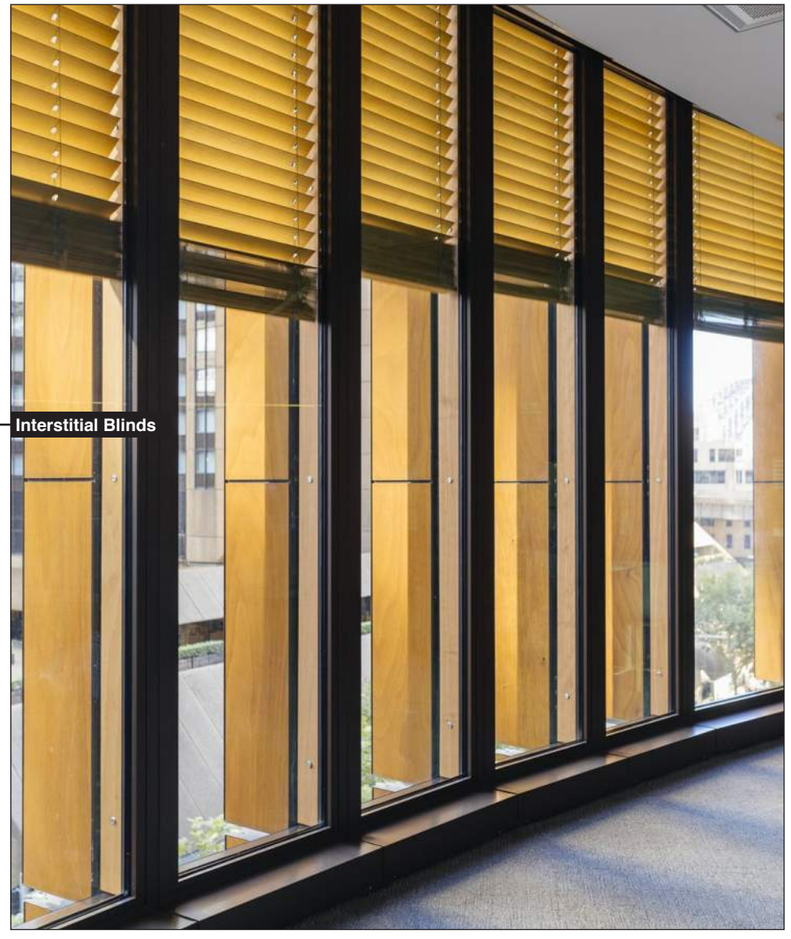


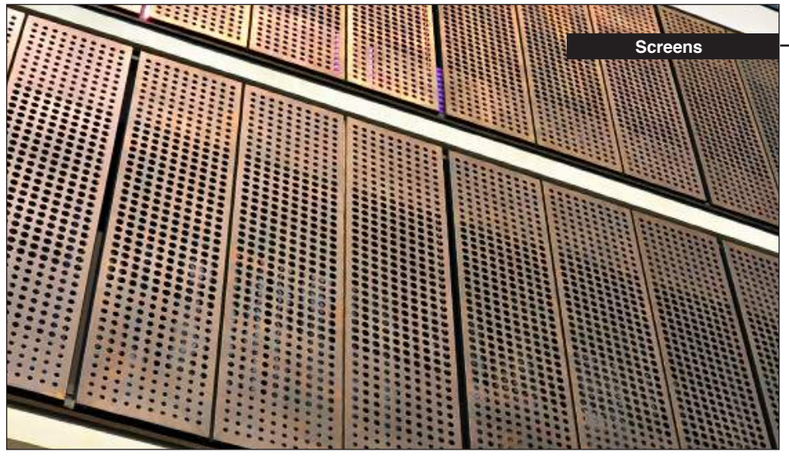
Design Response: Facade

Elements

Facade Study/External Finishes & Textures

A cohesive response to both privacy and sustainability.



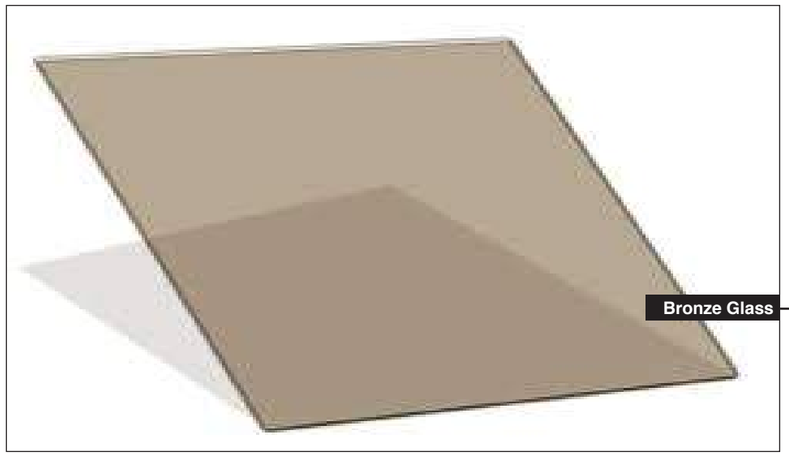


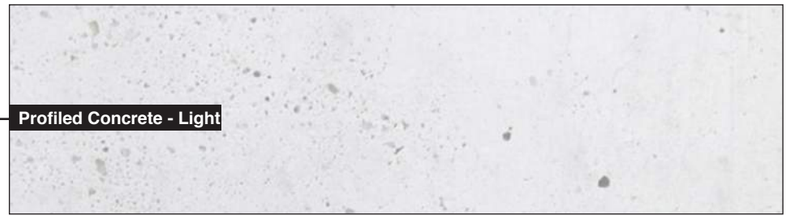
Design Response: Materials

External

Materials/External Finishes & Textures

Expressive, clean, and upmarket, exterior material choices focus on speaking to the site by introducing natural forms and greenery to the building, with other materials playing with light.



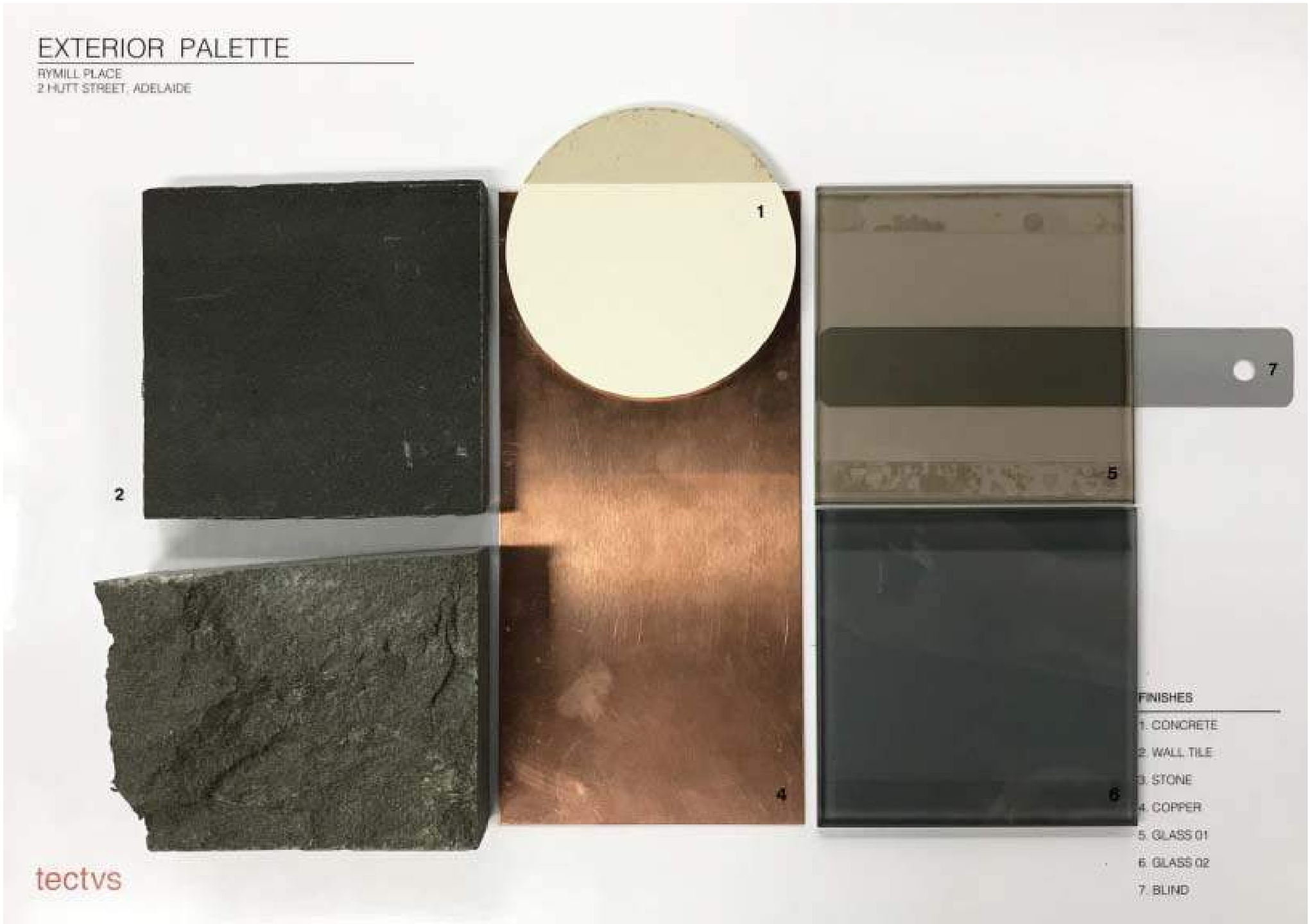


Design Response: Materials

External

Materials Board

A material board representing the anticipated exterior finishes was presented to the design review panel.



Design Response: Materials

Internal

Internal Finishes & Textures

Details of internal / external materials and finishes to be used on proposed building.

Marble

Wall Tile

Polished Plaster

Herringbone

Integrated Shading - Blinds

Bronze Mirror

Timber

Stone Flooring

Smoked Glass

Design Response

Key Points

Interface

Rich materials and textures work the building at the scale of ‘touch and feel’.

1

Cleo Lane

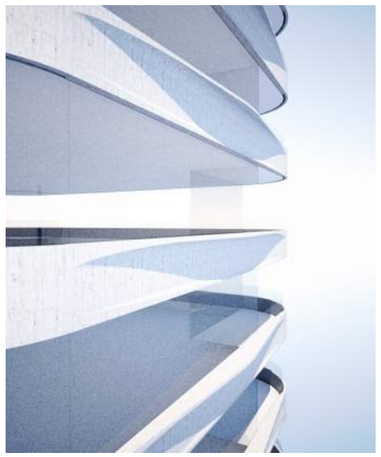
Upgrades seeking to improve amenity and access.

2

Roof Garden

Providing amenity to residents and extending the parklands in to the city.

3



Construction

Custom beams soften the edges of the building and promote it’s horizontality. Construction details have also been considered.

4

Facade

Built elements of the facade have been carefully considered to express the simple expression of the articulated form

5

Materials

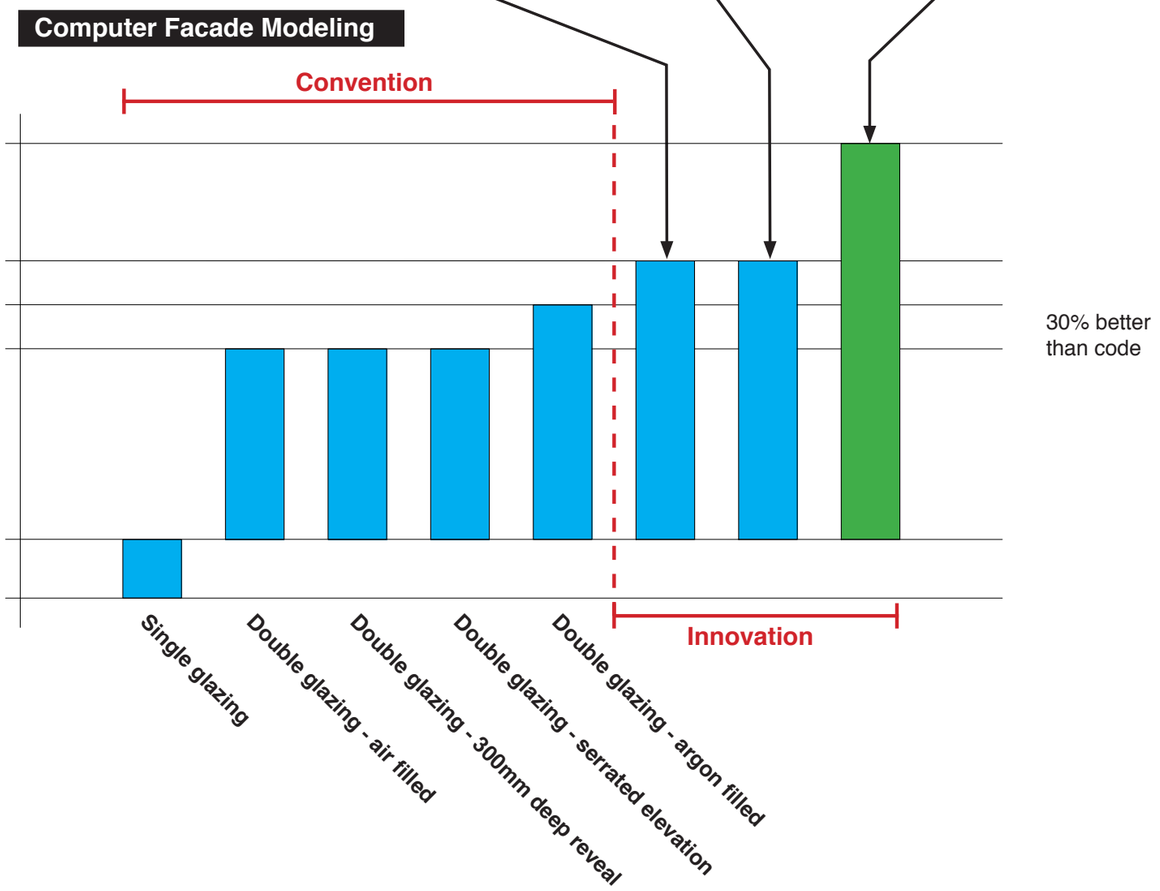
External and interior palettes reflect the surrounding environment through the use of warm, natural and neutral tones.

6

Sustainability

Sustainability

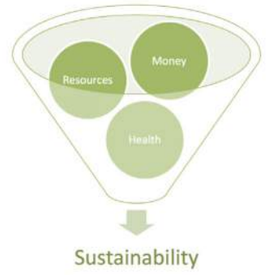
Principles + Facade



Sustainable Design Solutions

These are the Sustainability Guiding Principles for the Project:

- That the development is attractive to residents, visitors and the surrounding community
- That the buildings are designed in accordance with best practice in sustainable development
- That the development encourages sustainable living within a high-quality environment
- That the development provides a positive social return on investment
- That the development promotes the notion of biodiversity at podium and street level
- That the development delivers on the triple bottom line of sustainability: Environmental, Economic, and Social



Facade Design

The façade design which includes a high performance double glazing system including an interstitial blind system provides the highest level of thermal performance, **offering a solution which maximises daylight access and views, and an average NaTHERS rating of 8 Stars, which is 33% better than BCA code minimum compliance.**

This level of performance is better than façade veil systems, serrated façade designs, and the deployment of green shading. The biodiversity benefit of green shading is recognised by the Client, and instead extensive landscaping and green walls are proposed to be included in the podium and street level spaces, where they can be adequately shaded and maintained.

This level of performance is also better than façade solar PV glass systems. The greenhouse gas emissions (carbon) reduction benefit of a solar PV façade system is recognised by the Client, and instead a large scale (40kW) solar PV array will be installed at roof level. Whilst being smaller in physical size than a façade glazing array, the roof array efficiency will be significantly higher resulting in on annual generation capacity in the order of 64,000kWhr (64 T CO2) which is more than double the façade system generation rate.

In conclusion, it is proposed that the façade design comprises:

- a high performance insulated double glazing system, with a fully adjustable interstitial venetian blind. Glazing system to be Chevron Cardinal (Neat) or equal approved, comprising 6mm LoE3- 366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27.

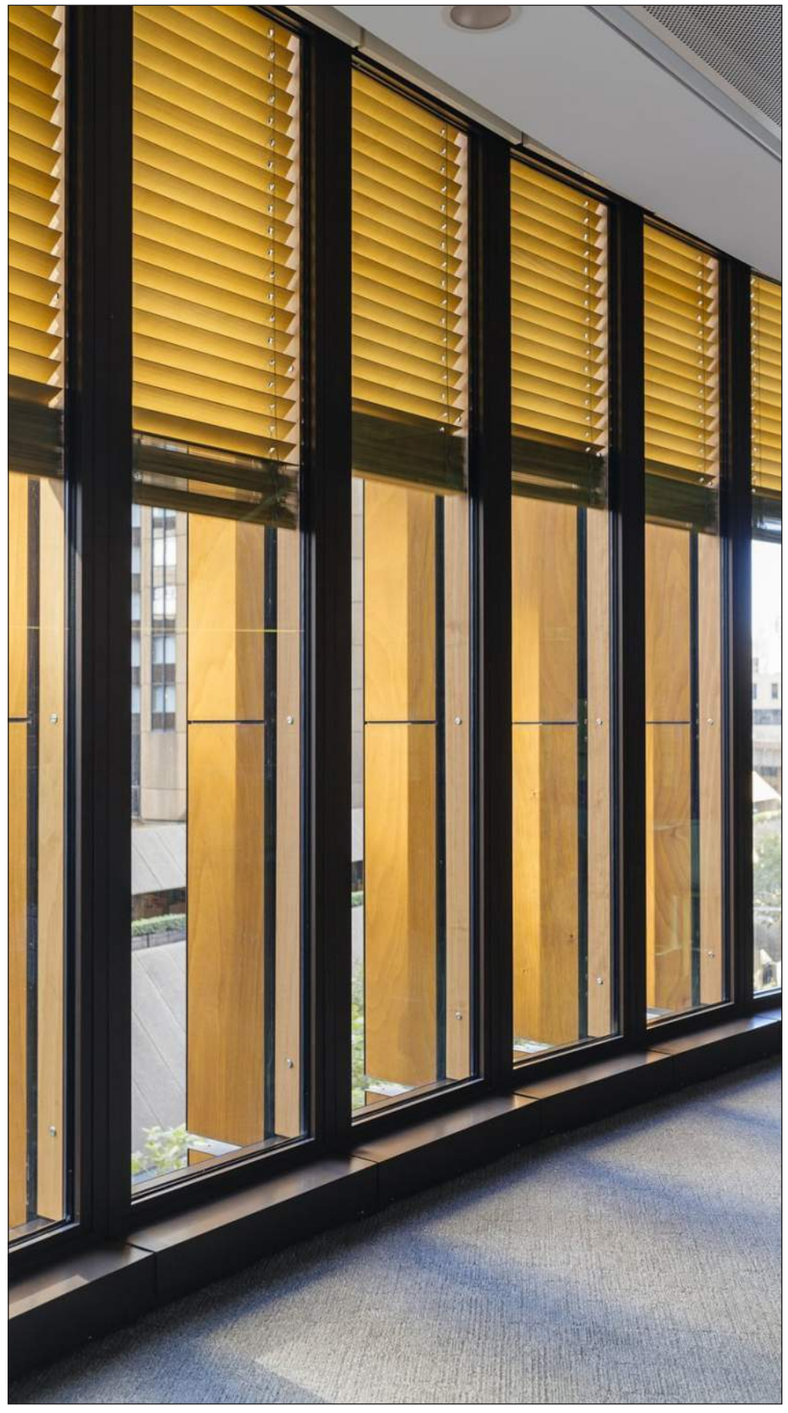
Apartments achieve a dwelling average NatHERS rating of 8 Stars

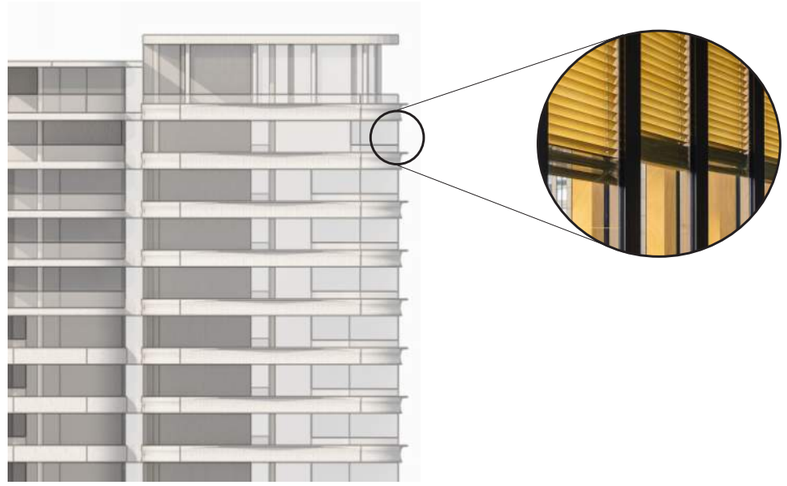
Sustainability

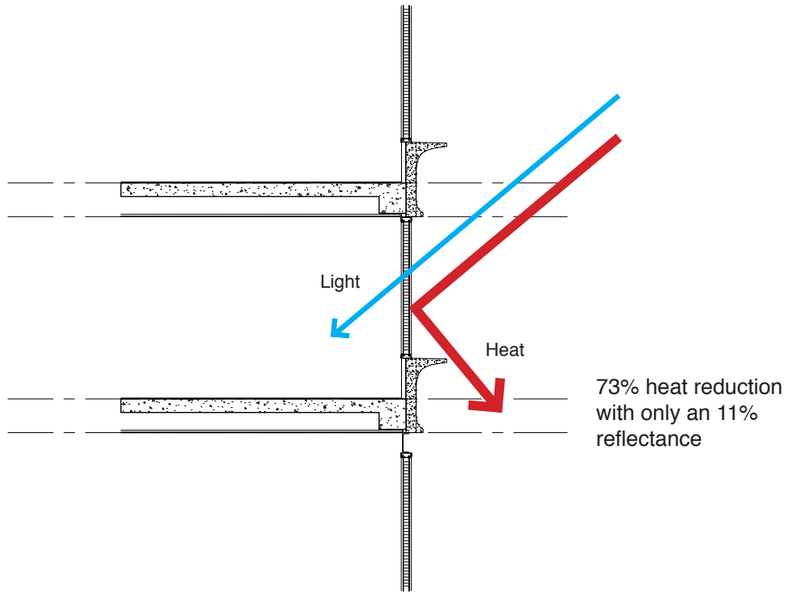
Interstitial Blinds

Integrated Shading Solution

Somfy Solution offers sun-tracking, shadow management and integrated web based remote controls.







73% heat reduction with only an 11% reflectance

High performance double glazing with adjustable interstitial blind

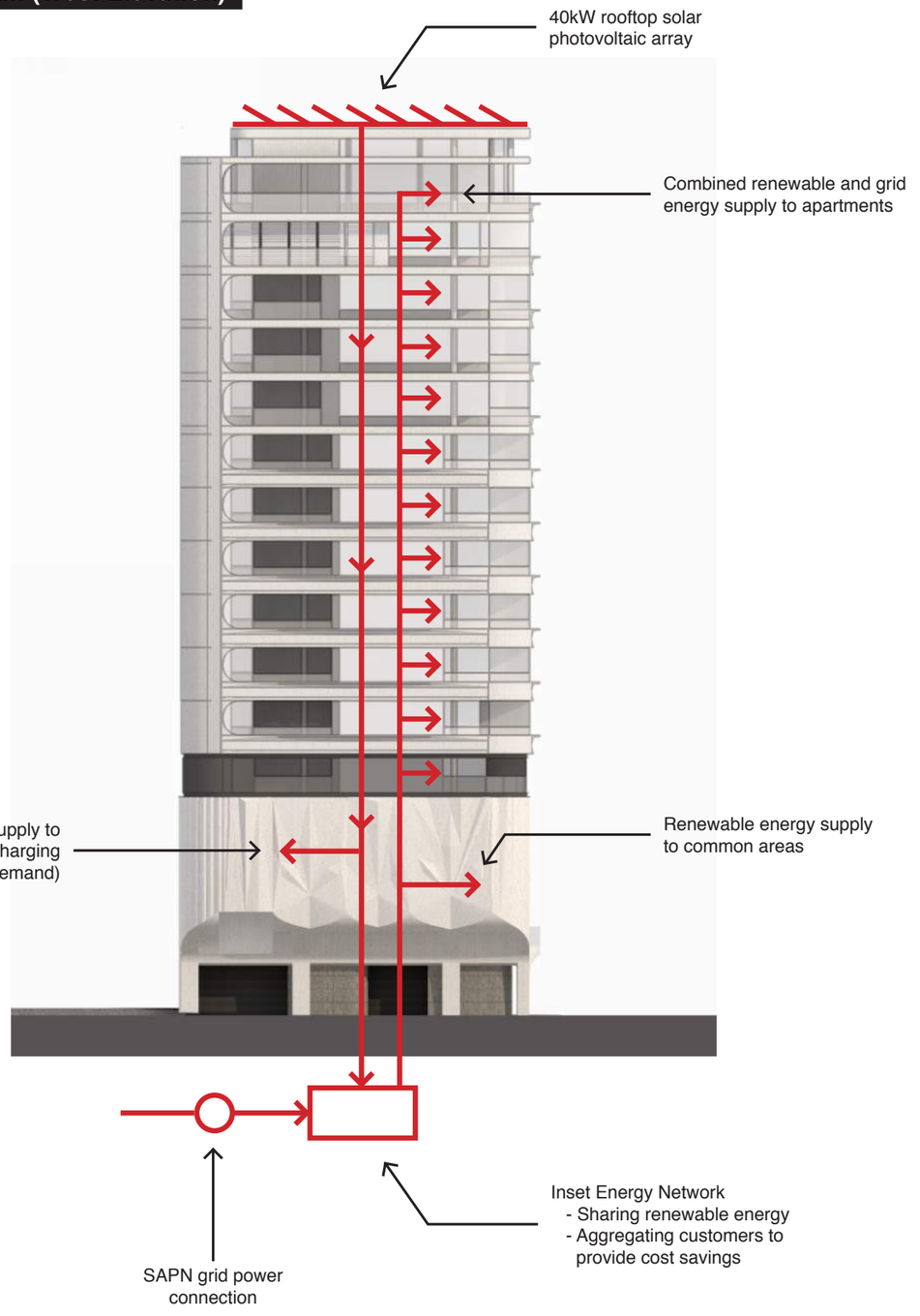
Sustainability

Energy & Water

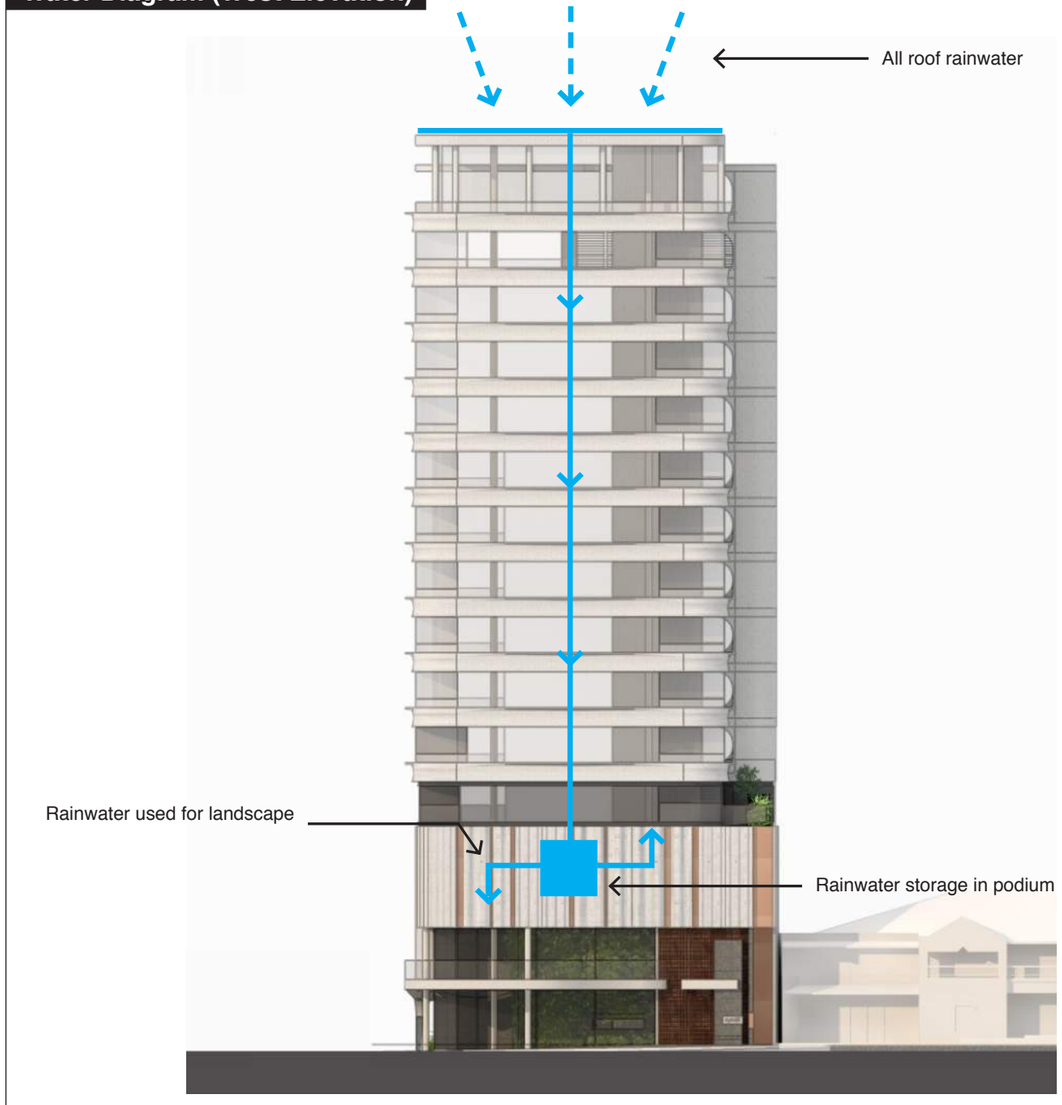
Sustainable Design Solutions

The intent of our ESD initiatives is to reduce the demands on active systems by enhancing the passive performance of the building. This includes optimising the network of installed systems with the development's built form, including orientation, shading, insulation, natural light, ventilation and lifespan.

