

FORBES RESIDENCES

DESIGN REPORT_REV C

30 JANUARY 2019

The following Design Report is in support of the application for

10-14 FORBES ROAD &
40A,B,C KISHORN ROAD
APPLECROSS

submitted on Monday 19 November,
and incorporates feedback from the
Design Review Panel.

KEY CHANGES INVOLVE:

- Building relocated 250mm east and 890mm north to lie within all setback boundaries, eliminating setback encroachment
- Total apartments reduced from 98 to 97, residential parking bays reduced from 139 to 135
- All podium parking removed and relocated to an additional basement floor (B4)
- Relocated podium parking reduces crossover from 11m to 6m along Kishorn Road
- Public 188m² Community Hall added to podium level 1
- Commercial space enlarged to 850m², supported with 17 parking bays
- Public Community Garden and peripheral landscaping areas significantly increased on podium level 1
- Additional public stair added to southern facade at Kishorn Road
- Consultation with certified irrigation and waste water engineers (Water Design International, with Greyflow Grey waste water reuse system)
- Updated street analysis undertaken

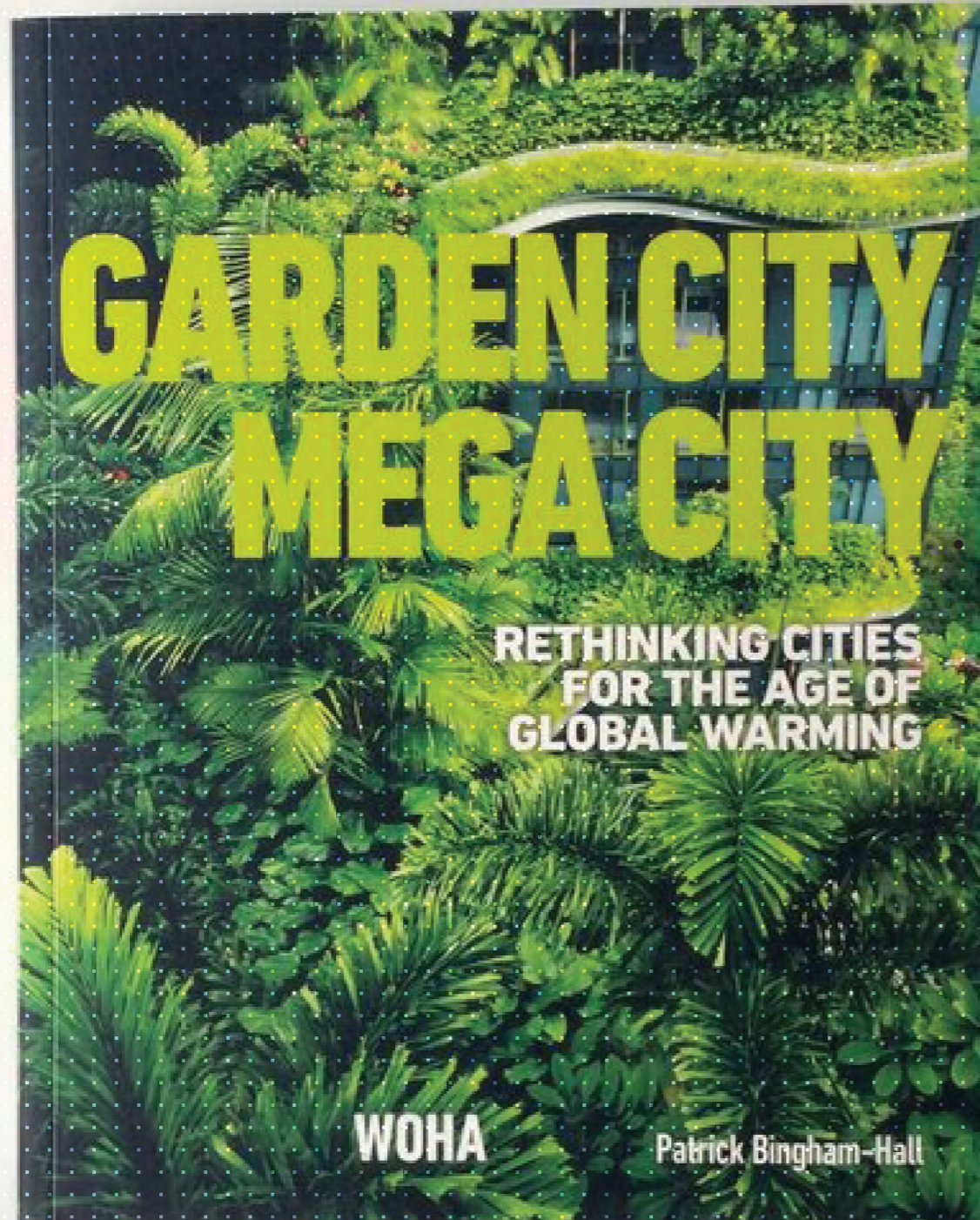
PROVIDED IN APPENDIX:

- Wind Analysis
- Waste Management Report
- Architectural Drawings

W O H A x M J A

CONTENTS

WOHA's Five Ratings	3
Context+ Character	5
Site Location	14
Site Analysis	16
Site Plan	18
Over+ Above	19
Built Form+ Scale	38
Setback Analysis	41
Floor Plate Comparison	41
Shadow Diagrams	42
Wind Analysis Summary	43
Street Analysis	44
Landscape Quality	47
Landscape Areas	51
Functionality+ Build Quality	52
Waste Management Summary	54
Transport Impact Summary	55
Sustainability	56
Amenity	58
Legibility	59
Safety	60
Community	61
Aesthetics	64
Final Score	65
Appendix	66



FROM THE **GROUND UP**, THIS PROJECT HAS BEEN CAREFULLY CONSIDERED IN REGARDS TO **WOHA'S FIVE RATINGS**, OUTLINED IN THEIR BOOK:

- **GARDEN CITY MEGA CITY:**
- RETHINKING CITIES FOR THE AGE OF GLOBAL WARMING
- WOHA & Patrick Bingham-Hall, Pesaro Publishing

The Five Ratings were conceived by WOHA to address antiquated & ineffective planning metrics, where measures of success were based purely on economic productivity and capital cost efficiency, rather than their overall contribution to the city as components within a self-sufficient system.

Cities must now be made of, by and for people. Sociable architecture and sustainable cities have now become the 21st Century priorities, and building developments need to be assessed in terms of their contribution to social and environmental sustainability, as well as their economic viability.

In order to redirect the priorities of 20th century rationalist (de-personalised) planning, and to emphatically reinstall the notion of the 'greater good', WOHA have created 5 new social and ecological ratings for all city developments.

WOHA'S FIVE RATINGS:

1 Green Plot Ratio

The amount of landscaped surfaces compared to a development's site area.

The measurement includes all new and preserved vegetation, vertical and horizontal landscaping, water features, lawns and trees, raised planters, and urban farms.

All buildings need to encourage bio-diversity, reduce the urban heat island effect, provide shade and cooling, improve air quality, soften the harshness of the cityscape, restore wildlife habitats, and re-connect people with nature.

2 Community Plot Ratio

The amount of community space allocated within a development's site area.

The measurement includes fully public areas, semi-private communal spaces, care centres, libraries, restaurants, cafés, and community centres.

The amenity of an urban precinct is largely determined by the quantity and quality of its community spaces. The buildings should encourage human interaction and facilitate social gatherings. Human scale, accessibility, and inclusivity, are crucial to the success of community integration.

3 Civic Generosity Index

The extent to which a development encourages and facilitates the public life of a city.

The index rates the value of a development's public attributes, such as urban connections, shared relaxation areas, sheltered walkways, gardens, and artworks.

In a sociable city, buildings should be judged by their 'human' characteristics...are they friendly, generous, and accommodating?

4 Ecosystem Contribution Index

The degree to which a development supplements a city's ecosystem.

The index rates a building's capacity to maintain connections between natural habitats; its intention to provide food, water and shelter for local wildlife, and settings for native plants; and its implementation of an environmentally sensitive method for water management.

As land in cities can be more successfully adapted for wildlife preservation than that of agricultural zones, building developments now play a key role in regenerating a city's (and a region's) ecological processes. In order to reverse the unprecedented environmental degradation caused by rapid urbanisation, a city's architects, planners, and developers must view buildings as homes for flora and fauna, as well as people.