Energy Diagram (West Elevation)



Water Diagram (West Elevation)



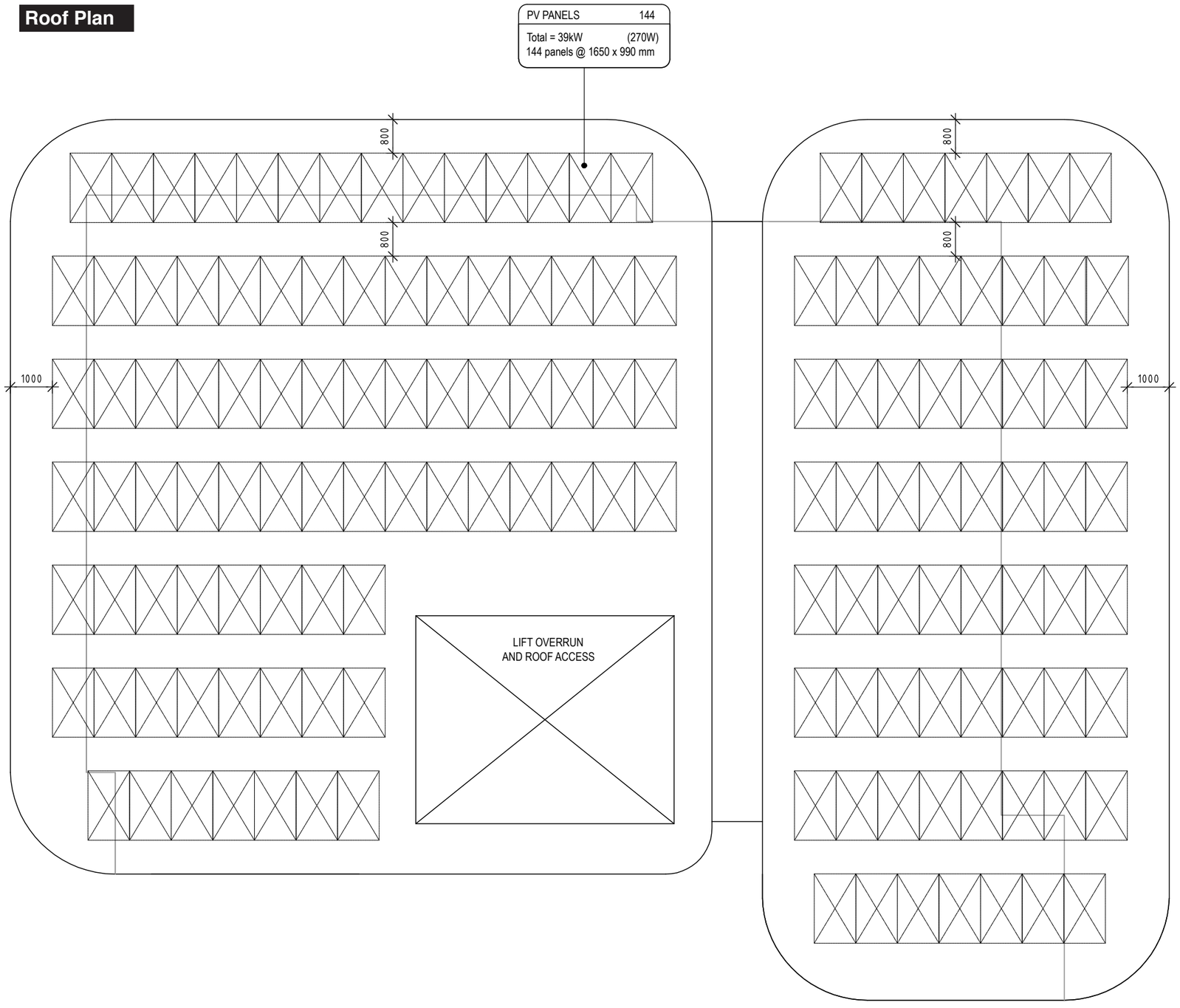
Sustainability

PV Array

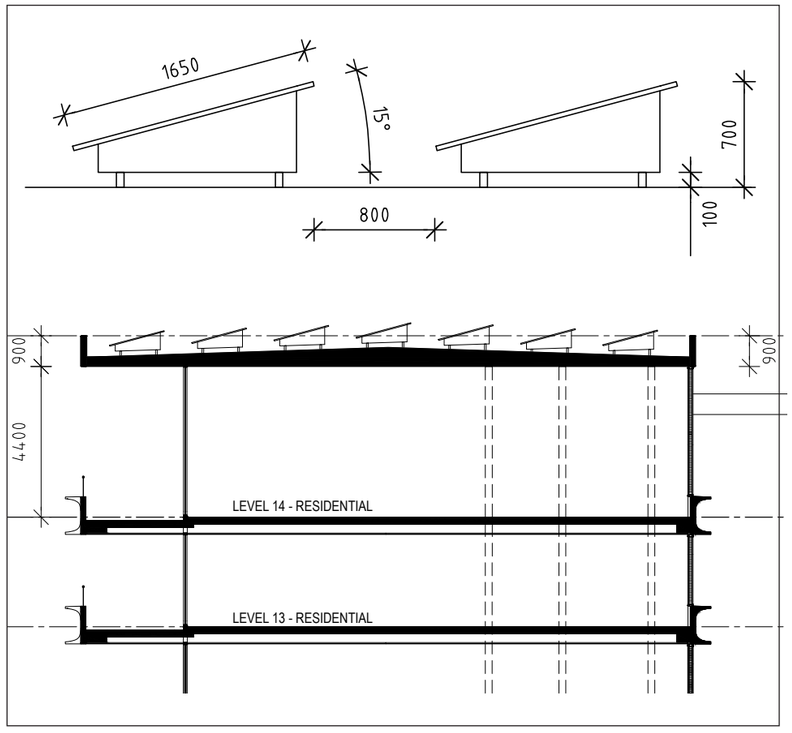
Solar Harvesting

The solar PV system has been subject to design development with the panel mounting angles, spacing, and general arrangement co-ordinated to maximise the potential renewable energy yield. This has resulted in the proposed deployment of a 144-panel array, with each panel having a plated capacity of 270W. The combined rated system capacity is therefore 39kW.

Roof Plan



Sections



Example

Sustainability

Glazing, Air Movement, Green Space

Privacy Glass
Air Movement
Green Space
Interstitial Blinds

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

L14
L13
L10-12
L5-9
L4
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L1
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G
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B2

L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

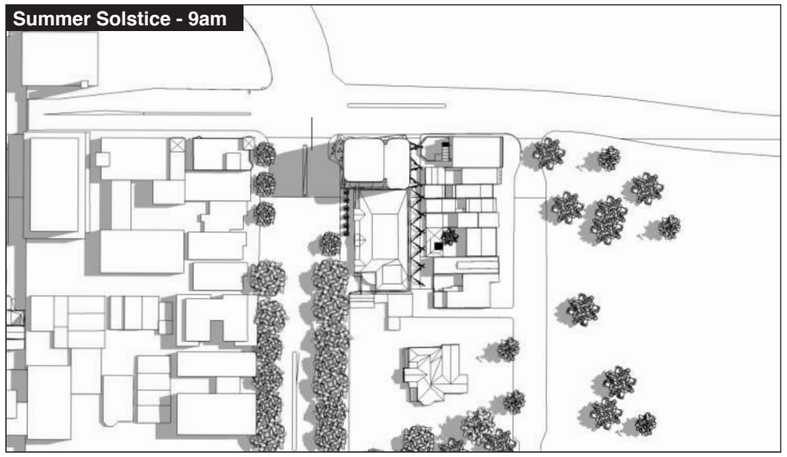
L14
L13
L10-12
L5-9
L4
L3
L2
L1
M
G
B1
B2

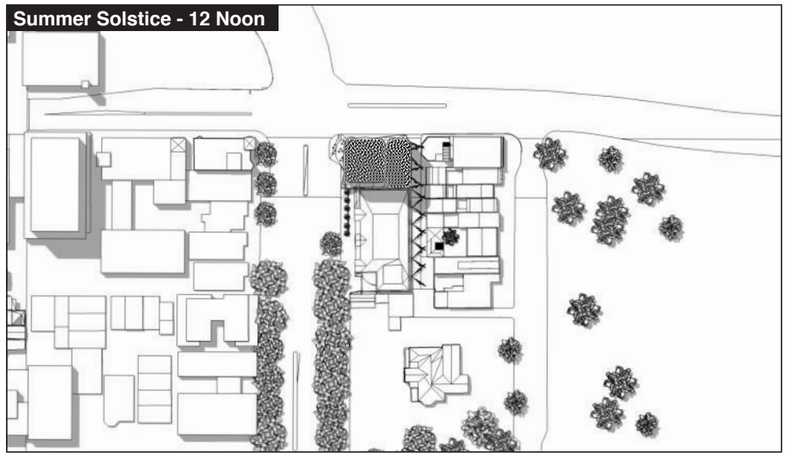
Sustainability

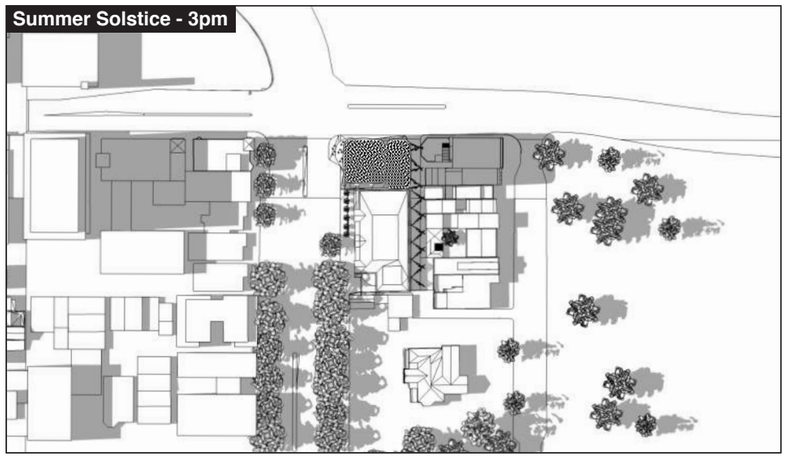
Sun Study

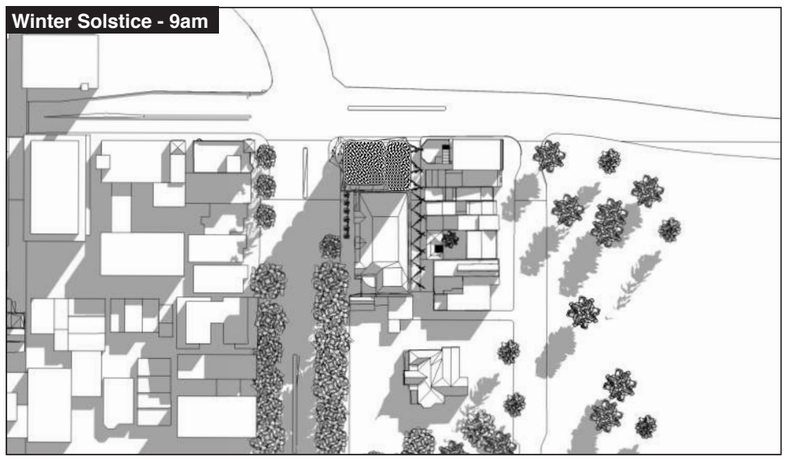
Summer and Winter Solstice Shading

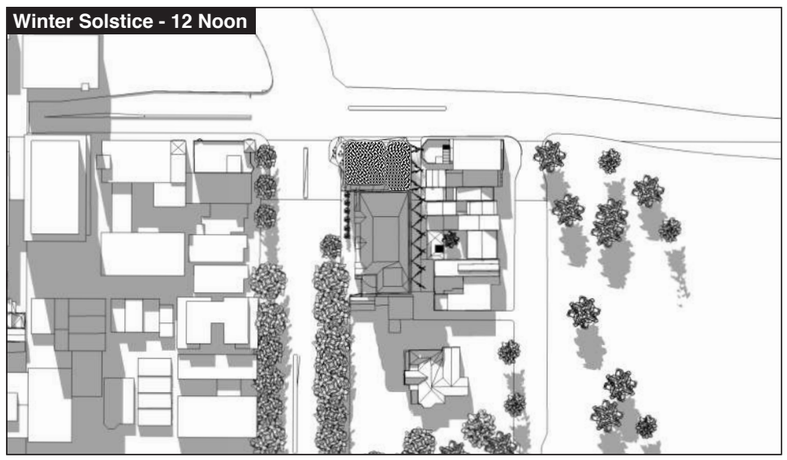
We acknowledge the produced shadows by the building.

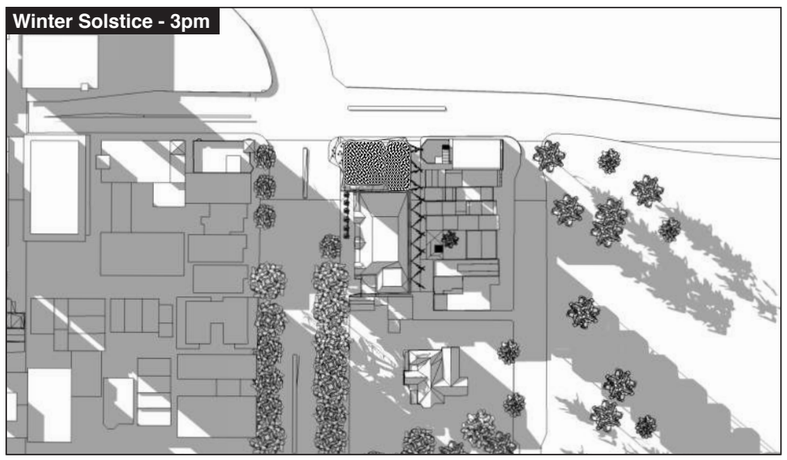






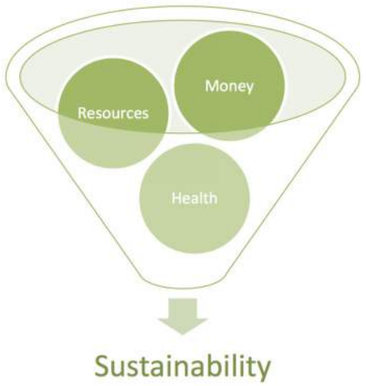






Design Response

Key Points



Sustainability

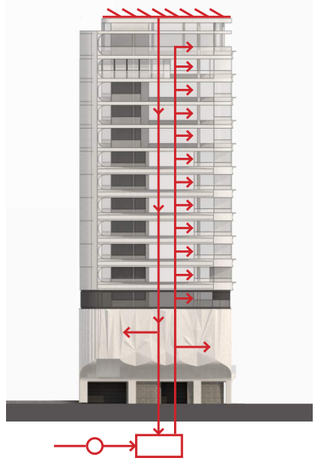
We acknowledge the limits provided within a 14 storey building, yet also note the multiple ways in which the building makes best use of sustainable principles.

1

Interstitial Blinds

The façade design which includes a high performance double glazing system including an interstitial blind system provides the highest level of thermal performance.

2



Energy

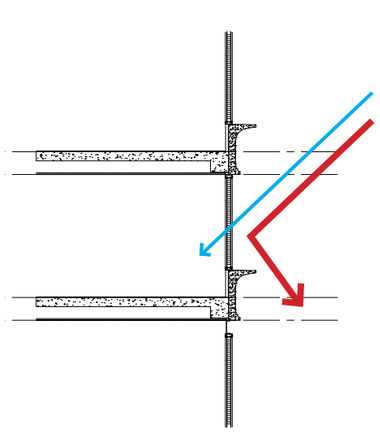
A 40kW rooftop solar photovoltaic array is combined with an inset energy network.

3

PV Array

The 144-panel array maximises the potential renewable energy yield. Each panel has a capacity of 270W, with a combined capacity 39kW.

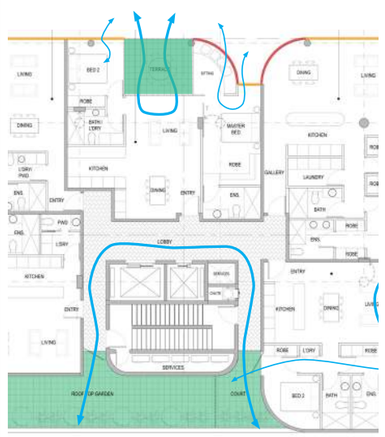
4



Double Glazing

The façade design offers an average NaTHERS rating of 8 Stars, which is 33% better than BCA code minimum compliance.

5



Air Circulation

Apartment design allows for workable air circulation.

6

Building Matrix

Development Team

MARAS Group

FUTURE URBAN GROUP

CAMBRIDGE GROUP

DESIGN - CONSTRUCT - DELIVER

Tract
Landscape Architects
Urban Designers
Town Planners

tectvs

infraPlan

d2

Think beyond the square.

DR Partners

Harcourts

Appendices

Rymill

infraPlan

policy – strategy – planning – infrastructure – transport – environment

Traffic Impact Statement

Report

Rymill Park Apartments

Mixed-use Development

2-6 Hutt Street, Adelaide

25 October 2017

Project Name	2-6 Hutt Street Mixed Use Development – Rymill Park Apartments
Client Contact Details	**Theo Maras** **Director – Maras Group** Level 3, Charlicks Building Ebenezer Place ADELAIDE SA 5000 E: theo.maras@marasgroup.com.au
Consultant Contact Details	**Erik Stopp** **Senior Transport Engineer** InfraPlan (Aust) Pty Ltd Level 3, 66 Wyatt Street Adelaide SA 5000 P: 08 8227 0372 M: 0433 199 593 E: erik@infraplan.com.au

Document Control					
Name:	**IP16.017_Hutt St Mixed Use Development_R3**				
Version	**Notes**	**Author**	**Date**	**Reviewer**	**Date**
0	Preliminary Draft for information only	AK	22.07.16	AD	01.08.16
1	Updated to reflect revised access & car park layout	AK	23.11.16	JE	28.11.16
2	Updated with JPE comments	GB	29.11.16	AK	29.11.16
3	Updated with changed plans (DRAFT)	ES	19.10.17	JE	26.10.17

Table of Contents

1 Introduction

InfraPlan has been engaged by Maras Group to prepare a Traffic Impact Statement (TIS) for the proposed Rymill Park Apartments – mixed-use, residential + retail development located at the south-eastern corner of East Terrace and Hutt Street intersection. These plans have been updated since the initial proposal from 2016 and this traffic impact statement updated accordingly.

A location map is included as Figure 1 (overleaf)

In the preparation of this report, we have undertaken the following tasks:

- Design advice and input to the traffic related elements of the proposed development, including entry/exit points for all traffic movements;
- Technical assessment of the layout and operation of the proposed carpark,
- Technical assessment of the capacity of the access/egress points located off Cleo Lane;
- Detailed engineering analysis of the likely traffic generation of the proposed development and its impact on the surrounding road network, and
- Recommendation of any changes to the proposed carpark layout, access/egress points to ensure adequate performance of the surrounding road and traffic network.

We have referred to the following documents during this assessment:

- City of Adelaide Development Plan – consolidated June 2017
- Department of Planning, Transport and Infrastructure, SA (DPTI) – Trip Generation Rates for Assessment of Development Proposals
- Roads and Maritime Services, NSW (RMS) – formerly known as Roads and Traffic Authority (RTA) - Guide to Traffic Generating Developments (herein referred to as the RTA Guide)
- Australian Standards AS2890.1-2004 Off-Street Car Parking
- Australian Standards AS2890.6 Off-street Car Parking for People with Disabilities.

The following drawings issued by tectvs in September 2017 have been referred to in providing the advice contained within this report:

- C01 – C08
- C08b
- C09 - C14

2 Existing Conditions

2.1 Local Context

The subject site is illustrated below, and bound by East Terrace to the north, Hutt Street to the west, Cleo Lane to the east and another property to the south. Adjacent land uses include offices, retail and commercial activity, and medium to high density residential apartments/housing.

The existing site currently houses commercial tenancies served by six at-grade car parks (reserved for tenants) accessed from Cleo Lane. Pedestrian access to the existing property is from Hutt Street and East Terrace.

Figure 1: Location Map – proposed Rymill Apartments – Mixed use development

The Adelaide Development Plan defines Bartels Road, Pirie Street as part of the "…Primary Bicycle Network Route…" The City of Adelaide Smart Move Strategy indicates that Bartels Road currently functions as an east-west 'Regional Link' and is envisioned as a future 'District Link', providing greater priority for pedestrians, cyclists and public transport users. The Bartels Road carriageway comprises 2 travel lanes in each direction, plus on-street parking (both parallel; for both cars and motorcycles) and a full-time exclusive bicycle lane.

Site location within the Capital City Zone is included as **Appendix A**.

The location of the site within the CBD is well positioned for access by public transport, cycling, and by private car or taxi, as discussed below.

2.2 Existing Land Use and Traffic Generation

It is understood that the existing building has two floors of commercial/office tenancies. With a total leasable area in excess of 600sqm, the existing site was estimated to generate approximately 12 peak hour trips (using a trip rate of 2 trips/100 sqm during peak hour) using the Department of Planning, Transport and Infrastructure (DPTI) Trip Generation Guidelines.

The existing commercial land use at the subject site was estimated to generate approximately 12 trips during the AM and PM peak hours, and up to 95 trips per day.

2.3 Site Access

As mentioned previously, the development site has frontage along both East Terrace and Hutt Street. An at-grade, undercover carpark for 6 vehicles is accessible from Cleo Lane.

Under existing conditions, Cleo Lane operates as a left-in-left-out laneway, providing vehicular access to properties located along its length. Cleo Lane is approximately 3.0m wide which is not wide enough to support simultaneous two-way traffic movement. Property owners (along the eastern side of Cleo Lane) have set back buildings by up to 3.0m to allow for vehicular movement into/out of their properties (garage). However, these set backs are not continuous and Cleo Lane therefore functions as a single lane laneway.

Cleo Lane operates as a left-in-left-out laneway forcing arriving vehicles to either change their travel route to arrive from the east or make a U-turn on Bartels Road (east of East Terrace) to access Cleo Lane.

Similarly, traffic exiting Cleo Lane is forced to turn left and pass through traffic light at East Terrace/Pirie Street/Hutt Street intersection.

2.4 On-street Parking

The Hutt Street site frontage comprises of 2 travel lanes in each direction. Sufficient on-street parking exists along Hutt Street south of Pirie Street/East Terrace within a walking distance of 400m (5-6 minutes) from the development site. Hutt Street has 90 degree on-street parking on the east side, and a mix of 60 degree and 90 degree on-street parking on the west side. A bicycle lane exists on the east side of Hutt Street, but not on the west side as it terminates at Tucker Street.

On-street parking is provided on Pirie Street, Hutt Street and Bartels Road in the vicinity of the site, as summarised below.

Hutt Street (eastern side) – 1P and 2P (ticket), 8am – 6pm Monday to Friday and 8am – 12 noon Saturday.

Hutt Street (western side) – 1P (ticket), 8am – 6pm Monday to Friday and 8am – 12 noon Saturday.

Bartels Road (both sides) – 3P (ticket), 8am – 6pm Monday to Friday and 8am – 12 noon Saturday; 10P (ticket), 8am – 6pm Monday to Friday.

Pirie Street (both sides) – 1P (ticket), 9am – 6pm Monday to Friday and 2P (ticket) 8am – 12 noon Saturday.

2.4.1 Public Transport

The proposed development site is situated at the corner of East Terrace/Hutt Street and Bartels Road/East Terrace, both being major public transport routes with more than 15 bus routes using these streets.

Stop 1 on Bartels Road – north side is located less than 50m from the development site with Stop 1 on Bartels Road – south side being 120m away from the subject site.

Stop V1 on Hutt Street – west side is located just across the street from the development site. Stop F1 on Hutt Street – east side is approximately 230m from the subject site.

Grenfell Street has been identified as a High Concentration Public Transport Route by the Adelaide City Development Plan, servicing between 300 and 500 buses per day[1]. Bus stops I1 & R1 on Grenfell Street are approximately 350 to 400m from the site, which is within a walking distance of 5 to 7 minutes from the site.

Pirie Street is not a transport corridor and no bus stops are located along Pirie Street.

Bus routes which pass along either Bartels Road, East Terrace or Hutt Street in the vicinity of the site include destinations such as City and North Adelaide (98A), Newton, West Lakes & Largs Bay (155, 157), Tusmore & Beaumont (147), and Klemzig, Paradise, Campbelltown, Modbury and north-eastern suburbs (O-Bahn services via Grenfell Street).

2.4.2 Walking

The Adelaide Development Plan defines Hutt Street (between Pirie Street/East Terrace and South Terrace) as a Secondary Pedestrian Area.

Hutt Street has generously proportioned footpaths on both sides of the carriageway, with paved surfaces.

Pirie Street/ East Terrace and Bartels Road, in general have wide footpaths with either paved or sealed surfaces. Cleo Lane however is too narrow to accommodate a footpath.

Businesses located along Hutt Street have frontage access to pedestrian footpaths and residences along East Terrace have access to pedestrian footpaths along East Terrace. There was no observed desire line of pedestrian movements along Cleo Lane (not a through road) and given the width of footpaths on Hutt Street and East Terrace these movements can be catered for by existing pedestrian footpaths.

2.5 Existing Traffic Conditions

East Terrace, Pirie Street, Hutt Street and Bartels Road are all under the care and control of the City of Adelaide. It is important to establish the current and future traffic carrying capacity of these streets and the surrounding local area in order to determine the impact of the proposed development.

Table 1: Local Street Network Details

Street/Road	Classification	Operations
East Terrace (EW) /Bartels Road	Secondary City Access	Two-way, four lanes with on-street parking and bicycle lanes on both sides
Pirie Street	Secondary City Access	Two-way, two lanes with on-street parking and bicycle lanes on both sides
Hutt Street / East Terrace (NS)	Primary City Access	Two-way, four lanes with on-street parking and bicycle lanes on both sides; turn lanes at key intersections
Cleo Lane	Local Access (private lane)	Two-way, single lane; primary function to provide vehicular access to properties along it; no through road

Intersections provide a node for two or more traffic streams to either cross or change direction safely. The capacity of an intersection is dependent on numerous parameters such as number of approaches, number of lanes on each approach, left/right turn treatments, cyclist and pedestrian movements, signal timing etc.

It is important to also assess current (and future) intersection capacities in order to determine the likely traffic impacts of the proposed development, in particular the intersection of Pirie Street/East Terrace and Hutt Street/East Terrace.

Most recent traffic counts (March 2015) reflecting traffic movement through East Terrace/Pirie Street/ Hutt Street intersection were sourced from the City of Adelaide.

A summary of traffic movement data sourced from the CoA is included in **Figure 2**.

Figure 2: Traffic Data Summary – Peak Hour and Weekday Daily Average

As can be seen from the above figure, East Terrace (EW)/Bartels Road was observed to carry an average of 23,000 vehicles/day (both directions) and Hutt Street was observed to carry an average 24,400 vehicles/day (both directions).

Weekday morning and afternoon peak hour traffic on East Terrace (EW) was observed to be 647 vehicles/hr and 445 vehicles/hr respectively. Site observations have indicated that queues on the Eastern Approach (East Terrace/Bartels Road) to the signalised intersection extend beyond 150m east of the signalised intersection. This frequently results in blocking egress from Cleo Lane which is located approximately 25m from the subject intersection.

Intersection Performance

Level of service (LOS) is a measure of effectiveness for intersection operations. It is categorised by letter designations ranging from "A," which is very good, to "F," which reflects very long delays.

Austroads Guide to Traffic Management Part 3 states, *"Level of service is a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety."*

The Highway Capacity Manual (published by Transportation Research Board, 2000) methodology defines intersection LOS by seconds of average vehicle delay at signalised intersections and seconds of average vehicle delay for the worst approach at one-way and two-way stop-controlled intersections.

SIDRA® intersection software developed by Akcelik Associates (Aust) is widely used by traffic engineers for evaluating intersection performance. This tool has been utilised to assess the current and future performance of the Pirie St /East Tce / Bartels Rd /Hutt St intersection.

Table 2: Intersection Performance – Existing

Intersection	Intersection control	LOS (average delay) – AM Peak	LOS (average delay) – PM Peak
Pirie St /East Tce / Bartels Rd /Hutt St	Signalised 100 sec cycle, five-phase	E (75 sec)	E (71 sec)

The subject intersection is part of a co-ordinated corridor (east west) and assessing it as a standalone would provide for conservative results. In reality, the subject intersection is envisaged to operate at a better level of service than estimated as above.

Sidra intersection modelling outputs are included in **Appendix B**.

3 Subject Development

3.1 Development Details

The proposed development will replace the existing commercial (office) tenancies with a mixed-use commercial/residential development. The proposed mixed-use development will have the following

- 220 m^2 restaurant/café including open terrace seating on mezzanine level
- 2 levels of underground (basement) car parking (28 parking spaces)
- 2 levels of above-ground car parking (28 parking spaces)
- 12 levels of residences – total 38 dwelling units

Detailed breakdown of types of dwellings is included as **Table 3** below:

Table 3: Dwelling Unit Details

	No. of Beds	Total Units	Total Bedrooms
1 bed	1	4	4
2 bed	2	21	42
3 bed	3	12	36
Penthouse	4	1	4
		38	**86**

The development proposal includes a setback of 3m on Cleo Lane on the western side along the property boundary. The proposal setback would allow for a simultaneous two-way traffic movement on Cleo Lane along the property boundary.

3.2 Vehicular Access – Widening of Cleo Lane

As mentioned previously Cleo Lane is a no-through road as the southern end is privately owned restricting through movement. Under existing conditions Cleo Lane is approximately 3.0m wide with two-way traffic movement.

The proposal includes a building setback of 3m on the ground floor along the eastern property boundary fronting Cleo Lane. The proposed building setback on the ground floor will provide for a two lane, two-way operation along the eastern boundary of the property – for approximately 20m from East Terrace.

The proposed widening of Cleo Lane at its approach to East Terrace (EW) would allow for simultaneous entry and exit movements into/out of Cleo Lane. The proposed widening would also provide a passing opportunity to vehicles destined/originating from properties served by Cleo Lane if a vehicle is waiting to enter the proposed Rymill Park Apartments Car park.

It is noted that a stobie pole will be required for relocation to facilitate widening of Cleo Lane.

Figure 3 - Stobie pole for relocation at junction of East Tce (EW) and Cleo Lane

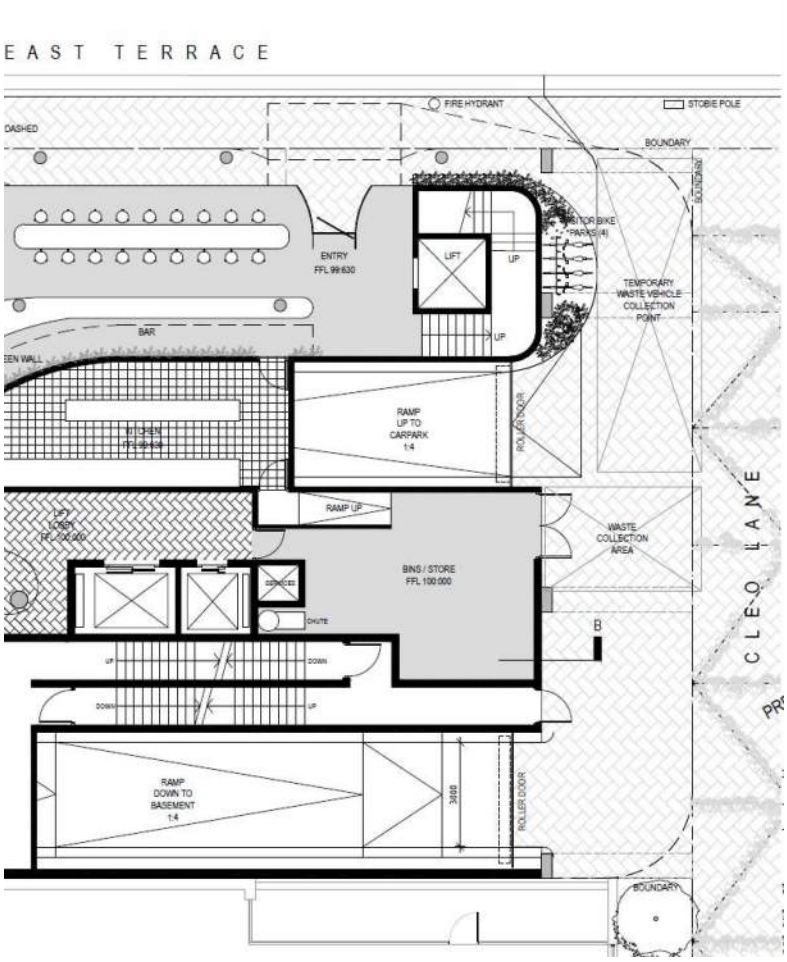


Figure 4: Proposed Cleo Lane Access Arrangement

3.3 Waste Collection

The bin storage area located on Ground Level will be accessible from Cleo Lane. It is understood that a private contractor will be engaged for collection and disposal/recycling of waste. Waste collection trucks will be required to reverse into Cleo Lane from East Terrace for waste collection.

Please refer to separate report on Waste Management.

3.4 Emergency Access

Emergency vehicles - Ambulance & Metropolitan Fire Service (MFS) will be able to access the development from East Terrace or Hutt St.

Two fire escape exits are proposed leading to Hutt Street (along the southern boundary) and to Cleo Lane.

4 Parking Demand

4.1 Car Parking Requirements – Residents

It is worth noting that Table Adel/7 of the Adelaide City Development Plan (ACDP) does not state a minimum parking provision for *Medium to High Scale Residential or Service Apartment* developments located within the Capital City zone.

However, the developer has allowed for a minimum parking provision for apartment units. A total 56 parking spaces are proposed in a four level (2 basements + 2 above ground) carpark using the following allocation (indicative only):

- 1 carparks for 1 bedroom units
- 1 carpark per 2 bedroom units
- 2 carparks per 3 bedroom units
- 3 carparks per penthouse

4.2 Car Parking Requirements – Ground Floor Tenancy

ACDP (Table Adel/7) does not state a minimum parking requirement for non-residential developments located within the Capital City zone. As such no parking is provided on-site for the proposed ground floor tenancy.

4.3 Car Parking Requirements – Visitors

ACDP (Table Adel/7) does not specify the minimum parking provision for visitors for *Medium to High Scale Residential or Service Apartment* developments located within the Capital City zone. As such no visitor parking is provided on-site.

It is worth noting that ample on-street parking (1P & 2P, ticketed and ½ P free) is available within the immediate vicinity of the development site (on both sides of Hutt Street). On-street (ticketed) parking is also available on East Terrace/Bartels Road and Pirie Street within a couple of hundred metres from the development site. Visitors to the proposed development (residences and ground floor tenancy) will be able to use the available on-street parking in the close vicinity.

4.4 Bicycle parking

4.4.1 Residential Component

Table Adel/6 of the Adelaide City Development Plan (ACDP) provides rates for bicycle parking provision for various land uses summarised below:

All Low, Medium and High Scale Residential Developments –

- 1 space for every dwelling/apartment with a total floor area less than 150 square metres
- 2 spaces for every dwelling/apartment with a total floor area greater than 150 square metres
- 1 visitor space for every 10 dwellings

The proposed residential development with a total of 30 apartments less than 150 m^2 in area and eight apartments greater than 150m^2 would require a total of 46 bicycle parking spaces for residents and 4 bicycle parking spaces for visitors.

It is understood that residents will be provided bicycle parking area on level 2 which is accessible via Lifts. Six bicycle parking spaces accessible for visitor use will be provided on the ground floor and will be accessible from East Terrace (EW).

4.4.2 Ground Level Tenancies

A café/restaurant/bar type tenancy (220 m^2) is proposed on the Ground Level.

Table Adel/6 of the Adelaide City Development Plan (ACDP) provides rates for bicycle parking provision for various land uses summarised below:

Café/Restaurant –

- 1 space per 20 employees – for employees
- 1 space per 50 seats – for customers/visitors

The proposed café/restaurant with (up to 100 seats) is estimated to require 3 bicycle parking spaces.

It is envisaged this will share the 6 spaces accessible for visitor use from East Terrace (EW). It is noted there is a shortfall of one space, however there is nearby bicycle parking available on-street on the south west corner of the Hutt Street and Pirie Street intersection and opportunity for further on-street bicycle spaces to be provided with the setback from the property boundary that this development offers.

All bicycle parking provision shall be designed in accordance with Australian Standard *AS2890.3 – Bicycle Parking*.

5 Traffic Impact Assessment

5.1 Trip generation – Existing Land Uses

The Department of Planning, Transport and Infrastructure publication "Trip generation rates for the assessment of development proposals", September 2013 provides ready to use trip generation rates for selected land uses. Trip generation rates provided for *Office and Commercial* in the DPTI publication are provided at 15.85 daily trips and 2.02 peak hour trips /100m^2, however they are listed as requiring further investigation.

For this reason, data provided by the RMS Guide to Traffic Generating Developments (Updated traffic surveys 2013) is used, with updated rates for Office blocks being:

- Morning Peak Hour Trips = 1.6 trips/100m^2
- Evening Peak Hour Trips = 1.2 trips/100m^2
- Daily Trips = 11 trips/100m^2

As mentioned previously, the existing building has two floors of commercial/office tenancies. With a total leasable area more than 600m^2, the existing site is estimated to generate traffic movements as listed below in Table 4.

Table 4 - Existing development traffic generation estimate

Time	Trips
Daily	66
Morning Peak	10
Evening Peak	7

The existing land uses of the subject site were estimated to generate in the order of 10 trips during morning peak, 7 trips during evening peak hours and up to 66 trips per day.

Where peak hour trips were not accommodated on site via Cleo Lane, they are assumed to use on-street parking along Hutt Street and/or Pirie Street.

5.2 Trip generation – Proposed mixed-use development

The aforementioned DPTI trip generation document can also be used to calculate trip generation rates for medium density residential developments. However, no trip generation rates for high-density residential developments were available in this DPTI publication.

InfraPlan have therefore referred to the RMS Guide to Traffic Generating Developments (Updated traffic surveys 2013) for rates applicable to high-density residential developments. It is noted that these

survey values are recorded for Sydney based properties. For applicability to Adelaide, these averages were multiplied by 1.5 which falls within the upper range of survey responses provided.

Since the number of dwellings is not directly linked to the number of car parking spaces and hence, car trips, an additional calculation was also undertaken based on the number of car parking spaces when estimating the trip generation.

Table 5: Trip Generation Estimate

RTA - Land Use	Weekday Daily	Weekday AM Peak	Weekday PM Peak	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
	Trips / Dwelling Unit or Car Space					
38 dwelling units	2.28	.29	.22	87	11	9
56 parking spaces	2.02	.22	.18	113	12	10

Using the higher estimate based on the number of parking spaces provided, the proposed development is estimated to generate 12 trips during morning peak hour and 10 trips during afternoon peak hour.

While no splits for in/out were readily available, InfraPlan have assumed the following splits

- Morning peak hour – 80% departing, 20% arriving
- Afternoon peak hour – 20% departing, 80% arriving

This translates into

- 10 vehicles departing, 2 arriving during morning peak hour
- 2 vehicles departing, 8 arriving during afternoon peak hour.

It is important to note that the proposed carpark will be split into basement and above ground carparks with equal capacity. In other words, 28 carparks in the basement and 28 carparks in above ground parking levels. Applying this split to trip generation the following is estimated:

Table 6: Arrival Departure Pattern – proposed development

Parking Level	AM Peak Hour		PM Peak Hour	
	Arriving	Leaving	Arriving	Leaving
Basement Carpark	1	5	4	1
Above Ground Carpark	1	5	4	1
Sub-total	2	10	8	2
Total Trips	**12**		**10**	

5.3 Trip Distribution

As per the 2011 census, more than half (55%) of the residents in Adelaide CBD are reported to work within the CBD. Consistent with census data, the proposed residential development is envisaged to have the majority of residents working within the Adelaide CBD.

Assuming a 60-40 split for vehicular trips (60% out of CBD, 40% within CBD), the proposed development was estimated to have:

- 5 trips during morning peak hour to/from Adelaide CBD
- 7 trips during morning peak hour to/from outside Adelaide CBD
- 4 trips during afternoon peak hour to/from Adelaide CBD and
- 6 trips during afternoon peak hour to/from outside Adelaide CBD

5.4 Net change in Trip Generation

As mentioned previously, the existing property has office tenancies with 6 carparks accessible from Cleo Lane. The existing site is estimated to generate up to 10 trips during the morning (arriving) and 7 during the evening peak hours (leaving).

Discounting for trips generated from the existing site, the proposed residential development is estimated to generate 2 new trips during the morning peak hour and 3 new trips during the afternoon peak hour. Net change in trip generation is deemed negligible in consideration of Cleo Lane being widened for two-way traffic movement.

In terms of daily trips generated, the proposed development would result in an extra 47 trips over the existing office facility. This increase is largely to occur outside of peak times and as such will have a negligible impact on the adjacent signalised intersection.

Summary

The proposed mixed-use (residential/commercial) development is estimated to generate 2 additional trips during the morning peak hour and 3 new trips during the afternoon peak hour compared to existing office development.

It is envisaged that the arrival/departure pattern would be reversed as a result of proposed development (office → residential).

Daily trips generated by the proposed development were estimated to be more than the current land use, but are likely to occur outside of peak times and have a negligible effect on the surrounding road network.

5.5 Local Area Traffic Impacts

As explained above, the proposed development was estimated to generate 2 new trips during the morning peak hour and 3 new trips during the afternoon peak hour. However, the arrival/departure pattern will be reversed compared to existing traffic. As such, traffic generated by the development will be departing (leaving the site) during the morning peak hour and arriving in the afternoon peak hour.

It is important to note that the departing trips in the morning peak hour will be exiting from Cleo Lane onto East Terrace. These trips will be left-out only thus merging with traffic in the left-turn lane on East Terrace, approaching the signalised intersection at East Terrace/Pirie St/Hutt Street. The only concern is that if an

exiting vehicle intends to cross over into the through lane, it will be dependent on the courtesy of other motorists travelling along East Terrace (EW)/Bartels Road to allow an exiting vehicle to cross over into the through lane. This is not dissimilar to a number of locations within Adelaide CBD.

As stated above, the proposed development was estimated to generate negligible trips during peak hour. Therefore no additional Sidra intersection assessment was undertaken.

In summary, the proposed development is estimated to result in negligible new trip generation during peak hours and therefore negligible impacts to the surrounding road network are envisaged.

6 Compliance with Standards

The proposed carpark was assessed as *User Class 1A – Residential, Domestic and Employee Parking* for compliance with relevant Australian Standards and Guidelines.

6.1 Car park access

6.1.1 Cleo Lane Access

As mentioned in this report (see Section 4) Cleo Lane will be widened to support a two-lane, two-way traffic movement. Access to the basement carpark will be provided from Cleo Lane.

The proposed single lane ramp access will be 3.6m wide (wall to wall) which is deemed compliant with AS2890.1 requirements for a single lane driveway/access point.

The subject single lane ramp access will also be provided with a 4.0m kerb radius at ground level to facilitate efficient maneuvering of an exiting vehicle such that there is no disruption to southbound traffic (or a vehicle waiting to enter the subject carpark).

Refer to Figure 5 overleaf for details on Cleo Lane access dimensions.

6.2 Car parking bays

The car park was assessed as User Class 1A (Table 1.1, AS2890.1), comprising residential parking only. Class 1A requires the following minimum dimensions for the provision of 90° parking bays:

- 2.4m wide x 5.4m long – large car bays
- 2.3m wide x 5.0m long – small car bays
- 5.8m wide aisles

The proposed carpark will have two basement parking levels and two above ground parking levels, each utilising 90° parking. The number of parks on each level is as follows:

Basement 2:	10 standard	5 small	
Basement 1:	10 standard	3 small	
Level 1:	10 standard	1 small	2 accessible (unmarked)
Level 2:	13 standard	2 small	
Total:	43 standard	11 small	2 accessible (unmarked)

Each car park complies with AS2890 with the exception of the north west spaces provided where there is less than a 1.0m gap for overhang and maneuvering as required for a blind aisle. However, these were tested using a B85 vehicle and are functionally accessible for both forward and reversing movements, without use of the ramp opposite (which can be used as a turning area). This is demonstrated in Appendix D, Figure 7 (a) & (b).

Table 7 of the Adelaide City Development Plan specifies that for 15 spaces provided, 1 space should function as a car space suitable for use by people with disabilities and other people with small children and prams. Additionally, every second space provided with people with special needs shall be reserved for the exclusive use of people with disabilities (i.e. 1 in 30 spaces).

Based on the parking provision of 56 vehicles, the car park should provide 2x accessible (unmarked) and 1x accessible (marked for exclusive use). The current layout of the car park does not explicitly provide for accessible parking spaces.

Given that there is no minimum parking requirement for this development, it being primarily residential in use and subsequently only for private use, it is considered reasonable that no accessible parking bays are provided. If required by a tenant of the building in future, existing parking bays can be converted (at the loss of one parking space) to provide for accessible use with a shared space as in the figure below.

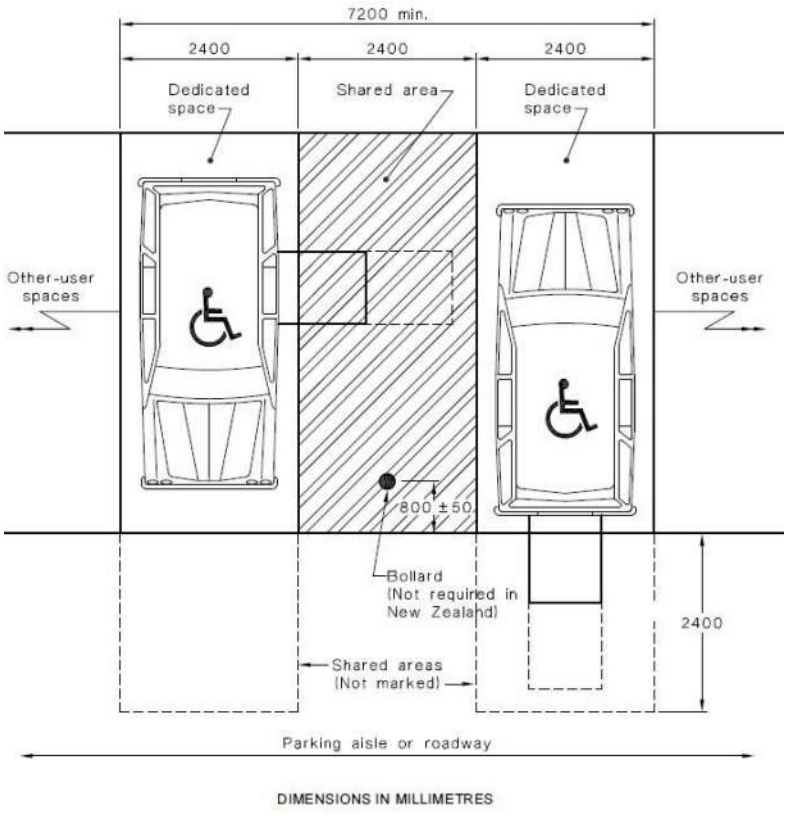


Figure 5 - Example of exclusive accessible provision if required in future

6.3 Car Park Ramp System

The car park is proposed to have single lane, reversible ramp system with access and egress controlled by a signalling system.

Ramps to both upper and lower parking levels are proposed to be 3.6m wide – clear width provided between walls as can be seen in the figure below. Additionally, this was checked using a B99 vehicle using AutoTrack software and facilitates this vehicle.

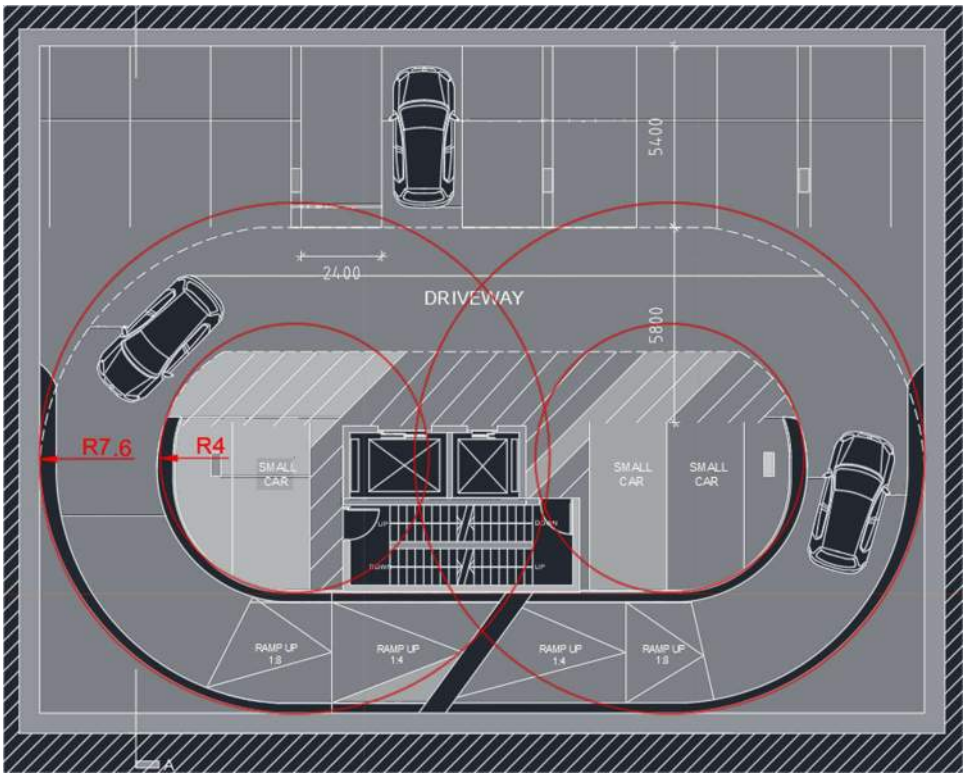


Figure 6 - Curved ramp dimensions

Changes of grade in the car park is primarily provided along straight sections of ramps. Details of ramps slopes proposed are summarised below:

	Floor to Floor Height	Transition Ramp at bottom end	Ramp Main Section	Transition ramp at top end
Basement 2 to Basement 1	2.85m	2.5m @ 1 in 8 (12.5%) slope	8.8m @ 1 in 4 (25%) slope	2m @ 1 in 8 (12.5%) slope
Basement 1 to Ground Level	2.85m	2.5m @ 1 in 8 (12.5%) slope	8.8m @ 1 in 4 (25%) slope	2.3m @ 1 in 8 (12.5%) slope
Ground Level to Mezzanine Level	3.8m	2.5m @ 1 in 10 (10%) slope	14m @ 1 in 4 (25%) slope	2m @ 1 in 8 (12.5%) slope
Mezzanine to Parking Level 1	2.7m	2m @ 1 in 10 (10%) slope	11.5m @ 1 in 5 (20%) slope	2m @ 1 in 10 (10%) slope
Parking Level 1 to Parking Level 2	2.7m	2m @ 1 in 10 (10%) slope	11.5m @ 1 in 5 (20%) slope	2m @ 1 in 10 (10%) slope

The grade change in the proposed ramp system has appropriate change of grade with no change greater than 1/8 and each grade change transition being greater than 2.0m in length. The proposed ramp system was deemed to comply with AS2890.1-2004 and AS2890.06-2009 requirements.

6.4 Circulation and Access Control

6.4.1 Circulation

As mentioned previously, a single lane reversible ramp system is proposed that would result in the following circulation pattern:

Circulation Pattern	Entering	Exiting
Basement 2 to Basement 1	Clockwise	Anti-clockwise
Basement 1 to Ground Level	Clockwise	Anti-clockwise
Ground Level to Mezzanine Level	Anti-clockwise	Clockwise
Mezzanine to Parking Level 1	Anti-clockwise	Clockwise
Parking Level 1 to Parking Level 2	Anti-clockwise	Clockwise

6.4.2 Access Control System

The proposed carpark will require a signal system to control access, circulation on each parking level and egress from the carpark.

The following guiding principles are proposed for the access control signal system.

1. The proposed carpark will be reserved only for residents of the proposed development
2. Each vehicle will be provided with a remote access key (remote control)
3. Entering vehicles will get priority over exiting vehicles.
4. A set of Green & Red lights will be installed at both ramps – to Upper and Basement parking levels
5. Only one vehicle will be allowed to use a ramp system at any given time with the following exemptions:
    a) In case of multiple entering vehicles, a predefined gap will be introduced between two vehicles to allow the leading vehicle to travel and park in the designated car park;
    b) In case of multiple exiting vehicles (with no entering vehicle) a predefined gap will be introduced between two vehicles to allow for safe exit;
    c) In case an "Entry Call" is registered in between two successive Exit Calls, an exiting vehicle which has already entered the ramp system will be allowed to exit safely and following Exit Calls will be delayed with priority given to the entering vehicle;
6. One-way circulation is proposed – thus no passing of vehicles on any parking level;
7. Sensors/detection loops will be required on both ends of ramps on each parking level to detect vehicle movement.

Exiting Traffic

1. An exiting resident, upon exiting from the lift on their parking level, will register an "Exit Call" using their remote access key;
2. Once a "Green" signal is displayed the motorist will be able exit from their parking bay and start travel towards Ground Level;
3. Priority will be given to entering vehicles to minimise impact on traffic movements in Cleo Lane. In a scenario where an entering vehicle has already entered the ramp system, an exiting vehicle

shall be made to wait until the entering vehicle has reached its parking level and completed their parking manoeuvre.

Entering Traffic

1. An arriving vehicle will have a "Green" signal at all times except when an exiting vehicle has already registered an "Exit Call";
2. In such a scenario (Red light for arriving vehicle), the arriving vehicle will register an "Entry Call" by using their remote access key;
3. An arriving vehicle can wait in Cleo Lane allowing the exiting vehicle to exit safely;
4. An *Out of Turn Exit Manoeuvre* would be where a motorist pulls out of the parking bay after registering an "exit" call but before getting the "Green" signal to exit, while another vehicle is using the ramp system. There is sufficient space for such an out of turn vehicle to pull out of the travel path of the other vehicle using the ramp system.

With a two way aisle width provided, there is sufficient room for two vehicles to pass or wait as required by the system. These principles provide a basic framework for the proposed single lane, reversible ramp system to function efficiently. The proposed access control system will be refined at the detailed design stage.

6.4.3 Signal Cycle Calculations

The following assumptions were made when estimating travel times between various parking levels.

- Vehicle Travel Speed
  - On Ramp = 8 km/hr
  - On parking level = 10 km/hr
- Ramp length (GL to Level 1) = 60m (approx.)
- Ramp length = 30m (approx.)
- Parking floor length = 30m (approx.)
- Time to park/retrieve vehicle = 30 seconds

Using the above information, the following time estimates were prepared:

Table 7: Car park movement time estimates

		Entering →		
		GL	B1	B2
	GL		52	74
	B1	52		52
Exiting ↑	B2	74	52	

		Entering →		
		GL	UL1	UL2
	GL		63	96
	UL1	63		63
Exiting ↑	UL2	96	63	

Refer to **Appendix C** for detailed calculations.

An entering/exiting vehicle to/from basement parking levels was estimated to require less than 75 seconds (1.25 minutes) to complete the manoeuvre. Thus, in a worst-case scenario, the maximum duration an entering vehicle (travelling to basement parking levels) will be required to wait on Cleo Lane was estimated to be less than 75 seconds (1.25 minutes).

An entering/exiting vehicle to/from the Upper Parking Levels is estimated to require less than 100 seconds (1.66 minutes) to complete the manoeuvre. Thus, in a worst-case scenario, the maximum duration an entering vehicle (travelling to Upper Levels) will be required to wait on Cleo Lane was estimated to be 100 seconds (1.66 minutes).

Sensors installed at either end of the ramps on all levels will be used to determine if vehicles (entering/exiting) have cleared the ramp system. A minimum clearance gap will be included between all entry and exit calls.

Queuing

Using Steady State queuing in accordance with Austroads Part 2 – Traffic Theory, the queuing space requirement is calculated as described below.

- Signal Duration = 100 seconds (worst case – upper levels)
- Service Rate = 36 vehicles/hour (3600/100)
- PM Peak Hour arrival rate = 5 vehicles (refer Table 6)

Based on these figures there would be a 1.9% chance that a vehicle would be required to wait for another vehicle at any given time. Thus, no queuing space would be required even in a series of conservative scenario as the number of entering vehicles is significantly less than the system service rate for vehicles travelling to/from upper level parking.

The proposed widening of Cleo Lane will allow for two-way movements. In case a vehicle is waiting to enter the proposed development car park, other local vehicles will be able to pass the waiting vehicle safely. This is not possible under exiting conditions with Cleo Lane only one lane wide.

It should be noted that the service rate mentioned above is calculated using 100 seconds per movement. Once an "entry" call is registered by an arriving vehicle; all exit calls will be superseded. Furthermore, the probability of two vehicles arriving is extremely low (less than 0.05%). Therefore, queuing is unlikely to occur on Cleo Lane.

6.5 Columns

Indicative column dimensions and locations provided by tectvs have been assessed and found to be in general compliance with AS2890.1 requirements.

It is recommended that column locations (in detailed design stage) be designed in accordance with the design envelope as per AS 2890.1:2004 requirements.

6.6 Headroom

It is understood that a floor to floor height of a minimum 2.7m is proposed for all parking levels, above ground and basement. The proposed ramp system was assessed to have a minimum 2.3m vertical clearance in accordance with AS2890.1-2004 requirements.

It is recommended that the proposed car park shall have a minimum vertical clearance of:

- 2.2m between the floor and any overhead obstruction (if lower than ceiling) for all parking spaces excluding accessible parking bays.
- 2.5m between the floor and any overhead obstruction (if lower than ceiling) for all car parks for people with disabilities.

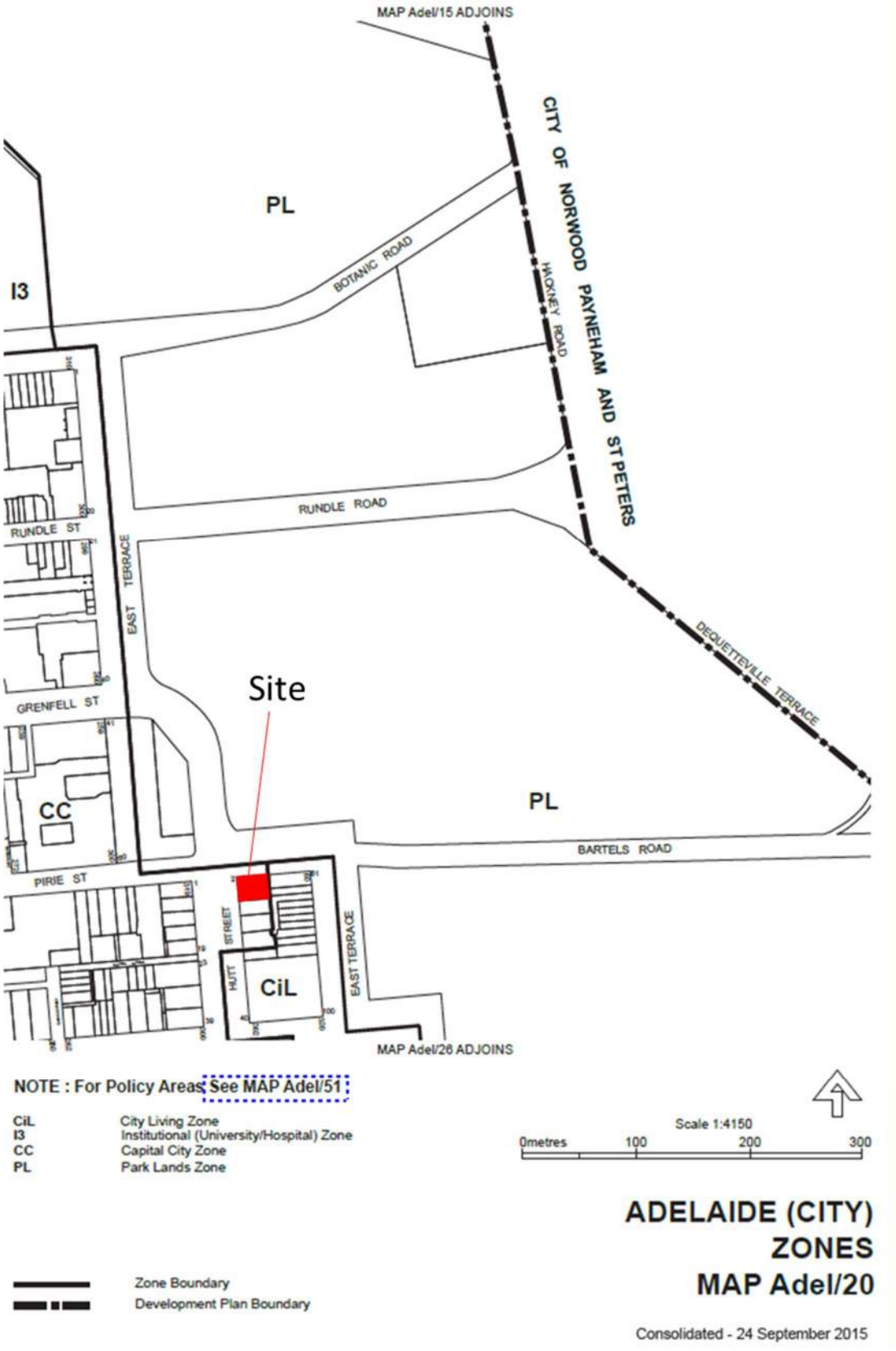
7 Summary and Conclusion

The proposed mixed-use (residential + retail) development has been assessed for accessibility, parking provision and traffic impact on the surrounding street network. A summary of the findings of this assessment is presented below.

1. The subject development will replace existing commercial tenancies with a mixed use residential and commercial development;
2. The development proposal includes a building setback of 3.0m along Cleo Lane to facilitate two-way traffic movement along the property boundary;
3. The proposed building setback on Cleo Lane is envisaged to improve access for other residences having parking access from Cleo Lane;
4. No changes are proposed to traffic movements at the existing Cleo Lane access, which will continue to operate as left-in-left-out only;
5. The proposed development will have negligible impact on the surrounding road network in terms of trips generated.
6. The subject development will eliminate six at-grade off-street carparks accessible from Cleo Lane;
7. A total 56 parking spaces are proposed in two sections – basement and above ground parking levels;
8. No visitor parking is proposed on-site, visitors can use existing on-street carparks along Hutt Street, Pirie Street and Bartels Road;
9. Existing access to at grade carparks from Cleo Lane will be replaced by two single lane ramps providing access to the basement and upper parking levels;
10. The proposed carpark will require a signalling system to allow for and control one-way, reversible movements. Guiding principles for designing such a signalling system are provided in this report and shall be reviewed at the detailed design stage;
11. A total of 53 bicycle parking spaces (46 for residents and 7 for visitors/customers) are required for the proposed development with 38 dwelling units and ground floor tenancy;
12. 46 bicycle parking spaces for residents will be provided on Level 2, accessible via lifts. 6 visitor cycle parking spaces will be provided on site with the one shortfall to use existing or future on-street bicycle parking spaces in the vicinity.
13. All bicycle parking provision shall be in compliance with *AS2890.3 – Bicycle Parking*
14. The proposed carpark design was assessed and found to be in general compliance with Australian Standards. Any deviation from standards have been identified and mitigation measures recommended to improve compliance.
15. A waste storage area is proposed on ground level with vehicular access from Cleo Lane. Please refer to the separate Waste Management Report for details on the proposed Waste Management System.

On the basis of the issues investigated, it is considered that the proposed development is supported from a transport and parking perspective.

Appendix A: Relevant Development Plan Zone Maps



Appendix B: SIDRA Intersection Outputs

MOVEMENT SUMMARY

Site: East Tce - Hutt St - Pirie St_2015 AM Peak

East Tce - Hutt St - Pirie St_2015 AM Peak
Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Hutt St											
1	L2	135	1.6	0.375	21.7	LOS C	8.8	62.6	0.67	0.66	30.7
2	T1	500	2.9	0.375	17.0	LOS B	10.5	75.1	0.67	0.60	27.2
3	R2	427	1.5	0.288	25.7	LOS C	6.9	49.2	0.71	0.75	34.2
Approach		1062	2.2	0.375	21.1	LOS C	10.5	75.1	0.68	0.67	31.3
East: East Tce/Bartels Rd											
4	L2	681	0.8	1.090	160.3	LOS F	70.2	494.4	1.00	1.37	11.5
5	T1	325	0.0	0.565	33.2	LOS C	13.5	94.3	0.90	0.79	34.4
6	R2	237	4.9	1.117	179.8	LOS F	24.6	179.2	1.00	1.47	10.8
Approach		1243	1.4	1.117	130.7	LOS F	70.2	494.4	0.97	1.24	14.3
North: East Tce											
7	L2	144	5.1	0.118	6.4	LOS A	1.3	9.5	0.26	0.58	48.5
8	T1	523	2.6	0.990	84.4	LOS F	18.4	131.6	1.00	1.31	10.0
9	R2	38	2.8	0.352	56.8	LOS E	1.9	13.7	0.99	0.73	18.4
Approach		705	3.1	0.990	66.9	LOS E	18.4	131.6	0.85	1.13	14.7
West: Pirie St											
10	L2	25	8.3	0.370	48.9	LOS D	4.1	29.5	0.96	0.75	20.9
11	T1	156	0.7	0.370	44.3	LOS D	4.2	29.8	0.96	0.75	30.5
12	R2	35	6.1	0.201	48.4	LOS D	1.6	11.7	0.93	0.73	19.7
Approach		216	2.4	0.370	45.5	LOS D	4.2	29.8	0.95	0.75	28.0
All Vehicles		3226	2.1	1.117	75.0	LOS E	70.2	494.4	0.85	0.99	17.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	36.2	LOS D	0.1	0.1	0.85	0.85
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.61	0.61
All Pedestrians		211	35.9	LOS D			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: INFRAPLAN (AUST) PTY LTD. | Processed: Friday, 22 July 2016 2:15:13 PM
Project: X:\Projects\2016_Projects\IP16.017 Hutt Street Mixed Use Dev\Outputs\TIA\2 Hutt Street.sip6

MOVEMENT SUMMARY

Site: East Tce - Hutt St - Pirie St_2015 PAM Peak

East Tce - Hutt St - Pirie St_2015 PM Peak
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Hutt St											
1	L2	52	0.0	0.280	18.9	LOS B	5.0	35.5	0.66	0.60	33.1
2	T1	401	2.1	0.280	14.3	LOS B	5.9	42.1	0.66	0.57	29.4
3	R2	1009	0.2	1.057	137.5	LOS F	42.5	297.8	1.00	1.48	12.9
Approach		1462	0.7	1.057	99.5	LOS F	42.5	297.8	0.89	1.20	14.3
East: East Tce/Bartels Rd											
4	L2	468	0.4	0.643	26.6	LOS C	14.9	104.8	0.86	0.84	34.3
5	T1	168	0.6	0.320	26.4	LOS C	5.3	37.3	0.84	0.72	37.3
6	R2	117	8.1	0.901	57.6	LOS E	5.5	41.5	1.00	1.03	24.0
Approach		754	1.7	0.901	31.4	LOS C	14.9	104.8	0.88	0.84	32.9
North: East Tce											
7	L2	272	4.3	0.445	23.6	LOS C	7.7	56.2	0.82	0.77	36.0
8	T1	443	1.7	0.849	44.1	LOS D	9.8	69.5	1.00	1.02	16.2
9	R2	19	0.0	0.138	44.2	LOS D	0.7	5.1	0.96	0.69	21.4
Approach		734	2.6	0.849	36.5	LOS D	9.8	69.5	0.93	0.92	23.8
West: Pirie St											
10	L2	40	2.6	1.039	110.2	LOS F	18.0	126.1	1.00	1.51	12.0
11	T1	466	0.0	1.039	105.7	LOS F	18.1	126.5	1.00	1.51	18.7
12	R2	67	0.0	0.502	46.1	LOS D	2.7	19.2	1.00	0.76	20.3
Approach		574	0.2	1.039	99.0	LOS F	18.1	126.5	1.00	1.42	18.4
All Vehicles		3523	1.2	1.057	71.7	LOS E	42.5	297.8	0.92	1.10	19.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P4	West Full Crossing	53	17.6	LOS B	0.1	0.1	0.66	0.66
All Pedestrians		211	29.9	LOS C			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: INFRAPLAN (AUST) PTY LTD. | Processed: Friday, 22 July 2016 2:15:35 PM
Project: X:\Projects\2016_Projects\IP16.017 Hutt Street Mixed Use Dev\Outputs\TIA\2 Hutt Street.sip6

Appendix C: Ramp System Travel Time Estimates

Rymill Apartments
2-6 Hutt Street
Carpark Travel Time Estimates

infraPlan
19.10.2017

Travel Time Calculations

Carpark Speed	10 km/h		
	2.8 m/s		
Ramp Speed	10 km/h		
	2.8 m/s		
Ramp Travel (d1) - GL to UL1	60 m	time taken	22 sec
Ramp Travel (d1) - all other levels	30 m	time taken	11 sec
Travel on parking floor (d2)	30 m	time taken	11 sec
GL to UL1 Travel			33 sec
Level to level Travel			22 sec
Parking Manoeuvre - IN or OUT (p1)		time taken	30 sec

(d1+d2) x no. of floors + p1		Total Time (Sec)
GL - Level 1	1	63
GL - Level 2	2	96

(d1+d2) x no. of floors + p1	Total Time (Sec)
GL - Basement 1	52
GL - Basement 2	74

PARKING MANOEUVRE TIMES - GL TO BEASEMENT

Entering → / Exiting ↓	GL	B1	B2
GL		52	74
B1	52		52
B2	74	52	

PARKING MANOEUVRE TIMES - GL TO UPPER LEVELS

Entering → / Exiting ↓	GL	UL1	UL2
GL		63	96
UL1	63		63
UL2	96	63	

Appendix D: Autotrack Turn Path & Design Envelopes

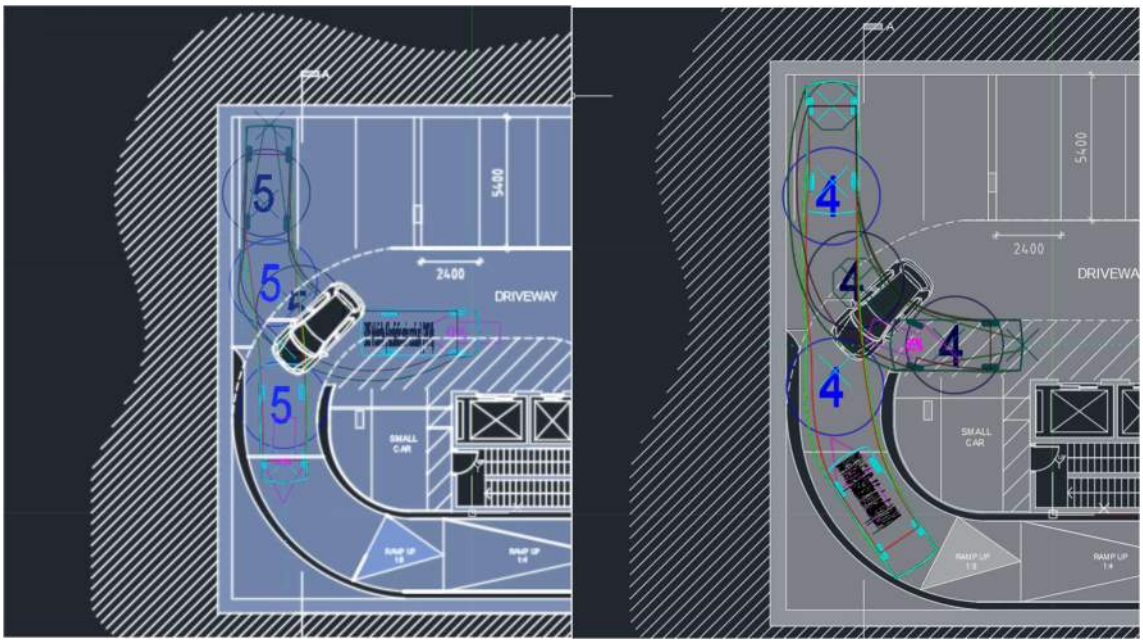


Figure 7 (a) & (b) - Front and reverse out, reverse in and front out (B2, B1, 1)

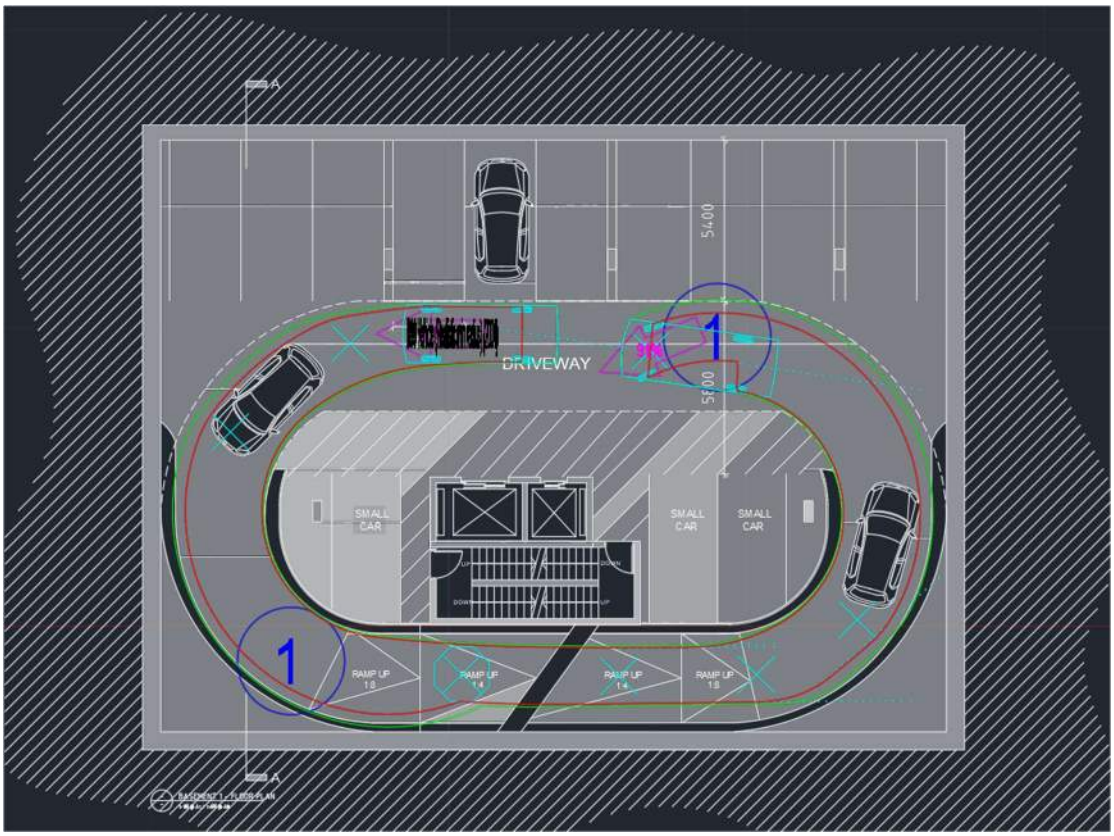


Figure 8 - B99 vehicle turning movement on ramp (all levels)

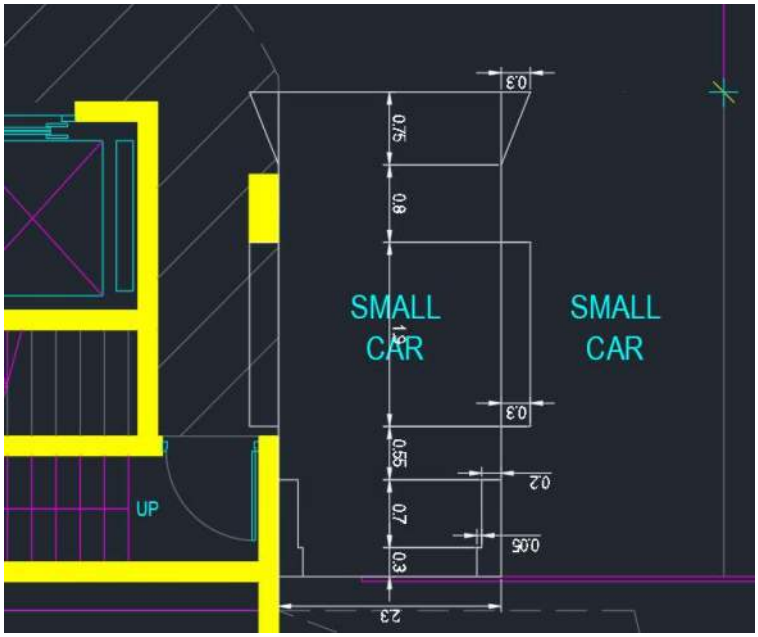


Figure 9 - Small car design vehicle envelope (B2)

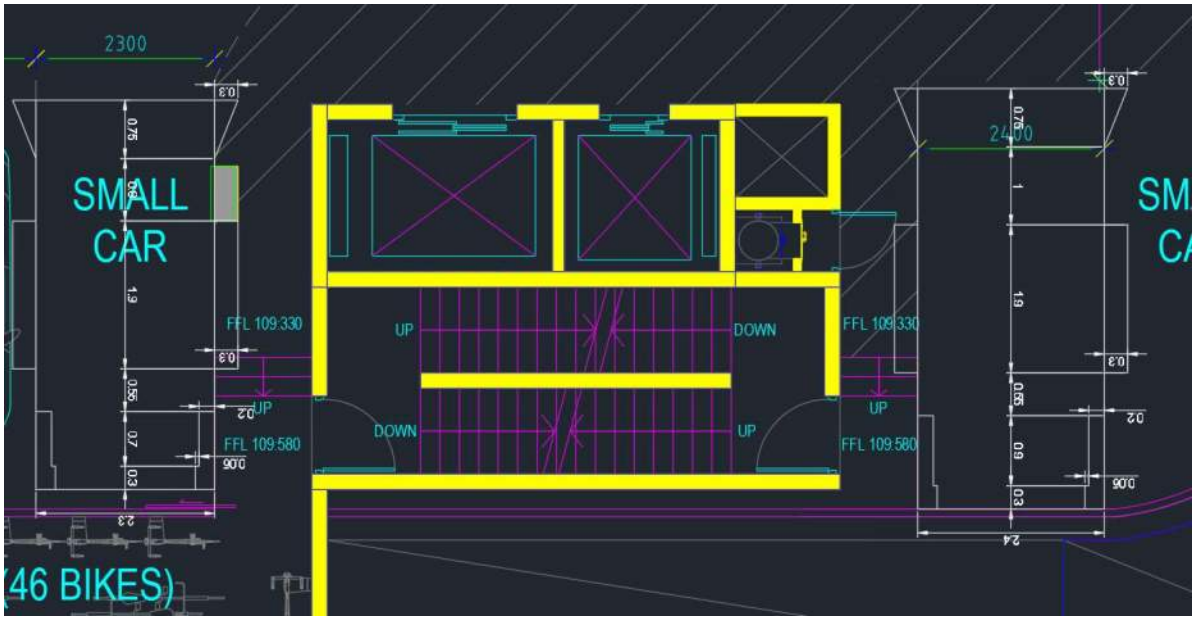


Figure 10 - Design car envelope: note lower level stair less at 125mm above ground with car door height around 200mm (1, 2)

infraPlan

policy – strategy – planning – infrastructure – transport – environment

Rymill Park Apartments
2-6 Hutt Street

Waste Management
Preliminary Draft Report

27 October 2017

Project Name	2-6 Hutt Street Mixed Use Development – Rymill Park Apartments
Client Contact Details	**Theo Maras** **Director – Maras Group** Level 3, Charlicks Building Ebenezer Place ADELAIDE SA 5000 E: theo.maras@marasgroup.com.au
Consultant Contact Details	**Erik Stopp** **Senior Transport Engineer** InfraPlan (Aust) Pty Ltd Level 3, 66 Wyatt Street Adelaide SA 5000 P: 08 8227 0372 M: 0433 199 593 E: erik@infraplan.com.au

Document Control					
Name:	**IP16.017_Hutt St Mixed Use Development_R0**				
Version	**Notes**	**Author**	**Date**	**Reviewer**	**Date**
0	Preliminary Draft for information only	AK	18.01.17		
1	Updated with Tectvs drawings Draft issue to Client	ES	19.10.17		

Table of Contents

1 Development Details

InfraPlan has been engaged by Maras Group to prepare a waste management plan for the proposed mixed-use residential + commercial development at 2 Hutt Street, Adelaide.

The proposed development includes a total 38 apartments and ground floor tenancies. Development details considered in preparing this report are provided below:

Land Use: Residential + Commercial

Site Area: 578 m^2

No. of Dwellings: 38

Dwellings per hectare: 660 dwellings per ha

The proposed development is considered as a *high density residential development* with a dwelling density greater than 75 dwellings per hectare (ha).

The proposed development would have a 220 m^2 retail and café/restaurant tenancies on the ground floor accessible from Hutt Street and East Terrace. A total of 56 carparks are proposed in 4 level car park accessible via Cleo Lane.

Figure 1: Location Map – proposed Rymill Apartments – Mixed use development

2 Type of Waste System

For the purpose of developing a waste management plan InfraPlan have referred to the "*Better Practice Guide Waste Management for Residential and Mixed Use Developments*" published by Zero Waste SA (ZWSA) in 2014.

The proposed development will be a high density development (10 or more dwellings). Thus, using ZWSA guidelines, a **Complex Waste Management System** is recommended for the proposed development.

To further promote tenant awareness of recyclable waste streams, the developer intends to provide an integrated bin system that will provide segregated compartments for the sorting of co-mingled recycling, non-recyclable waste & organic food waste streams.

Figure 2 below shows a typical bin system for all the units.

Figure 2: Hafele HAILO Trio Integrated Bin System (Typical)

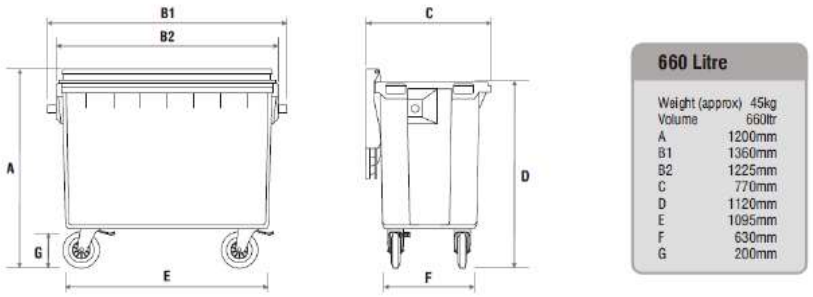
It is understood that a private waste operator will be engaged to collect & dispose of all co-mingled recycling, non-recyclable and organic food waste generated on site.

3 Waste System Sizing

3.1 Bin sizes

The following waste bins have been proposed for use at the subject development.

Table 1 - Waste Bin Sizes

Capacity	Dimensions	
1,100 Litres	1,360 L x 1,090 W x 1,390 H	
660 Litres	1,360 L x 770 W x 1,200 H	
240 Litres	730 L x 580 W x 1,060 H	
		 General Waste Co-mingled Recyclables Food/Organics

3.2 Projected Waste Generation and Storage provision

Ready to use *Waste Resource Generation Rates (WRGRs) by land use type* provided in Table C.2 of ZWSA guide were used to estimate waste generation from the proposed development.

The projected waste generation volumes from residential portion of the proposed development are presented in Table 2 and the café portion in Table 3 below.

Table 2 - Waste generation – Residential

WASTE STREAM (collection frequency)	ZWSA Waste Generation Rates [L/bedroom/week]	No of Bedrooms	Projected Weekly Waste Generation	Residential component	Total Waste Storage Capacity Provided
Non-recyclable waste to landfill (weekly)	30 L	**86**	**2,580 L/week**	**2 x 1,100 L 1 x 660 L**	**2,860 L**
Co-mingled recycling (weekly)	25 L	**86**	**2,150 L/week**	**2 x 1,100 L**	**2,200 L**
Organic [food] waste (weekly)	10 L	**86**	**860 L/week**	**1 x 660 L 1 x 240 L**	**900 L**

Table 3 - Waste generation: Commercial – Café/Restaurant tenancy (220m2)

WASTE STREAM (collection frequency)	ZWSA Waste Generation Rates [L/10m²/day]	Projected Weekly Waste Generation	Total Waste Storage required	Café component	Total Waste Storage Capacity Provided
Non-recyclable waste to landfill (twice weekly)	30 L	**4,620 L/week**	**2,310 L**	**2 x 1,100 L 1 x 240 L**	**2,440 L**
Co-mingled recycling (twice weekly)	20 L	**3,080 L/week**	**1,540 L**	**1 x 1,100 L 2 x 240 L**	**1,580 L**
Organic [food] waste (twice weekly)	40 L	**6,160 L/week**	**3,080 L**	**3 x 1,100 L**	**3,300 L**

This results in a total number of bins as presented in Table 4.

Table 4 - Total number of bins required

Number and Type of Bins Required	1,100L	660L	240L
Landfill	2x Res 2x Comm	1x Res	1x Comm
Recycling	2x Res 1x Comm		2x Comm
Organic	3x Comm	1x Res	1x Res
TOTAL	**10**	**2**	**4**

3.3 Hard Waste and e-waste

As per ZWSA guide, a total 29 m^3 area (38 dwellings x 0.77 m^3/dwelling) would be required to store hard waste for the proposed development. However, the City of Adelaide offers free, at-call hard waste collection service to residents. Considering that up to 12 at-call services (1 per month) can be availed by residents of the proposed development, a total 2.4 m^3 area would be required to store hard waste generated by the proposed development.

A 1.4m^2 area (approx.) is proposed within the bin storage area for storing *hard waste* and *e-waste*. The proposed bin storage area has a 3.5m floor to ceiling height. Thus, a total up to 4.9m^3 of space will be available to store hard waste within the bin storage area. This would reduce and possibly eliminate any unwanted furniture/bulk waste/e-waste items ending up kerbside.

4 Bin Storage Location

The bin storage area has been located centrally, adjacent to the lift lobby to ensure it can be readily accessed by residents/tenants. The storage area is located on the ground level with a 3.5m floor to ceiling height allowing for natural ventilation, it is however sheltered from the weather by the building above.

The bin storage area will be hard paved/concrete floor to facilitate easy maneuvering/wheeling of bins within and out of the storage area.

5 Bin Chute with Diverter system

The proposed development will have an integrated waste chute system. Access to the waste chute is proposed from the stair well on each floor. The proposed chute system will have an automated diverter that will segregate general waste and recyclable waste.

Key principles of the diverter system are listed below:

- Resident selects type of waste to be deposited – e.g. general waste or recyclable
- Put the waste in chute using door
- Waste is deposited in selected (general or recyclable) bin in the ground level bin storage area
- Tenants will be required to deposit large cardboard boxes/other recyclable items (larger than chute opening) in the ground level bin storage area.

The proposed system will require initial monitoring to determine the frequency for replacing filled bins by empty bins under the chute. An automated bin rotation system can also be installed subject to a detailed assessment at the detailed design stage.

Residents will be required to deposit organic waste on the ground level. Organic bins will be accessible from a door located in the lift lobby.

Café/restaurant will share the bin storage area with residents but will be provided with separate bins. Waste generated from the café/restaurant can be transferred using a direct access to the bin storage area.

Refer to Figure 3 (overleaf) for a typical chute diverter system.

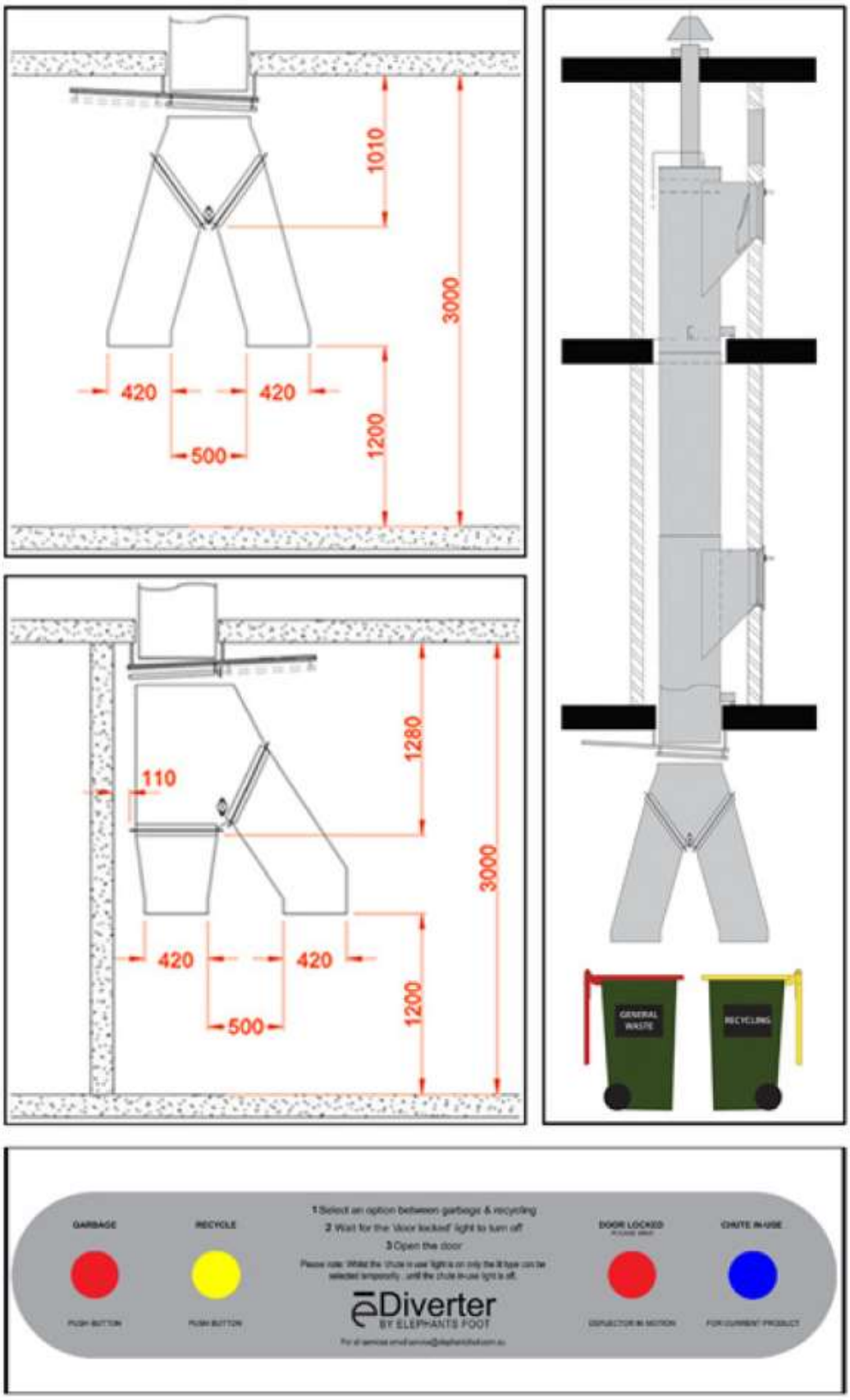


Figure 3: Typical waste chute diverter system (source: eDiverter system by Elephant's Foot)

6 Bin Presentation and collection time

6.1 Bin Presentation Area

A private contractor will be engaged to collect waste generated from the proposed development for both residential and commercial components (café/restaurant).

The proposed widening of Cleo Lane will enable a two-way traffic movement. The private operator vehicle will have to reverse into Cleo Lane from East Terrace and exit in a forward motion.

The private contractor will be required to wheel out filled bins from the bin storage area and wheel empty bins back into the bin storage area.

6.2 Collection Times

It is recommended that waste collection should be done outside peak periods (7-9am, 3-6pm) to minimise impact to traffic on the surrounding road network.

Please refer to **Figure 4** for a plan of the bin storage area and collection point.

7 Waste Collection Frequency and Method

7.1 Residential Waste

As mentioned previously, a private waste operator will be engaged to collect all waste streams: co-mingled recyclable, non-recyclable general waste and organic waste streams from the proposed development.

The three waste streams (General, Co-mingled Recyclables and Organics) from the residential component will be collected on a weekly basis.

On the day of collection, the private waste operator will wheel out filled bins for collection and wheel empty bins back in the bin storage area.

7.2 Café/Restaurant

Waste generated by the café/restaurant is proposed for twice a week collection.

Details of collection day will be finalised based on discussions between the café/restaurant tenancy and waste collector.

On the day of collection, the private waste operator will wheel out filled bins for collection and wheel empty bins back in the bin storage area.

7.3 Hard waste and e-waste

The City of Adelaide offers up to 12 free services (1 per month) to collect hard and e-waste from large residential developments. Residents/tenants of the proposed development can avail this free service by storing waste in the bin storage area or arrange for a private hard waste collection service.

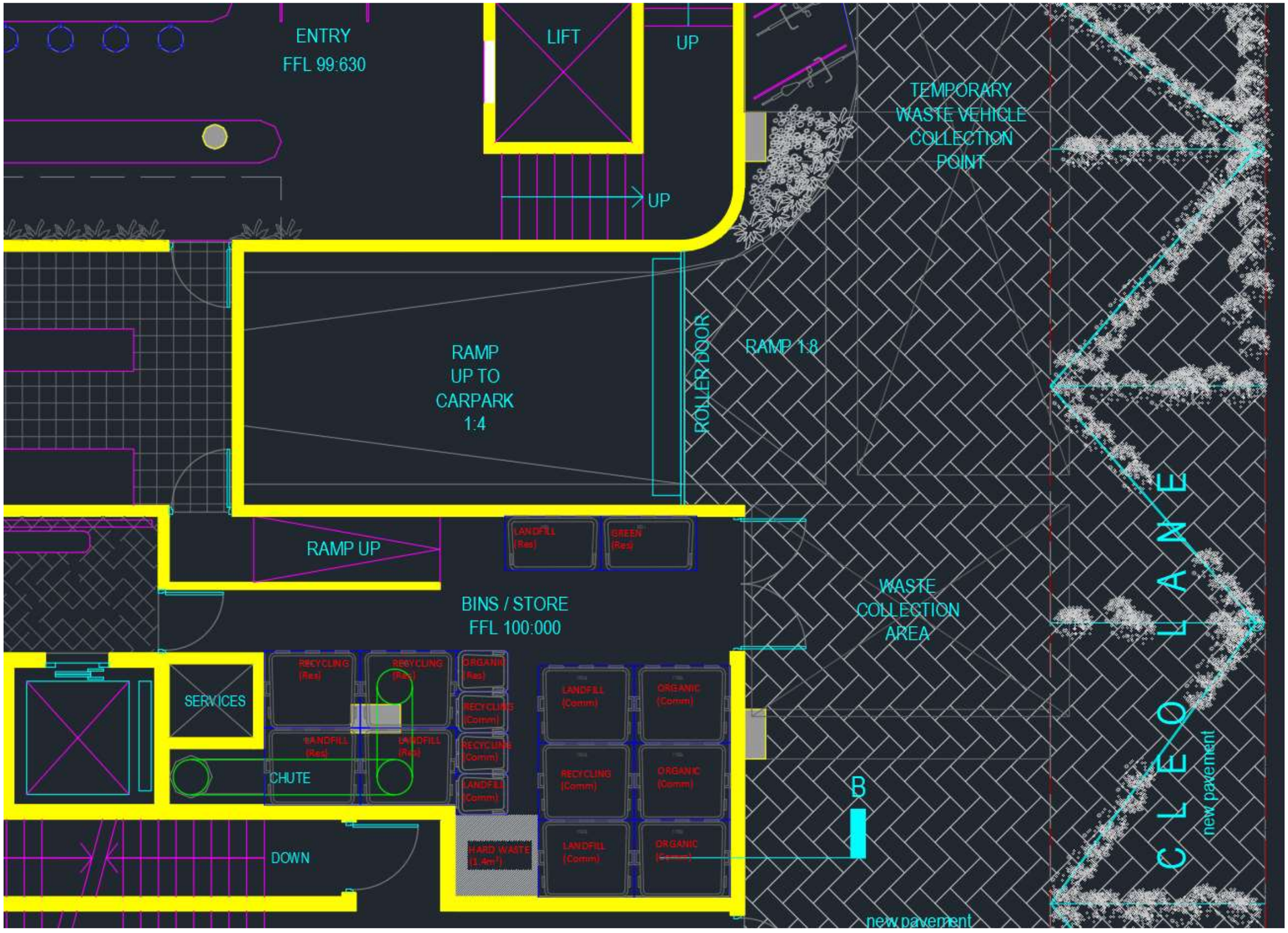


Figure 4: Bin Storage and Waste collection area

8 Conclusions

Based on the calculations and methodology presented in this report in relation to waste generation and collection at the proposed high density residential development at 2 Hutt Street in Adelaide, the following can be concluded:

- Waste generation for the proposed residential and retail development was estimated using Zero Waste SA guidelines.
- Using ZWSA guide, a Complex Waste Management System is recommended for the proposed high density mixed-use development
- A private waste collection operator will be engaged to collect waste generated from the proposed development
- Separate waste storage bins will be provided for residents and café/restaurant tenancy on the ground level.
- Residential waste is proposed for weekly collection; café/restaurant tenancy is proposed to have twice a week waste collection.
- Sufficient waste storage capacity for each of the three waste streams has been provisioned on-site to meet estimated waste generation demand.
- Sufficient Hard waste and e-waste storage area is provisioned within the bin storage area.
- Residents will be able to avail up to 12 per year, at call, free hard waste and e-waste service offered by ACC.
- The bin storage area will be centrally located near the lift lobby.
- A bin cleaning area has been provisioned within the bin storage area.
- In case a fully automatic system is not installed, a community attendant will be required to periodically monitor bin capacity under bin chutes and replace filled bins with empty bins.
- The attendant will also be responsible for upkeep of the bin storage area.
- Waste collection vehicles will have to reverse into Cleo Lane, temporarily blocking access to/from upper parking levels. It is recommended that bin collection times be strictly adhered to by the operator and be communicated to residents to minimise impacts to residents using upper parking levels.

The proposed number of bins are deemed sufficient for the proposed development for the stated collection frequency by private operator.

If you have any questions regarding the waste management plan presented in this report please contact us at 8227 0372 to discuss further.

Yours sincerely,

Erik Stopp
Senior Transport Engineer
InfraPlan (Aust) Pty. Ltd

Think beyond the square

ESD and Sustainability Consultants
Master Planning
Resource Management
Strategic Advice
Governance
Advocacy

Rymill Place

2 Hutt Street, Adelaide

Sustainability Strategy

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green building council australia
MEMBER 2016-2017

Document Control

Issue	Date	Change	Checked	Approved
1	24/7/17	First Draft issue	PD	DD
2	8/8/17	Updated following design development	PD	DD
3	18/9/17	Updated following adjustment of external shading element and addition of electro-chromic glass	PD	DD
4	31/10/17	Updated with roof PV layout and capacity review	PD	DD

Think beyond the square

Contents

1 Introduction

This report proposes the Sustainability Vision - the overriding principles which will be applied to the Rymill Place Development, and the Sustainability Strategies which will be employed to reduce the development's impact on the environment in both construction and operation.

This report is based on:

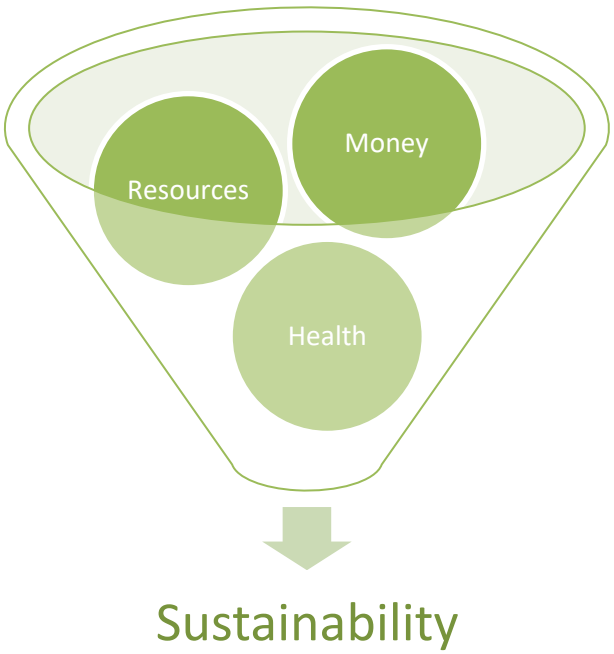
- a review of the building design and proposal summary prepared by Tectvs Architects;
- the commitments made at planning stage by the Client; and
- the results of computer building simulation modelling of a number of design options undertaken by dsquared.

The report has been prepared Paul Davy, a Director of consultancy firm dsquared. Paul has over 30 years' experience in the UK, Europe, Asia and Australia as an engineering, ESD, and sustainability consultant. Paul holds IEng and MCIBSE Accreditation, is a Green Star Certified Assessor, a Green Building Council of Australia Teaching Faculty Member, an Ambassador for the Living Futures Institute of Australia, and a member of the South Australian Government ODASA Design Review Panel.

2 Sustainability Guiding Principles

These are the Sustainability Guiding Principles for the Project:

- *That the development is attractive to residents, visitors and the surrounding community*
- *That the buildings are designed in accordance with best practice in sustainable development*
- *That the development encourages sustainable living within a high-quality environment*
- *That the development provides a positive social return on investment*
- *That the development promotes the notion of biodiversity at podium and street level*
- ***That the development delivers on the triple bottom line of sustainability:***
  Environmental, Economic, and Social



3 Sustainability Initiatives

3.1 Community and Social Sustainability

The following Community and Social Sustainability initiatives are included:

1. Connecting the building with the local environment and allowing the building to respond to the seasons.
2. Providing access to views from within the building to outside, from external vantage points to the environment, and into the building from outside to provide transparency and a visual connection between residents and the community and environment.
3. Provide easily accessible communal areas to both residents and visitors to the building.
4. Provide overt green walls and landscaping at podium and street levels to connect the indoor space with the outside and to promote the notion of urban biodiversity.

3.2 Water

The following Water initiatives are included:

1. Selecting water efficient fittings of a minimum 6 Star WELS rating for taps, 4 Star for WCs and 3 Star for showers.
2. Selecting appropriate landscape planting to minimise irrigation water use.
3. Providing rainwater storage and re-use systems for landscape and green wall irrigation.
4. Providing the firefighting systems with a test water recycling facility.

3.3 Transport

The following Transport initiatives are included:

1. Providing bicycle storage facilities for apartment residents and visitors, with a minimum of one secure rack provided per apartment. Additional racks will be provided for visitors at ground floor level.
2. Providing end of trip facilities for the retail and commercial tenants, including secure bicycle racks and locker space.
3. All apartment purchasers will be offered the option of the provision of an electric vehicle charge point at their car park space, in order to promote the de-carbonisation of Adelaide's transport network. Dependent upon the final size of PV array installed, a number of these points can be supplied with 100% renewable energy.

3.4 Energy

The building and systems design has been subject to optioneering using computer building simulation modelling techniques. The façade design has, in particular, been the subject of design option studies. The options considered and the results of the modelling undertaken are included in Section 4 of this report.

The following finalised Energy initiatives are included:

1. Active facade design - the use of high performance double glazing with integrated and adjustable interstitial blinds, access to daylight, and natural ventilation of the apartments to reduce energy demands. Electro-chromic glass has been incorporated in strategic locations to provide additional privacy and solar load reduction. The façade will include solar sensors and automated control of the interstitial blind systems to provide an active façade. Occupants will be have the ability to manually override the automated control of the blinds as required to suit their own requirements.
2. All common areas at Ground level and above will be naturally ventilated and provided with daylight access.
3. Electricity will be supplied via an inset (embedded) network, so that residents can benefit from the option of reduced electricity supply rates, and the ability to share renewable energy from the building solar PV array.
4. Daylight control to lighting systems in common areas.
5. Selection of energy efficient lighting fittings. All lighting will be LED.
6. Zoning the apartment air conditioning systems into functional areas (e.g. living rooms, bedrooms) and providing automatic and manual controls. All apartment air conditioning units will be inverter controlled and rated to the highest available Energy Star rating. All units can be operated in fan mode providing low energy air circulation.
7. Providing a kill switch to each apartment allowing a one touch isolation of all lighting and air conditioning power when the apartment is vacant.
8. Providing a 39kW roof mounted solar photovoltaic array. The array will be connected via the inset network so that it can benefit all residents and tenants in the development, but is sized to adequately provide renewable energy equivalent to 100% of the common area power needs, including car park ventilation.
9. Designing and certifying the apartments to achieve an energy performance at least 30% better than current Building Code minimum NatHERS rating of 6 Stars average, representing a dwelling average NatHERS Rating of 8 Stars.
10. Designing the tenancy and common areas to achieve an energy performance at least 30% better than a deemed to satisfy compliant space in accordance with the NCC/BCA Section J, JV3 methodology.
11. Using light coloured external finishes (in particular roof coverings) to reflect heat, reduce solar gain, and reduce the heat island effect.
12. Using solar gas boosted hot water systems, gas hobs, and European Energy Label A category ovens for cooking throughout in order to reduce peak electricity demands, reduce the overall development carbon footprint, and provide an economical amenity for apartment owners.

13. Providing a building energy management system with smart metering to automatically record and monitor the building's resource use and establish trends and profiles to assist with the ongoing control of energy use. This information will be made available on-line.
14. As far as practicable, designing the car park levels to be naturally ventilated. In areas where access to natural ventilation is not possible, the car parking will be mechanically ventilated but with a system designed using an engineered approach, with variable speed drives and carbon monoxide automatic control, to reduce fan energy use by 80% when compared to a conventional system.
15. Providing apartment owners with retractable clothes racks in their apartments, to minimise electric clothes drier use. These facilities will also minimise the incidence of clothes drying on exposed balconies.
16. Providing retail and commercial tenancy space air conditioning systems with an economy cycle control allowing 100% outside air to be used for free cooling purposes when external weather conditions allow.

3.5 Waste

The following Waste initiatives are included:

1. Construction waste will be minimised through efficient design techniques including standardisation and wherever practicable off site pre-fabrication.
2. All Construction waste will be managed via the implementation of an approved Environmental Management Plan.
3. A minimum of 90% of all construction waste will be diverted from landfill. All Construction waste will be sorted and binned on site to facilitate ease of recycling.
4. Each apartment kitchen will be designed to accommodate split bins for general, recycling, and compost waste.
5. The building will incorporate ventilated and weather proof storage facilities for the collection and disposal of general, recyclable, organic waste, bulky waste, and e-waste, which will be separated on site to facilitate ease of disposal for recycling.
6. A Waste chute will be provided for general waste and recycling waste movement for all apartment levels.

3.6 Indoor Environment Quality

The following Indoor Environment Quality initiatives are included:

1. Using paints, sealants, adhesives, carpets, coverings and furniture which have low off-gassing properties (low VOC, low formaldehyde).
2. Maximising access to daylight to all residential areas whilst minimising glare.
3. All dwellings will be fully naturally ventilated.
4. All common areas at ground level and above will be fully naturally cross ventilated.
5. Electro-chromic glass is provided to some glazing to improve occupant privacy.

3.7 Construction

The following Construction initiatives are included:

1. Selecting locally sourced materials wherever viable.
2. Selecting recycled and recovered materials wherever viable, particularly sourced from the local area in order to build in a recognition of the local area and heritage.
3. Selecting materials with a comparatively low embodied energy/carbon profile e.g. timber in preference to steel, where practicable.
4. Selecting building materials with a recycled material content e.g. thermal insulation, reinforcement bar, fly ash in concrete, recycled content floor coverings, where viable.
5. Using off site pre-fabrication techniques to reduce on site construction time, waste, and greenhouse gas emissions, wherever practicable.

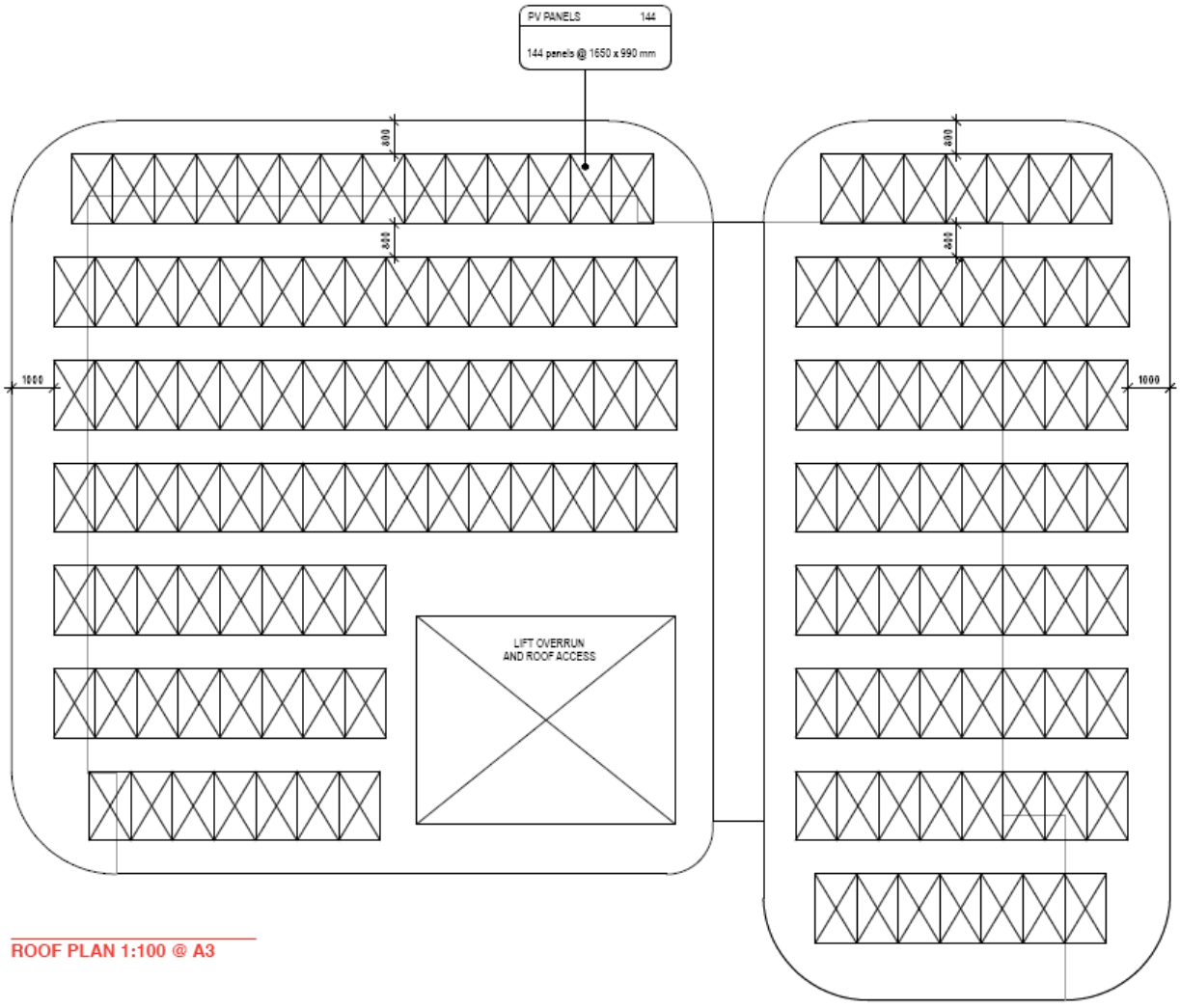
3.8 Landscape and Biodiversity

The following landscape and biodiversity initiatives are included:

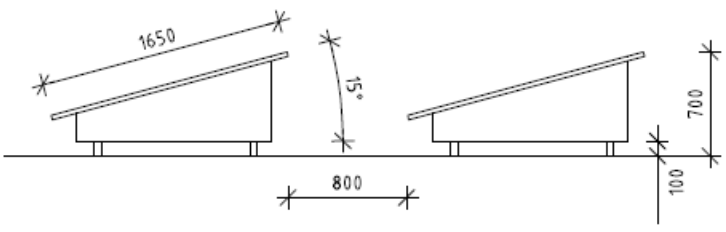
1. The strategic use of landscape and green walls in common terrace areas, to reduce the heat island effect at podium level, and to introduce the notion of biodiversity.
2. The use of extensive green walls at ground and podium levels, to reduce the internal heat loads, improve common area air quality, and to promote the notion of biodiversity.

4 Solar PV Design Development

The solar PV system has been subject to design development with the panel mounting angles, spacing, and general arrangement co-ordinated to maximise the potential renewable energy yield. This has resulted in the proposed deployment of a 144-panel array, with each panel having a plated capacity of 270W. The combined rated system capacity is therefore 39kW.



ROOF PLAN 1:100 @ A3



5 Façade Design Development

5.1 Introduction

The purpose of this section of the report is to summarise the results of the computer building simulation work that has been undertaken to inform the design development of the building façade.

5.2 Methodology

A typical mid-tower, west facing apartment has been modelled for the purposes of façade design development. The west elevation is considered to be subject to the most significant heat loads and so has been used to determine a worst-case scenario.

The building has been constructed as a dynamic model using IES Virtual Environments Software, which is a globally recognised leading software programme and BESTEST Certified. In addition, the apartments have been built using FirstRate 5 software, in order to generate a NaTHERS predicted rating for code compliance purposes.

The modelling has been undertaken following our third party verified quality management system, verified under the Green Building Council of Australia Recognised Provider programme.

Multiple façade design approaches have been modelled, in order to determine the relative merits of each façade design approach, and the modelling re-run until an optimal solution has been established.

5.3 Criteria

The following criteria has been applied to determine the options for modelling:

1. The glass reflectance needs to be “low” to avoid a reflective or mirror appearance *(reflectance therefore needs to be less than 20%),* and generally clear/neutral in colour *(to provide a residential rather than commercial building aesthetic).*

2. The materials and design approach used can be innovative, but needs to be practicable using Adelaide-based trades.

3. The materials and design approach needs to be affordable so that the project remains commercially viable.

4. In order to deliver the building aesthetic required by the Client and Tectvs, the inclusion of protruding horizontal or vertical shade systems is prohibited. The solution is required to maintain a “sheer” façade aesthetic.

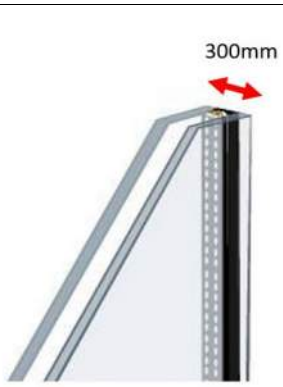
5. The finalised solution “meets ODASA requirements”. This is considered to be achieved if the finalised solution introduces an element of innovation to manage the load on west facing elevations.

6. The resultant NaTHERS rating is 7.0 Stars or higher (with 6.0 Stars average being the BCA minimum code compliance required).

5.4 Initial Options Modelling

The following options have been modelled:

Option		Description
1		As a reference case, with high performance single glazing only. Viridian Enviroshield ITO Neutral 54 (#4), 10.76mm thick. 6% reflectance. SHGC 0.44. - Does not meet ODASA requirements - Thermal load: 117.7 MJ/sqm - NaTHERS: 5.2 Stars *(does not comply with BCA)*
2		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. - Does not meet ODASA requirements - Thermal load: 72.4 MJ/sqm - NaTHERS: 6.9 Stars *(15% better than BCA)*
3		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm argon gap, 6mm clear. 11% reflectance. SHGC 0.27. - Does not meet ODASA requirements - Thermal load: 68.7 MJ/sqm - NaTHERS: 7.1 Stars *(18% better than BCA)*
4		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. Integrated adjustable interstitial venetian blind. *Note: the final system selection will have a deeper air gap to accommodate the blind system. A 12mm air gap has been modelled as a conservative scenario.* - Can be presented as an integrated, innovative solution – meeting ODASA requirements - Thermal load: 51.4 MJ/sqm - NaTHERS: 7.8 Stars *(30% better than BCA)*

Option		Description
5		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. 300mm deep reveal *(which could be a "lost" reveal between panes, to maintain the sheer appearance of the elevation).* - Does not meet ODASA requirements - Thermal load: 71.8 MJ/sqm - NaTHERS: 6.9 Stars *(15% better than BCA)*
6		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. Additional layer of 10.76mm laminated glass with a 50% frit (or alternatively a solar PV glass) to form a veil. - Meets with ODASA requirements - Thermal load: 61.7 MJ/sqm - NaTHERS: 7.3 Stars (22% better than BCA) - PV option generates 30,000 kWHr annually (30 T CO_2)
7		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. Introduce a 5° angle to the elevation *(either as a whole or with serrations).* - Potentially ODASA compliant as it is an alternative façade design and there are other Adelaide precedents *(e.g. University of Adelaide IPAS building)* - Thermal load: 71.1 MJ/sqm - NaTHERS: 6.9 Stars *(15% better than BCA)*

Option		Description
8		High performance insulated double glazing system. Chevron Cardinal (Neat) 6mm LoE^3-366, 12mm air gap, 6mm clear. 11% reflectance. SHGC 0.27. Apply an external green shading system. *This is assumed to be providing up to 50% shading to maintain occupant views to outside.* - Meets with ODASA requirements - Thermal load: 62.9 MJ/sqm - NaTHERS: 7.3 Stars *(22% better than BCA)*

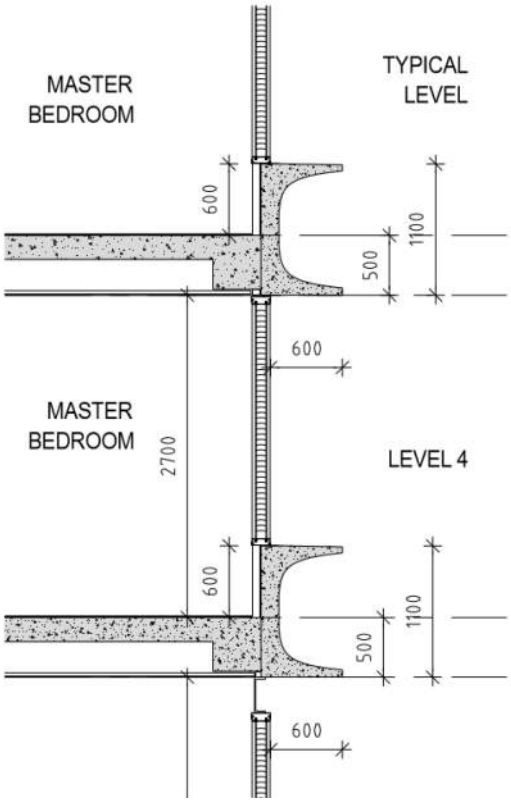
5.5 Comparison

The comparative performance results are as follows:

Option		ODASA Compliant	Thermal Load (MJ/sqm)	NaTHERS Rating (Stars)	% better than BCA
1	Single glazing	No	117.7	5.2	*(none)*
2	Double glazing – air filled	No	72.4	6.9	15%
3	Double glazing – argon filled	No	68.7	7.1	18%
4	**Double glazing – interstitial blinds**	**Yes**	**51.4**	**7.8**	**30%**
5	Double glazing – 300mm deep reveal	No	71.8	6.9	15%
6	Double glazing – external frit veil or PV glass	Yes	61.7	7.3	22%
7	Double glazing – serrated elevation	Yes	71.1	6.9	15%
8	Double glazing – green shading	Yes	62.9	7.3	22%

5.6 Option Design Development

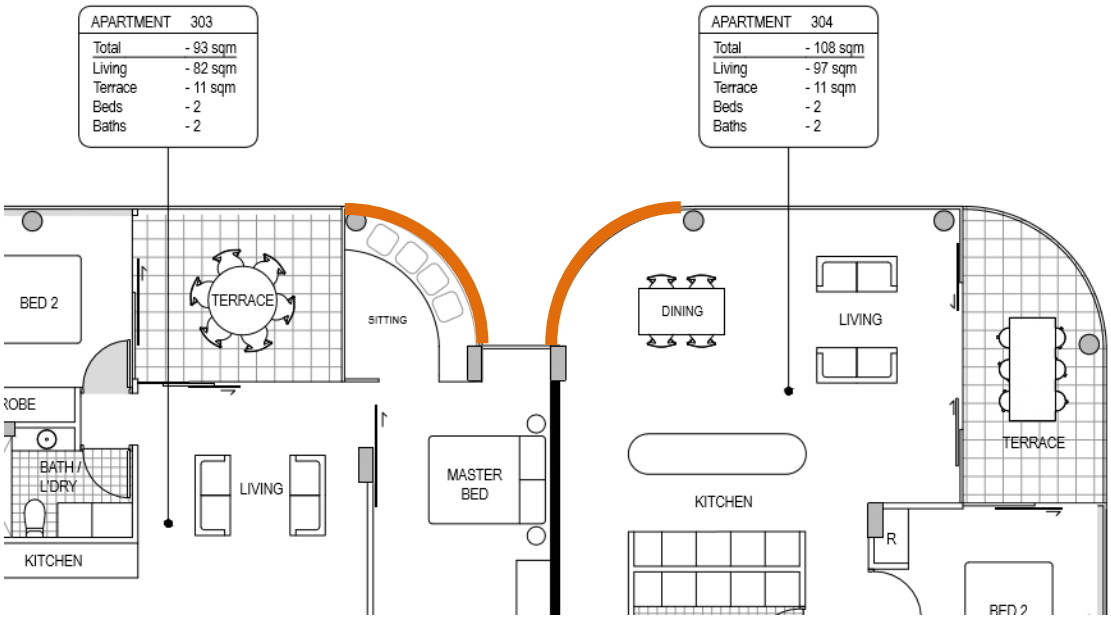
Option 7 – “high performance double glazing with interstitial blinds”, has been selected as the preferred option for design development and was presented to the ODASA Design Review Panel for review. This review identified an opportunity to optimise the design approach by utilising the proposed concrete form as an external shading device. This has now been documented as follows:



The modelled NaTHERS result is an annual average thermal load of 45.9 MJ/sqm, achieving an 8 Star NaTHERS rating which is 33% better than the minimum code requirement.

5.7 Electro-chromic glass

During design development, the deployment of electro-chromic glass has been identified for glazed areas which face each other from different apartment owners, in order to provide visual privacy. Electro-chromic glass is normally obscure but can be made clear when a small electric current is passed through it.



Example location

Electro-chromic glass can also provide a reduction in solar heat gain but this benefit has not been included in the modelling undertaken.

5.8 Conclusion

The façade design which includes a high performance double glazing system including an interstitial blind system provides the highest level of thermal performance, offering a solution which maximises daylight access and views, and an average NaTHERS rating of 8 Stars, which is 33% better than BCA code minimum compliance.

This level of performance is better than façade veil systems, serrated façade designs, and the deployment of green shading. *The biodiversity benefit of green shading is recognised by the Client, and instead extensive landscaping and green walls are proposed to be included in the podium and street level spaces, where they can be adequately shaded and maintained.*

This level of performance is also better than façade solar PV glass systems. *The greenhouse gas emissions (carbon) reduction benefit of a solar PV façade system is recognised by the Client, and instead a large scale (40kW) solar PV array will be installed at roof level. Whilst being smaller in physical size than a façade glazing array, the roof array efficiency will be significantly higher resulting in on annual generation capacity in the order of 64,000kWhr (64 T CO_2) which is more than double the façade system generation rate.*

In conclusion, it is proposed that the façade design comprises:

- a high performance insulated double glazing system, with a fully adjustable interstitial venetian blind. Glazing system to be Chevron Cardinal (Neat) or equal approved, comprising 6mm LoE^3-366, 12mm air gap minimum *(or deeper to accommodate the blind system)*, 6mm clear. 11% reflectance. SHGC 0.27.

- The use of electro-chromic glass in select locations for apartment owner privacy.

5.9 Precedents

Precedent for the use of sheer high-performance facades with interstitial blinds, in order to adequately suppress thermal loads whilst maximising daylight access and views include:

	**200 George Street, Sydney** New high-rise development with a sheer double-glazed façade and interstitial blinds. The blinds are automatically controlled in conjunction with façade mounted solar incidence sensors. The resultant workplace fitout for Ernst & Young is targeting a 6 Star Green Star rating and a WELL Building rating.
	**1 Bligh, Sydney** High-rise development completed in 2014, including a sheer double-glazed system with integrated interstitial blinds. Certified 6 Star Green Star As-Built.

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Tectvs Pty Ltd
167 Flinders St
ADELAIDE SA 5000

30th November 2017

Dear Heather,

PROPOSED RESIDENTIAL DEVELOPMENT, 2 HUTT ST
RESULTANT WIND EFFECTS AT STREET LEVEL

This report is in relation to the proposed development at the corner of East Tce and Hutt St and presents an opinion on the likely impact of the proposed development on the wind environment on the critical areas within and around the proposed development. The impact of wind activity is examined for wind from the north, south, east and west. The analysis of the wind effects relating to the proposal was carried out in the context of local wind climate, building morphology and land topography.

The conclusions of this report are drawn from experience in this field, and based upon examination of the architectural drawings which have been prepared by Tectvs. No wind tunnel testing has been undertaken. As such, this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection. Any recommendations in this report are made only in principle and are based upon our experience in the study of wind environment effects around buildings.

Wind Climate of the Adelaide Region
The Adelaide region is subject to varied winds from different directions at different times of the day and at different times of the year. These variables are measured at the Adelaide Airport and the data is presented in the form of Wind Roses. The wind roses are included as appendix A. It is clear that the critical wind directions are North Northeast in the mornings and the Southwest in the afternoon.

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Wind Effects on People

The acceptability of wind in any area is dependent upon its use. The following table describes the effects of various wind intensities on people (Penwarden, 1975)

Type of Winds	Beaufort Number	Gust Speed (m/s)	Effects	Applicability
Calm, light air	1	0 - 1.5	Calm, no noticeable wind	Generally acceptable for Stationary, long exposure activities such as in outdoor restaurants, landscaped gardens and open air theatres.
Light breeze	2	1.6 - 3.3	Wind felt on face	
Gentle breeze	3	3.4 - 5.4	Hair is disturbed, Clothing flaps	
Moderate breeze	4	5.5 - 7.9	Raises dust, dry soil and loose paper - Hair disarranged	Generally acceptable for walking & stationary, short exposure activities such as window shopping, standing or sitting in plazas.
Fresh breeze	5	8.0 - 10.7	Force of wind felt on body	Acceptable as a main pedestrian thoroughfare
Strong breeze	6	10.8 - 13.8	Umbrellas used with difficulty, Hair blown straight, Difficult to walk steadily, Wind noise on ears unpleasant.	Acceptable for areas where there is little pedestrian activity or for fast walking.
Near Gale	7	13.9 - 17.1	Inconvenience felt when walking.	
Gale	8	17.2 -20.7	Generally impedes progress, Great difficulty with balance.	Unacceptable as a public accessway.
Strong gale	9	20.8 - 24.4	People blown over by gusts.	Completely unacceptable.

The criteria for acceptance of wind conditions for various activities is shown in the table below:

Comfort Criteria	Beaufort Scale Equivalent
Safety	9 – Strong Gale
Walking	5 – Fresh Breeze
Standing	4-5 – Moderate to Fresh Breeze
Sitting	<4 – Moderate Breeze

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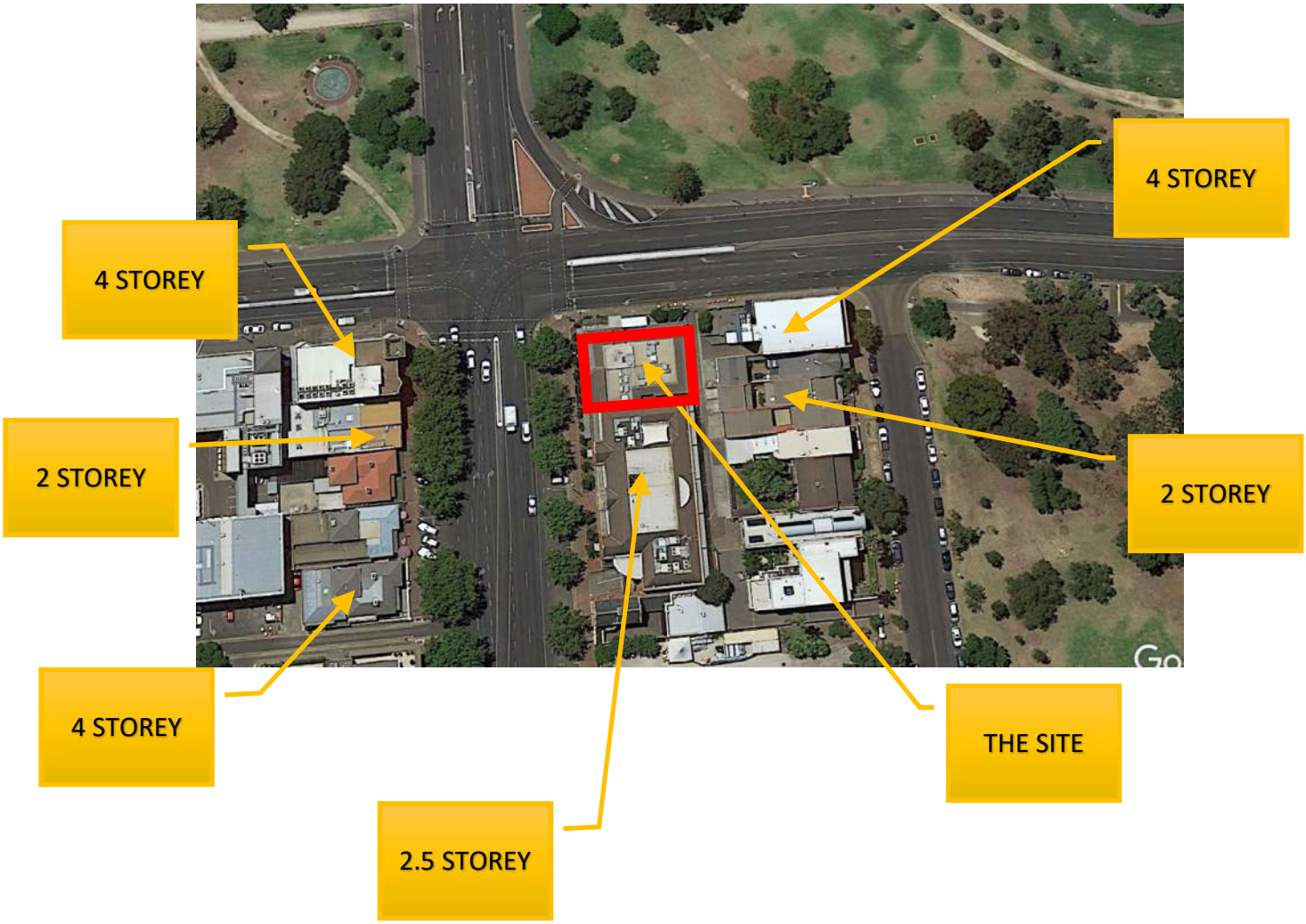
Description of the proposed Development and Surrounds

The proposed development consists of a 19 storey apartment building. The building footprint is approximately 27.5 x 21 metres and covers the site to the street boundaries on the east, north and west sides and against an existing two level office building to the north. The tower is immediately bounded by existing buildings in the range of 2 to 5 storeys There is a 4 storey apartment

The surrounding topography is gently sloping to the northeast – Rymill Park Lake.



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The outdoor trafficable areas within and around the subject development site are summarised as follows:

- Hutt St and East Tce — pedestrian footpaths under verandah structures
- Cleo Lane — Pergola over the street

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Assessment and Discussion

The interaction between the prevailing winds and the building morphology has been considered.

Hutt St Footpaths
For westerly winds Hutt St footpaths benefit from shielding provided by the proposed veranda on the west of the building. Upwind in the south western quadrant are several medium rise buildings. Winds from the south westerly quadrant are shielded at low levels by several existing buildings up to 4 storeys, and will be further softened by buildings currently under construction in the near vicinity. Northerly wind is open to the parklands and will tend to funnel down Hutt street. Downwash from the proposed tower is disrupted by indented balconies and protruding surface features and a street level veranda is proposed to protect pedestrians.

East Tce Footpath
North-easterly quadrant and north-westerly quadrant winds are not shielded, flowing in from the parklands. Downwash on this northern façade is disrupted by indented balconies and protruding surface features and a street level veranda is proposed to protect pedestrians.

Cleo Lane
North-easterly quadrant winds are not shielded, flowing in from the parklands. South easterly quadrant winds are shielded at low level Downwash on the eastern façade is disrupted by indented balconies and protruding surface features and a street level pergola structure is proposed to protect pedestrians.

Summary

The site is situated within a local pedestrian movement zone as defined in the City of Adelaide Smart Move Strategy. The main pedestrian activity considered to be people walking from parked cars into the city during the working week or alternatively to the parklands on weekends.

Wind impact from the proposed development is assessed as negligible to minor to pedestrian traffic on Rundle St and East Tce.

The relevant provisions of the City of Adelaide Development plan, consolidated on 2 April 2015. are as follows:

> **PDC 119** Development should be designed and sited to minimise micro-climatic and solar access impact on adjacent land or buildings, including effects of patterns of wind, temperature, daylight, sunlight, glare and shadow.
>
> **PDC 125** Development that is over 21 metres in building height and is to be built at or on the street frontage should minimise wind tunnel effect.
> ***Design Techniques*** *(these are ONE WAY of meeting the above Principle)*
> ***125.1*** *Methods to reduce the potential for a wind tunnel effect may include:*
> *(a) a podium built at the base of a tall tower and aligned with the street to deflect wind away from the street;*
> *(b) substantial verandahs around a building to deflect downward travelling wind flows; and/or*
> *(c) placing one building windward of another building.*

The development has been designed incorporating both methods (a) and (b).

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Given the level of pedestrian activity, and minor to negligible wind impact the development is considered to be in keeping with these provisions in that it will create minimal wind tunnel effects, and have minimal detrimental effect on pedestrians.

Regards,

Jon Rudd
Partner

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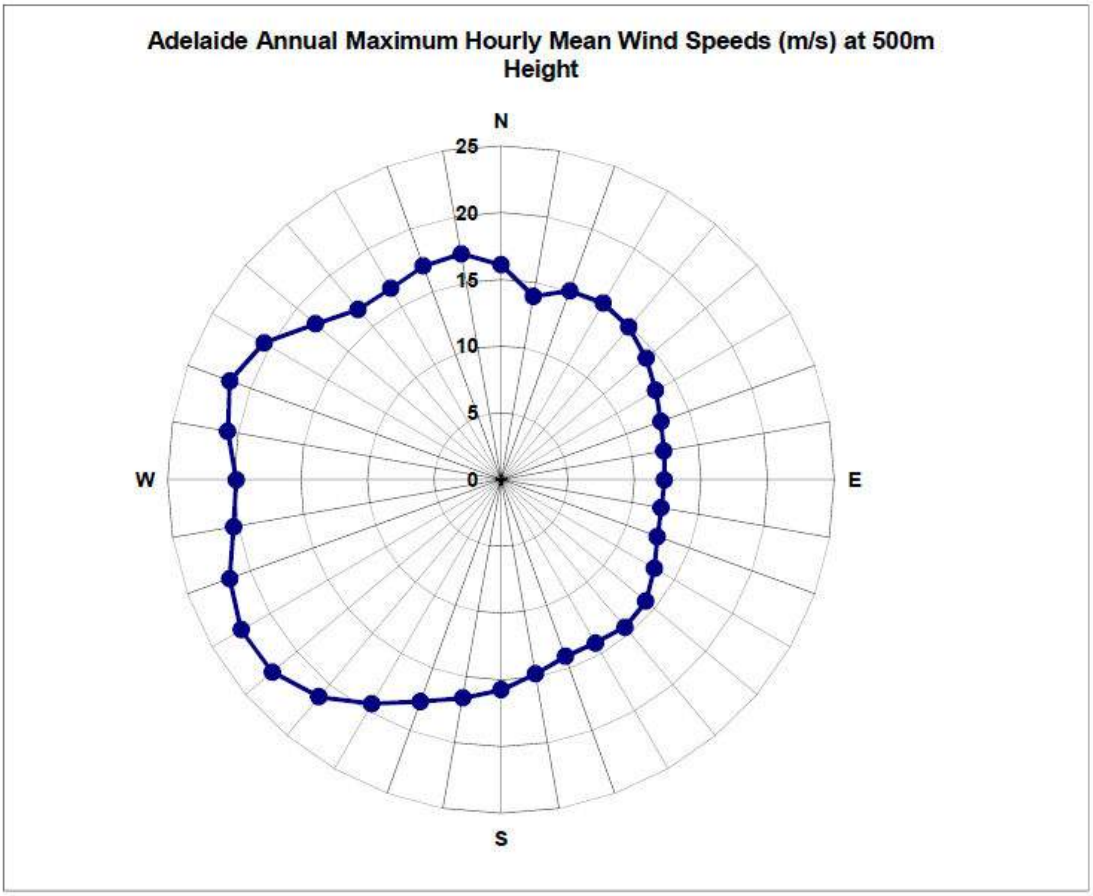
APPENDIX A –



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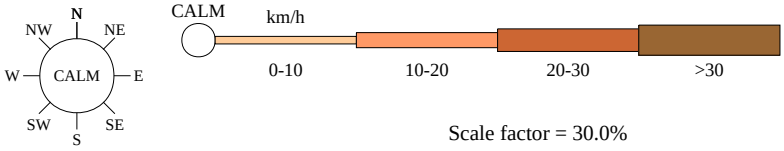
APPENDIX B

WIND ROSES

WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

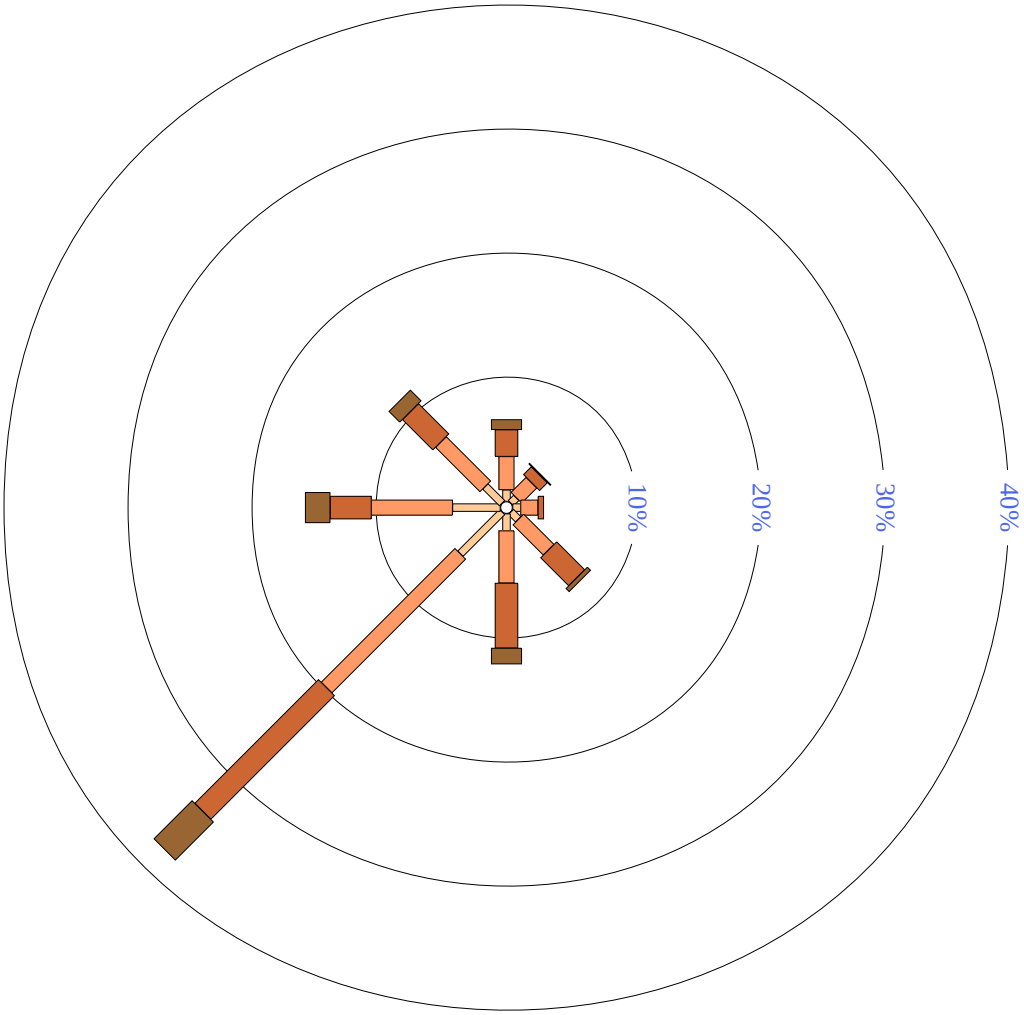
Latitude: -34.95 ° Longitude: 138.52 °



3 pm Autumn
4598 Total Observations (1955 to 2004)

Scale factor = 30.0%

Calm 2%

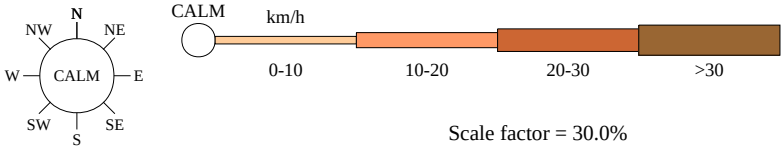


Wind directions are divided into eight compass directions. Calm has no direction.
An asterisk (*) indicates that calm is less than 1% .
An observed wind speed which falls precisely on the boundary between two divisions (eg 10km/h) will be included in the lower range (eg 1-10 km/h). Only quality controlled data have been used.

WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

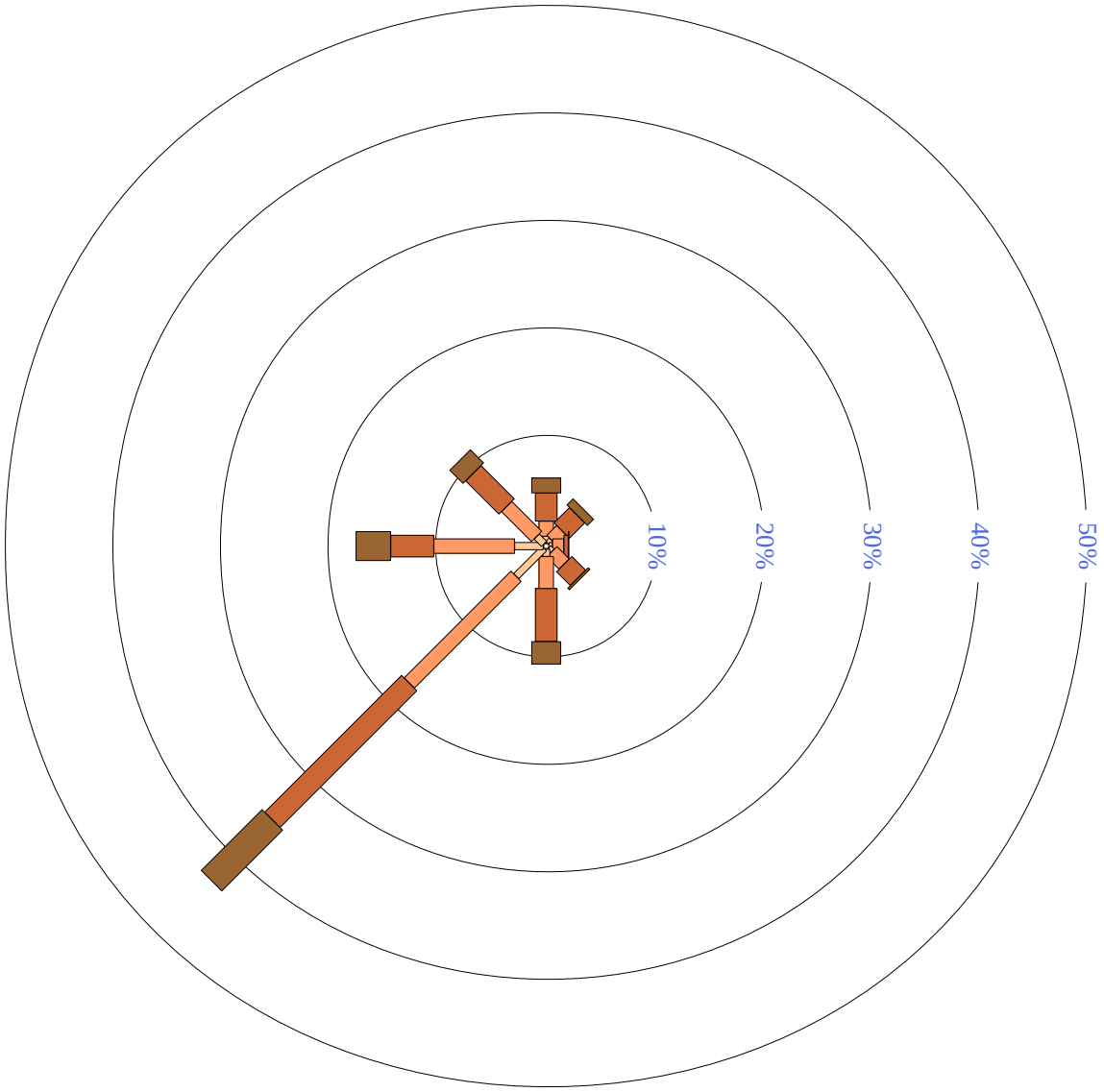
Latitude: -34.95 ° Longitude: 138.52 °



3 pm Spring
4424 Total Observations (1955 to 2004)

Scale factor = 30.0%

Calm 1%

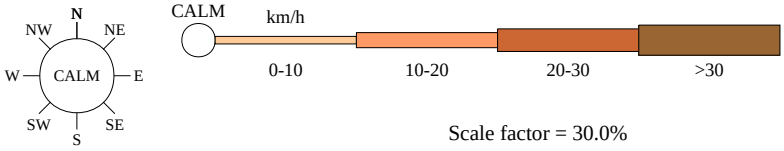


Wind directions are divided into eight compass directions. Calm has no direction.
An asterisk (*) indicates that calm is less than 1% .
An observed wind speed which falls precisely on the boundary between two divisions (eg 10km/h) will be included in the lower range (eg 1-10 km/h). Only quality controlled data have been used.

WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

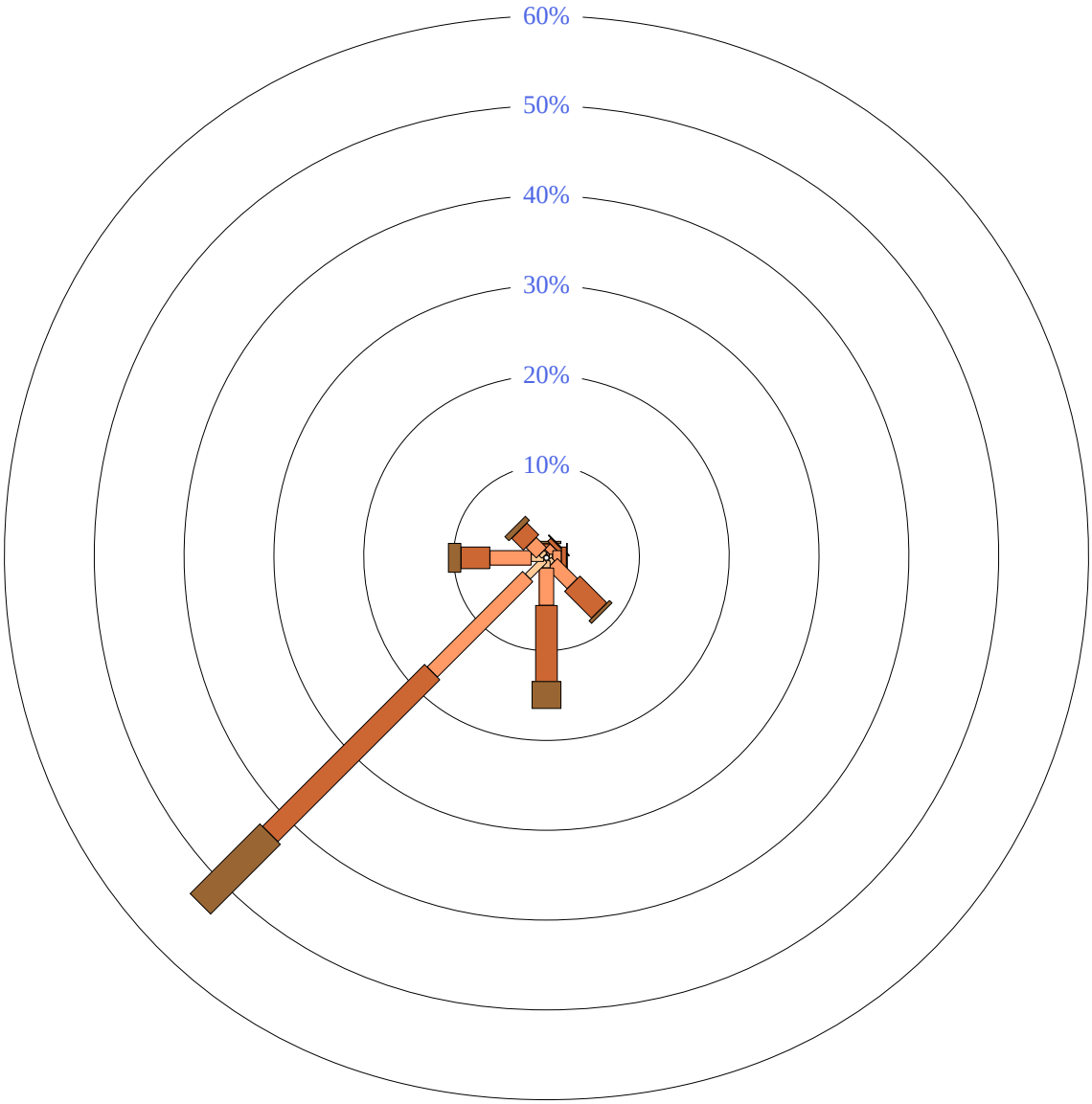
Latitude: -34.95 ° Longitude: 138.52 °



3 pm Summer
4348 Total Observations (1955 to 2004)

Scale factor = 30.0%

Calm 1%

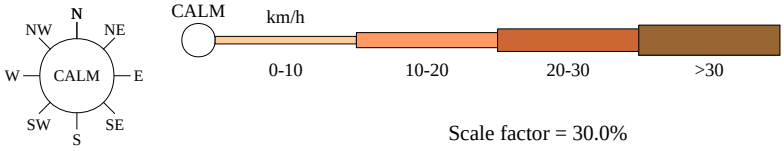


Wind directions are divided into eight compass directions. Calm has no direction.
An asterisk (*) indicates that calm is less than 1% .
An observed wind speed which falls precisely on the boundary between two divisions (eg 10km/h) will be included in the lower range (eg 1-10 km/h). Only quality controlled data have been used.

WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

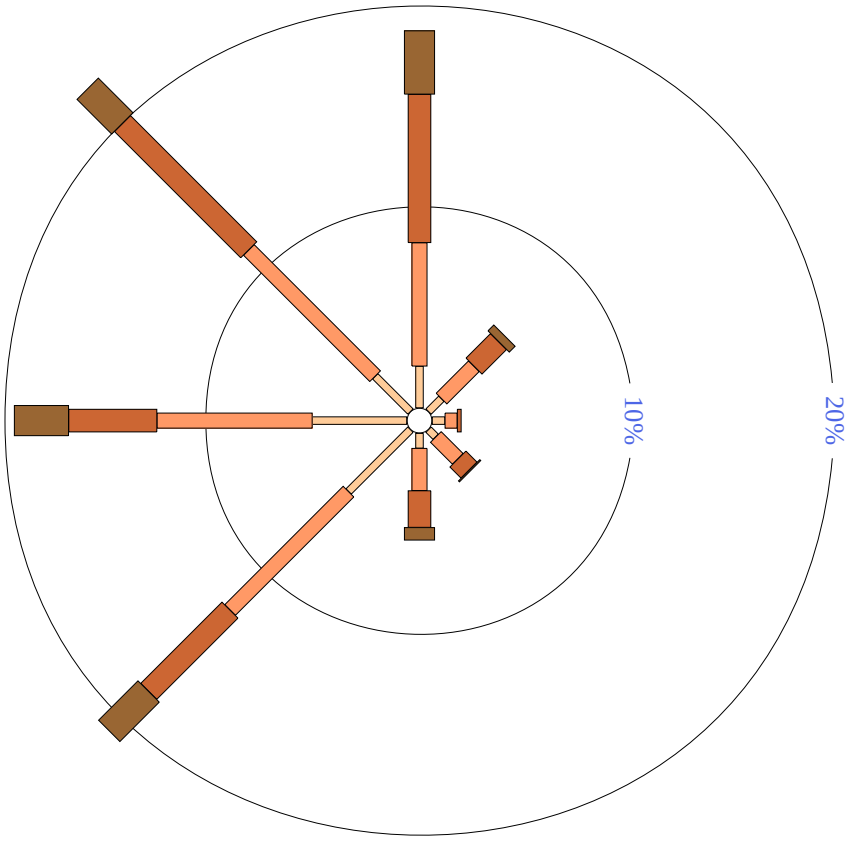
Latitude: -34.95 ° Longitude: 138.52 °



Scale factor = 30.0%

3 pm Winter
4507 Total Observations (1955 to 2004)

Calm 3%



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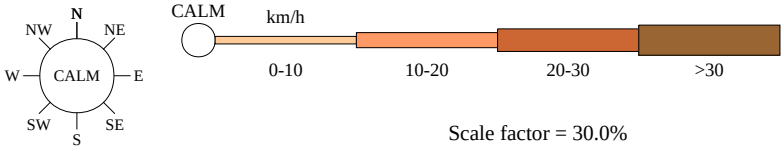
WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

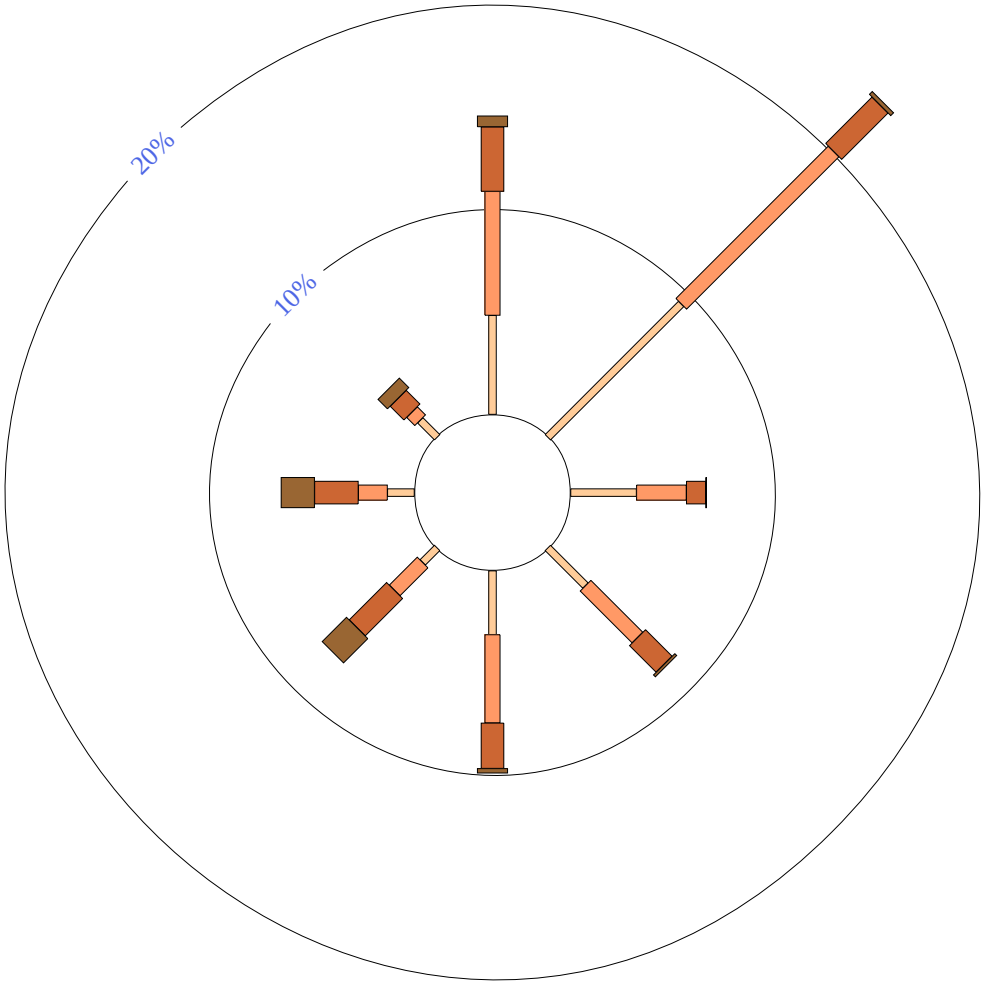
Latitude: -34.95 ° Longitude: 138.52 °



9 am Autumn
4594 Total Observations (1955 to 2004)

Scale factor = 30.0%

Calm 19%



Wind directions are divided into eight compass directions. Calm has no direction.
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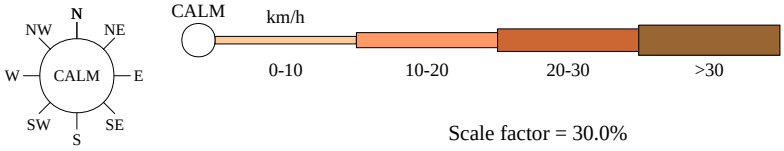
An observed wind speed which falls precisely on the boundary between two divisions (eg 10km/h) will be included in the lower range (eg 1-10 km/h). Only quality controlled data have been used.

WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

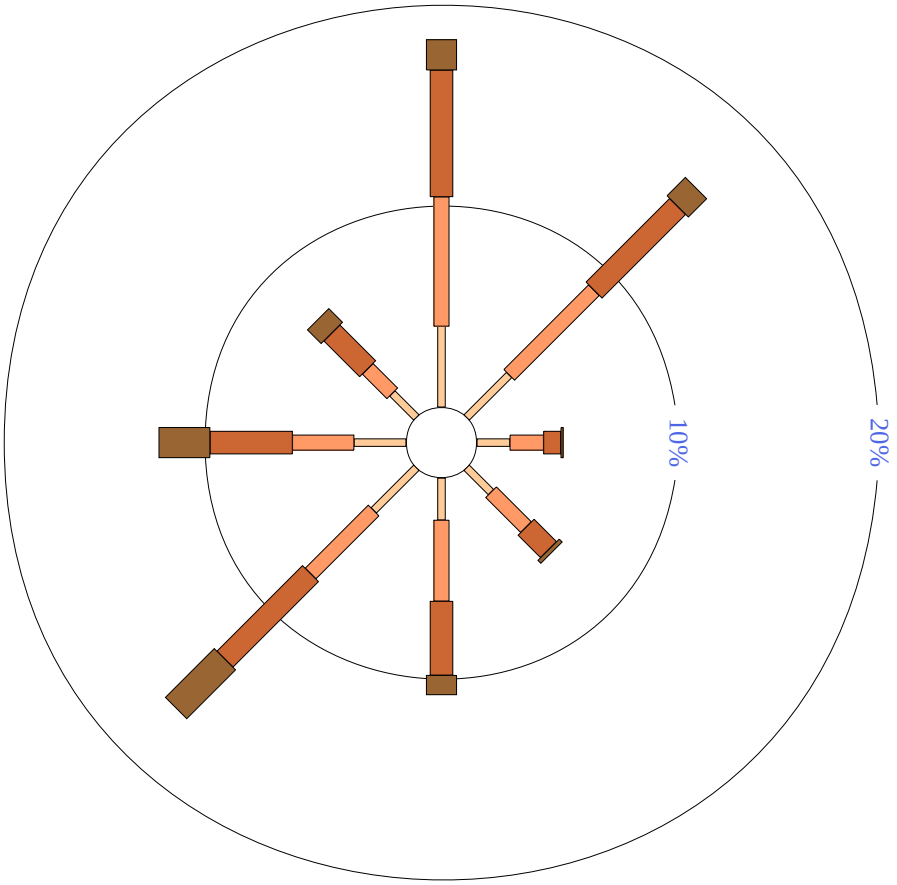
Latitude: -34.95 ° Longitude: 138.52 °



Scale factor = 30.0%

9 am Spring
4423 Total Observations (1955 to 2004)

Calm 9%



Wind directions are divided into eight compass directions. Calm has no direction.
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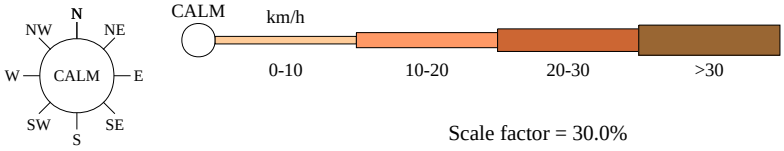
WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

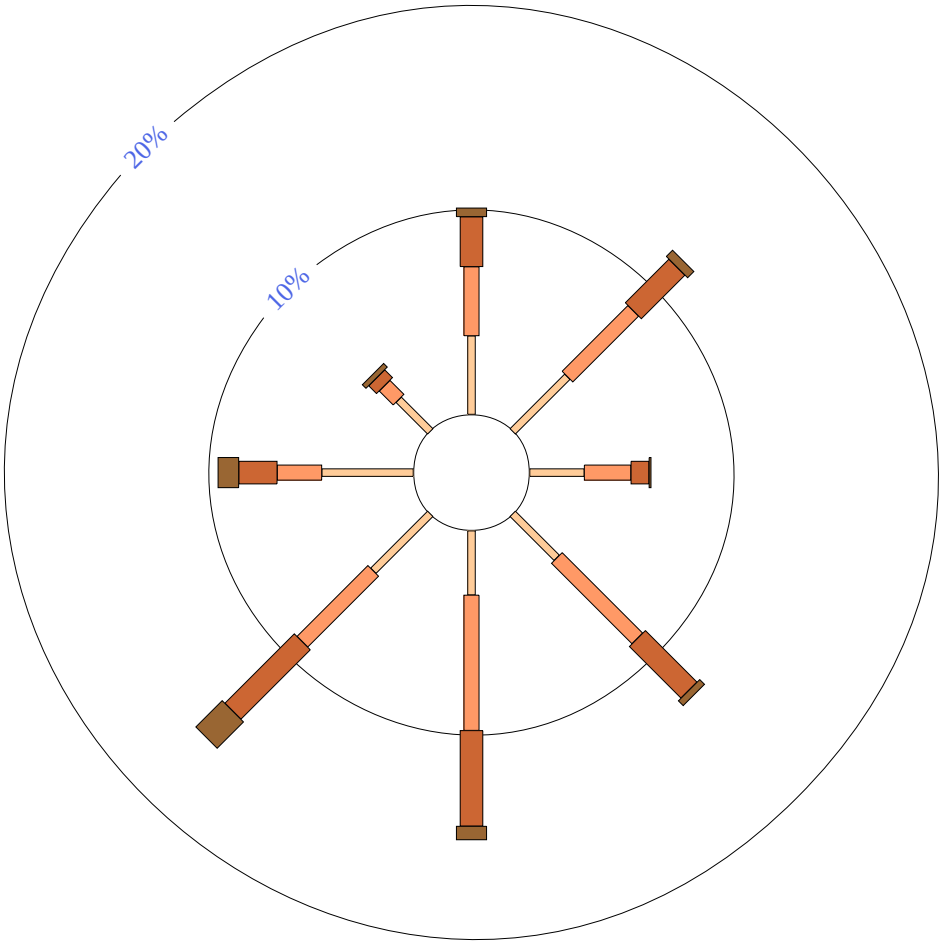
Latitude: -34.95 ° Longitude: 138.52 °



Scale factor = 30.0%

9 am Summer
4346 Total Observations (1955 to 2004)

Calm 14%



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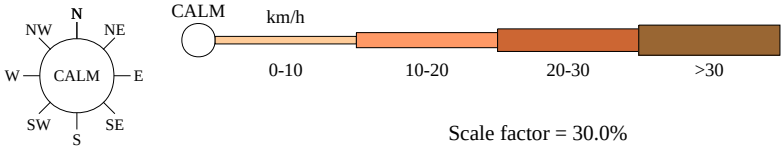
WIND FREQUENCY ANALYSIS (in km/h)

ADELAIDE AIRPORT STATION NUMBER 023034

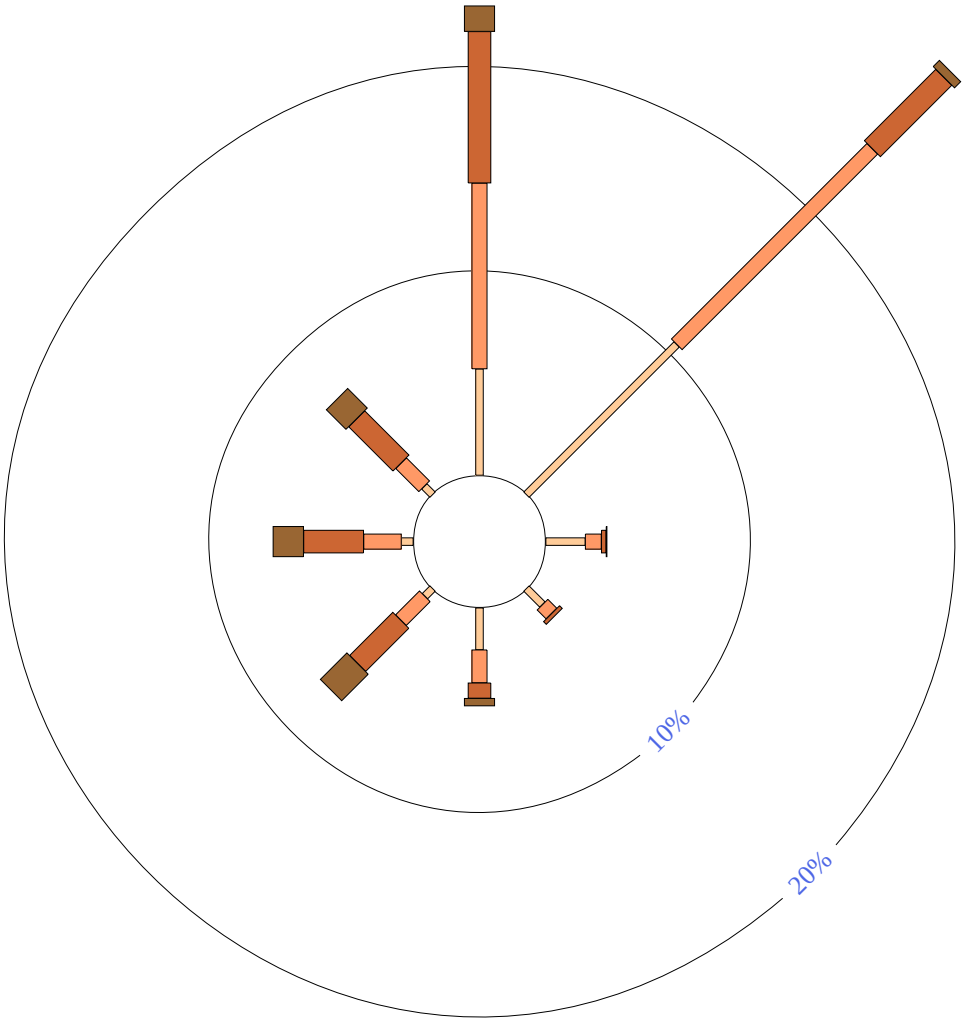
Latitude: -34.95 ° Longitude: 138.52 °



9 am Winter
4502 Total Observations (1955 to 2004)

Scale factor = 30.0%

Calm 16%



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D R Partners
Consulting Engineers
Structural ● Civil
L4 190 Flinders St
Adelaide SA 5000

Tectvs Pty Ltd
167 Flinders St
ADELAIDE SA 5000

30th November 2017

Dear Heather,

PROPOSED DEVELOPMENT 2 HUTT ST ADELAIDE
STORMWATER

This report discusses the existing site conditions, the proposed development and the council requirements for handling and treatment of stormwater flows resulting from the development of the site.

Existing site details:

- Area 578 sqm
- Total Impervious 578 sqm
- Landscaped areas minor sqm

The site falls to the north east corner - approxi.

Discharge to the street drainage system is via:

- steel crossovers to the street kerbs to the north (East Tce)

Proposed development:
The proposed development consists of apartments, retail tenancies and associated carparking.

- Area 578 sqm
- Total Impervious 578 sqm
- Landscaped area minor – in planter boxes

Stormwater System:

Council has advised that since the impervious proportion of the site remains unaltered that no on site detention of stormwater is required. Refer attached email.

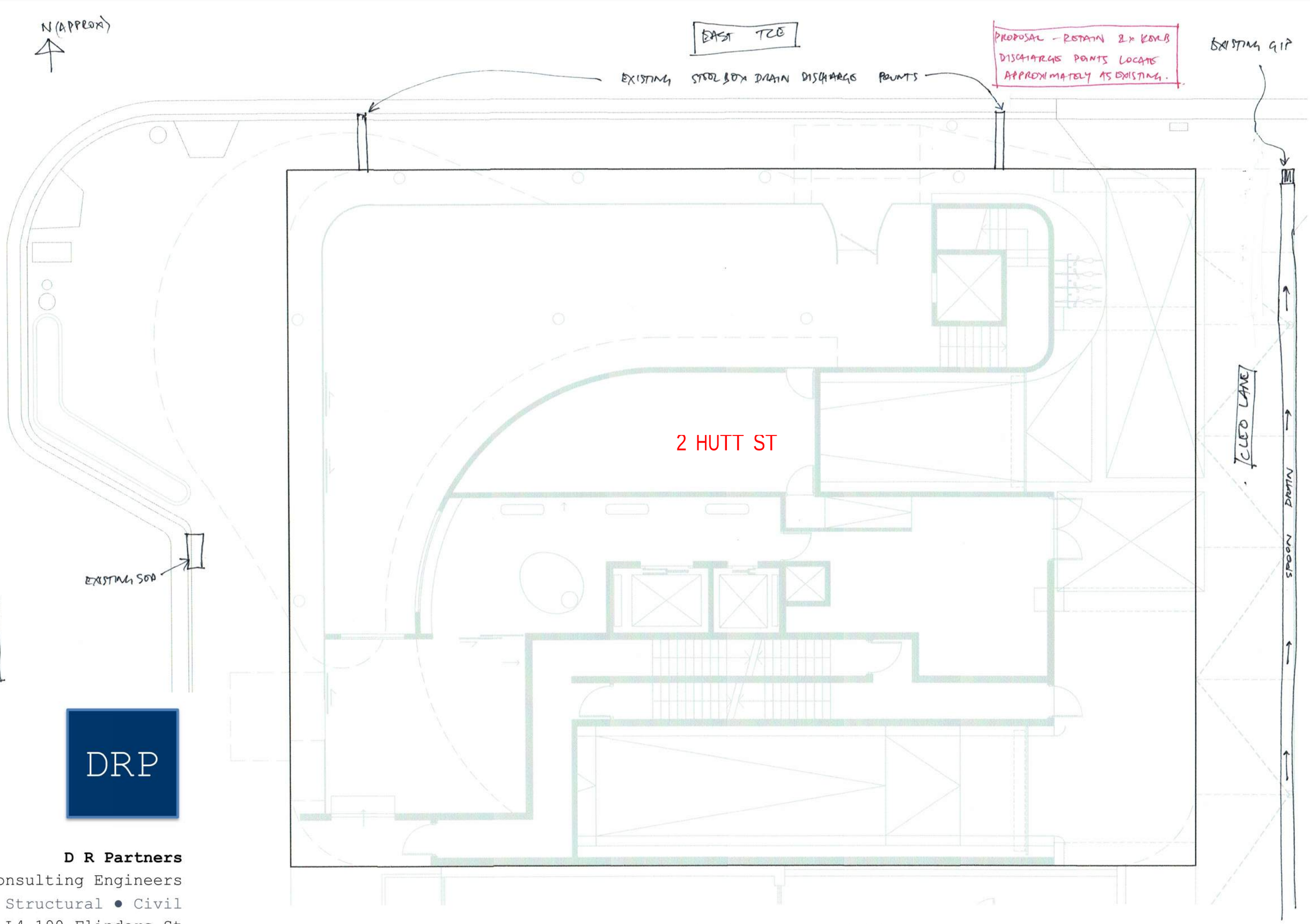
Major flood events (1 in 100 year ARI event) will be catered for by overland flow paths discharging to the surrounding streets. Floor levels on will be set above back of existing footpath levels in accordance with council requirements.

This proposal is consistent with the natural grade on the site.

Refer to the attached sketch drawings SK1 for a schematic stormwater management plan.

Regards,

Jon Rudd
Partner



D R Partners
Consulting Engineers
Structural • Civil
L4 190 Flinders St
Adelaide SA 5000

2 HUTT ST STORMWATER SCHEMATIC

Drg SW-01

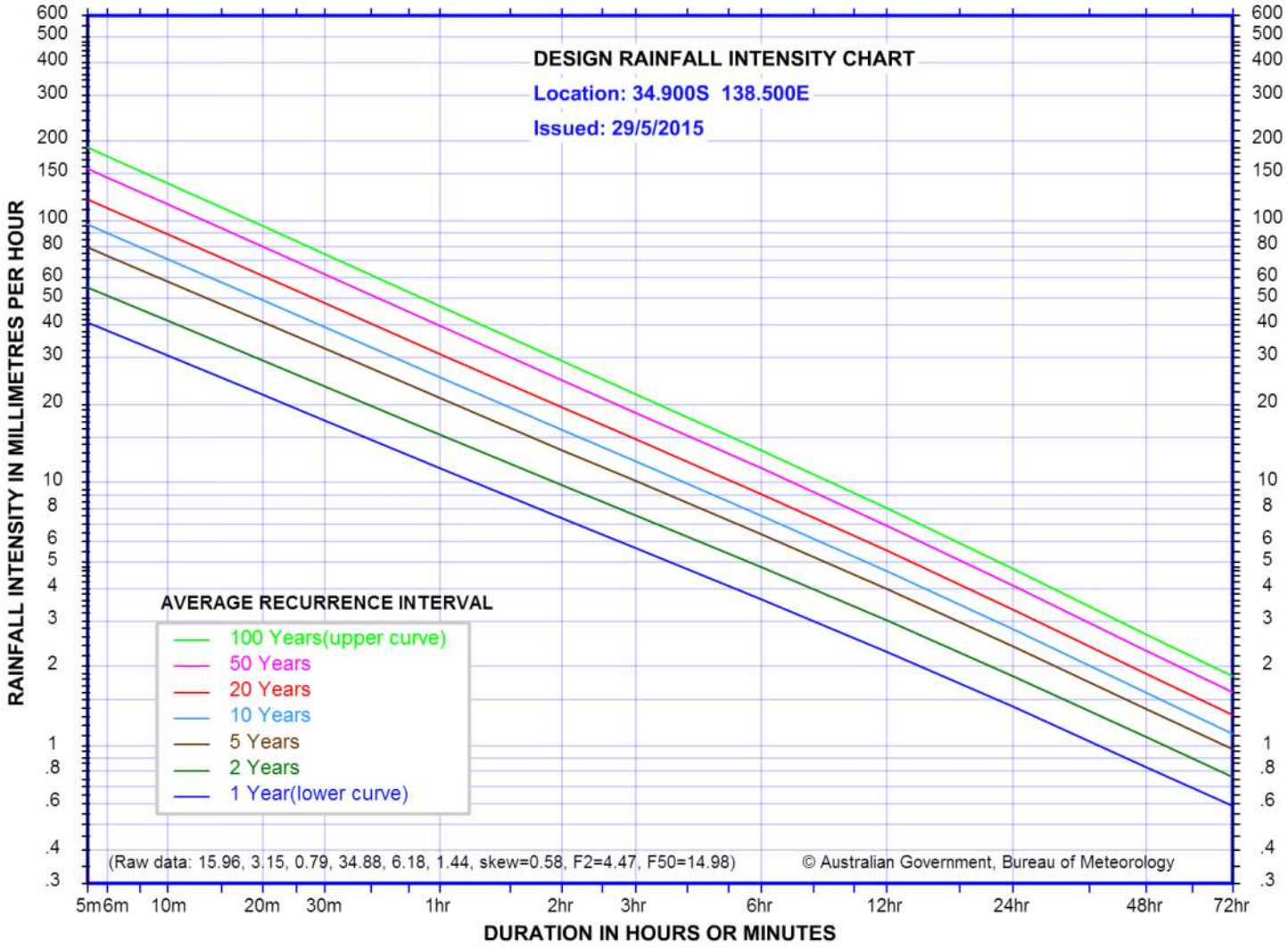
CHECK KERB DISCHARGE RATES.

SPLIT SITE TO 2 POINTS.

AREA = 578/2

20 yr ARI — 5 min TOC. 5m storm.

→ $q = \frac{1.0 \times 289 \times 120}{3600} = 9.6$ l/s. → acceptable.


DESIGN RAINFALL INTENSITY CHART
Location: 34.900S 138.500E
Issued: 29/5/2015
RAINFALL INTENSITY IN MILLIMETRES PER HOUR
600
500
400
300
200
150
100
80
60
50
40
30
20
10
8
6
5
4
3
2
1
.8
.6
.4
.3
AVERAGE RECURRENCE INTERVAL
100 Years(upper curve)
50 Years
20 Years
10 Years
5 Years
2 Years
1 Year(lower curve)
(Raw data: 15.96, 3.15, 0.79, 34.88, 6.18, 1.44, skew=0.58, F2=4.47, F50=14.98)
© Australian Government, Bureau of Meteorology
5m
6m
10m
20m
30m
1hr
2hr
3hr
6hr
12hr
24hr
48hr
72hr
DURATION IN HOURS OR MINUTES

LUCID
CONSULTING AUSTRALIA

RYMILL APARTMENTS
2 HUTT STREET, ADELAIDE SA

Project No: LCE14350

BUILDING SERVICES REPORT

DOCUMENTATION ISSUE REGISTER

REVISION	DESCRIPTION	DATE ISSUED	ENGINEER	REVIEWED
A	Planning Approval Issue	13/12/2017	PC	NAH

CONTENTS

1 INTRODUCTION

1.1 BUILDING DESCRIPTION

The subject development site is located on the prominent corner of Hutt Street and East Terrace and abuts Cleo Lane at the eastern rear of the building.

The project involves the construction of a 16 storey plus 2 basement carpark levels residential apartment development comprising the following;

- Basement 1 and 2 levels to house 28 motor vehicles
- Ground/Mezzanine Restaurant and Bar facility with approx. 60 person seating capacity and associated kitchen and ablution areas.
- Ground Floor Entry/Lift Lobby, Bin Store and access to Basement and upper level carpark ramps.
- Levels 1 and 2 – two levels of carpark to house 28 motor vehicles and Bike Storage for 46 bicycles.
- Levels 3 and 4 – 5 off mix of one and two and three-bedroom apartments per level – 10 apartments total.
- Levels 5 – 9 inclusive - 4 off mix of two and three-bedroom apartments per level – 20 apartments total.
- Levels 10 – 12 inclusive – 2 off three-bedroom apartments per level – total 6 sub-penthouses.
- Level 13 – 1 off three-bedroom sub penthouse with a large outdoor terrace including a small lap pool plus the building Fire Tank/Pump Room and Penthouse and Sub Penthouse Pool Plant in the south-eastern corner of the floor.
- Level 14 – 1 off three-bedroom plus Study Penthouse with a large outdoor terrace including a small lap pool.

In summary the development will comprise a total of 38 high quality residential apartments.

2 UTILITIES

2.1 SA POWER NETWORKS ELECTRICAL SUPPLY

Discussions with SA Power Networks (SAPN) has resolved that a dedicated on-site transformer will be required to service the development. Subject to final estimated maximum demand calculations, the transformer will be 500kva rated.

SAPN underground high voltage infrastructure traverses directly past the Hutt Street side of the site. To provide a suitable service connection point to the site, it is proposed to provide a high voltage cut-in and extend a high voltage feed to an on-site transformer positioned at the rear of the building, accessed from the site rear service driveway adjoining Cleo Lane.

It is noted that there is an existing SAPN power pole positioned off East Terrace which requires relocation to provide clear access to the building rear service driveway. Preliminary discussions have been undertaken with SAPN with respect to repositioning the power pole to the east such that the street light over entrance to Cleo Lane can be reinstated on the new pole. The relocation works will also include re-feeding a light pole on the opposite side of East terrace and reconnection of existing low voltage supplies fed from this pole.

ACC will be consulted in relation to providing an alternative street lighting arrangement to illuminate the entrance to Cleo Lane.

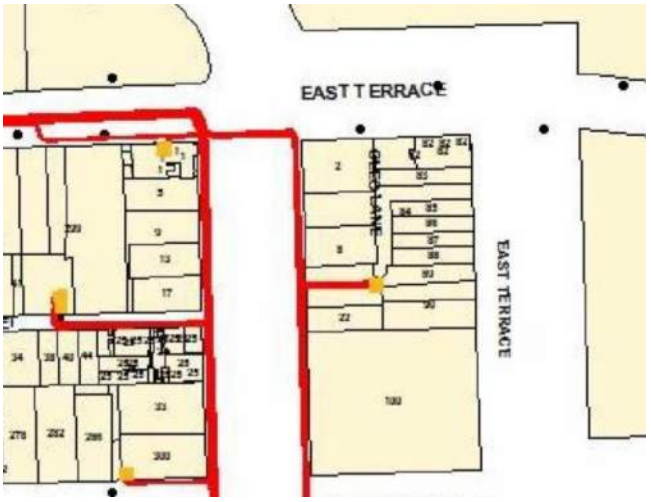


Figure 1 - Details of existing SAPN High Voltage Infrastructure

2.2 COMMUNICATIONS

NBN Co have confirmed that their roll-out will have extended to this site by the anticipated completion date. Should timing not be feasible the site has access to Telstra copper communications infrastructure.

2.3 SA WATER CORPORATION

2.3.1 SEWER INFRASTRUCTURE

The site has access to a 150mm PVC sewer main in both East Terrace and Cleo Lane at the rear.

The fixture loading unit assessment for this development indicates that a single 150mm sewer connection will be sufficient to service the site. The final number of connections may however be dictated by the internal drainage arrangement and will be resolved during detail design.

Figure 2 - Details of existing SA Water Corp Sewer Mains

2.3.2 DOMESTIC COLD WATER INFRASTRUCTURE

The subject development site is afforded access to SA Water Corporation towns mains on all three street frontages (150mm diameter in Hutt Street and 100mm in both East Terrace and Cleo Lane). Given that the building is more than 8 storeys height, to meet the Water Supply Code of Australia (WSA 03-2011) version 3.1 requirements, SA Water will require that the development is serviced by a minimum of a 200mm towns mains.

Review of the SA Water Corporation Map indicates the presence of a 400mm trunk mains in Bartels Road which provides the feed to the 100mm towns water mains which traverses past the subject development site. Given that the mains upgrade will be derived from the 400mm trunk main, it is expected that the 200mm towns mains will extend as a minimum just past the eastern boundary of the development site. Domestic Cold Water and Fire Services connections will therefore be positioned towards the eastern end of the site.

The fixture loading unit assessment for this development indicates that a 50mm water meter will be required to service the planned development. The water meter will be housed in a cast iron footpath box by SAWC in the footpath off East Terrace. The water meter will be positioned towards the eastern end of the site to suit connection to the proposed upgraded towns mains.

The incoming water main extending from the proposed new 50mm water meter will extend to 2 x 5000 litre capacity break tanks and associated domestic cold water pressure pump assembly, which will be utilised to service all upper levels of building above the carpark levels. Ground and Mezzanine Floors will be fed directly off the towns mains.

A 150mm fire services connection is proposed to be derived from the proposed upgraded towns main in East Terrace to serve the building's combined hydrant and sprinkler systems comprising an on-site booster assembly, attack hydrants in the stairwells, fire tanks and pumps and automatic sprinkler system.

Figure 3 - Details of existing SA Water Corp Water Mains

2.4 APA GROUP NATURAL GAS INFRASTRUCTURE

The site has access to a 250mm low pressure gas mains in East Terrace and a 100mm low pressure gas mains in Hut Street, both positioned directly adjacent the development site.

Careful consideration has been given to positioning visible infrastructure e.g. fire booster assembly and gas meters such that it does not impact on the aesthetics of the prominent Hutt – East Terrace corner frontage.

Accordingly, the gas meter enclosure will be recessed (flush with façade) positioned at the rear of the building within a fire rated enclosure under the Ground – Mezzanine stairs.

The enclosure will house the gas meters for the Restaurant and Apartment Gas Hot Plates and Bulk Hot Water system.

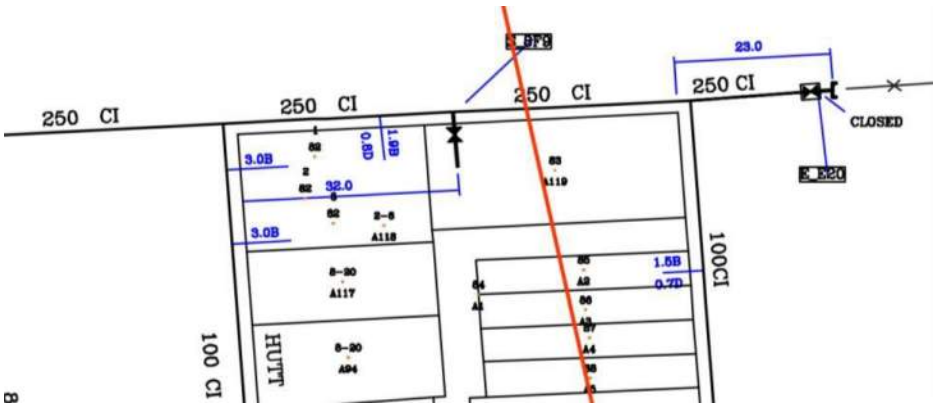


Figure 4 - Details of existing APA Natural Gas Mains

3 BUILDING SERVICES

3.1 ELECTRICAL & COMMUNICATION SERVICES

- Connection to on-site transformer low voltage fuse rack and provision of consumers mains to site Main Switchboard comprising building main circuit breaker, master (parent) meter and essential services distribution section. Main Switchboard located within a fire rated Switchboard Room on Ground Floor a rear of the building with dedicated external access.

- Electrical distribution system including fire rated mains to Main Distribution Switchboard located on the carpark Level 2, comprising metering panel comprising embedded (child) meters for the individual apartments, metered sub-mains to each apartment and common area sub-mains.

- Essential services power distribution comprising fire rated sub mains to serve the lifts, stairwell pressurisation and associated air relief fans and fire pump power supplies.

- Apartment and ground floor tenancy circuit boards.

- Lighting, power, communications and MATV/PAY TV installation to each apartment.

- Programmable lighting control system and motion sensor control to common area lighting.

- Common area power distribution system to serve common area and stairwell lighting, carpark lighting and exhaust/fresh air fans and miscellaneous equipment.

- Exit and emergency lighting system complying with the requirements of AS2293.

- Electronic security and access control systems.

- NBN fibre optic network infrastructure servicing the apartments

- Reticulated MATV and PAY TV backbone cabling reticulation to each apartment and Ground Floor tenancy.

- Audio intercom system to each apartment with master intercom station at Ground Floor Main Entry for visitor controlled access to each apartment.

- Energy efficient lighting (LED)

- 39KW PV roof mounted solar array with connection to the building power reticulation system after the Main (master) meter.

3.2 FIRE SERVICES

- Connection to SA Water Corporation towns mains in East Terrace and establishment of a 150mm fire services connection to the site.

- Incoming fire service connection to extend to SAMFS booster recessed into building façade under the Ground-Mezzanine stairs.

- Fire Pump Room on Ground Floor comprising 2 x diesel fire pumps and Fire Services Storage Tanks (approx. 50,000 litres effective capacity) located in a Fire Pump Room located in south-eastern corner of the building on Level 13.

- Diesel Fire Pump located in Basement Hydraulic Services Room to provide a reliable make-up water supply to the Fire Tanks.

- Fire hydrants located within the fire isolated scissor stairs, providing coverage to all areas of the building. Ground coverage provided via connection to booster assembly.

- Automatic fire sprinkler system to serve the entire building. Sprinkler control valve assembles (one per level) to be located on each residential apartment level in the nominated fire stair. Separate sprinkler control valve assemblies to be provided for the basement carpark levels, upper carpark levels and ground/mezzanine floor. Latter sprinkler control valve assemblies to be positioned in a separate sprinkler control valve enclosure in the Basement Fire Pump Room and be towns main fed. Residential sprinkler valve sets to be fed off the boosted (Fire Pump boosted) system.

- Smoke detection system throughout the building for activation of the smoke control systems and early activation of the occupant warning systems.

- Fire hose reels on ground, mezzanine and all carpark levels and portable fire extinguishers throughout.

- Interfaces with other services for control of building fire mode operations.

3.3 HYDRAULIC SERVICES

- Connection to SA Water Corporation Authority water and sewer infrastructure

- Connection to APA Group Authority gas infrastructure including gas meter enclosure

- Sanitary drainage system comprising multiple sewer stacks and associated relief vents within vertical plumbing ducts within the apartments which will be combined at high level in Level 2 carpark, roll over to sewer stacks within the carpark and continue to Ground floor level offsetting where required to suit the Mezzanine floor plan layout prior to rolling over and combining at high level in Ground floor and dropping at rear of building into the basement where the main sewer drains will connect to the SA Water Corporation connection point (s) in Cleo Lane.

- Waste points to serve miscellaneous equipment including Fire Pump Room, central hot water plant, Bin Room and L13 and L14 swimming pool backwash.

- Domestic Cold Water Break Tanks and associated Pressure Pump Assembly for connection to the building's cold water reticulation system. The Pressure Pump Assembly will comprise 3 x 50% duty pumps. Lower levels of the building up to Level 2 carpark shall be direct towns mains fed.

- Central gas fired storage hot water plant for supply of hot water to the apartments.
- Dedicated electric continuous flow hot water unit to serve the common ablutions on Mezzanine level.
- Cold water supply make-up feed to the L13 Fire Services Storage Tanks.
- Hot and cold reticulation to all apartments comprising hot and cold water risers with sub water meters to apartments. Sub-meters to form part of the building's embedded metering system.
- Hot and cold water supplies to serve the Restaurant/Bar tenancy fed from the building hot and cold water supply with sub meters to each feed.
- Natural gas supply to apartment cooktops and L13 and L14 lap pool heating systems.
- Grease arrestor and trade waste pumping chamber to serve the Ground Floor Kitchen and Mezzanine Catering Kitchen.

3.4 MECHANICAL SERVICES

- Individual reverse cycle ducted air conditioning systems to serve each apartment comprising energy efficient invertor type systems. Associated condensing units will be grouped on each apartment level within an external screened enclosure accessible from the service core.
- Energy efficient variable refrigerant volume type reverse cycle ducted air conditioning systems to serve the Restaurant and Bar areas on Ground and Mezzanine levels. Associated condensing unit will be positioned in a plant area at the rear of the building on Mezzanine level.
- Carpark levels exhaust and fresh air ventilation systems
- Cooking canopy exhaust duct provisions with pre-treatment systems prior to discharge as required.
- Ducted rangehood exhaust system to each apartment with discharge directed to the façade adjacent the apartment served.
- Ducted bathroom and laundry exhaust system to each apartment with discharge directed to the facade adjacent the apartment served.
- Miscellaneous exhaust systems to serve common ablution area, Fire Pump Room and Bin Room.
- Stairwell pressurisation system (1 per stairwell) comprising roof mounted exhaust fan/ductwork assemblies with connection to builder's shaft comprising supply grilles in stairwell at every 2nd level.

- Mechanical air relief system forming part of the stairwell pressurisation system comprising 4 x in-line axial fans in the ceiling space of the common residential passage (2 each side of lift shaft) with discharge directed to wall discharge louvres located on the southern side of the building. A similar arrangement will be provided to the Mezzanine level with connection to a wall discharge louvre on the northern side of the building.

3.5 VERTICAL TRANSPORTATION SERVICES

- The building will be provided with 2 off motor-room-less type variable frequency drive passenger lifts to serve all levels of the building. One of the lifts will be sized to accommodate a stretcher in accordance with BCA requirements.