5 Self-Sufficiency Index

A development's capacity to provide its own energy, food and water.

The index rates the success of a development's energy, food and water production; the amount of its surfaces allocated to solar collection and urban farming; and the extent of its systems for recycling and harvesting natural resources.

In a sustainable city, buildings must aim to be completely self-sufficient... they must produce as much energy as they consume, and preferably more, in order to compensate for existing high-maintenance buildings.

We have evaluated Forbes Residences against these ratings and summarise the results on page 65



10_Principles

CONTEXT+ CHARACTER

**Perth
needs to
densify,
but there's a
resistance
to highrise
housing..**



The quarter-acre block with a back lawn, a shed and a hills hoist is a cultural icon and many are resistant to other, denser forms of housing...

...a threat to Perth's laidback suburban lifestyle?



To them, the future seems worse...



less green and more crowded, noisy, & congested. certainly very different to the present



The question we're asking is...

HOW CAN WE MAKE DENSER HOUSING THAT ACTUALLY GIVES **MORE OF** **WHAT WE LOVE?**



Can Applecross be more pleasant, leafier, quieter, and yet with more facilities, more support for long term and older residents?

Can Applecross share more of itself with friends, relatives and new arrivals?





Multi-level housing is usually perceived as something which takes away from the district and doesn't give back...

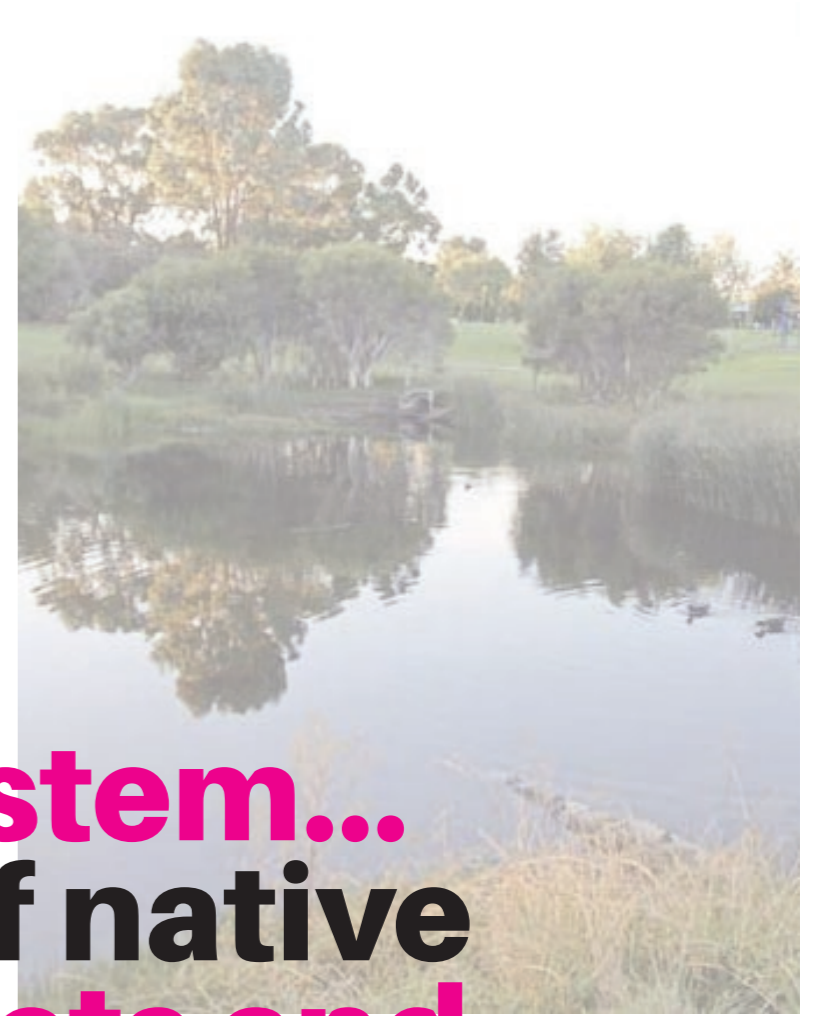


This project will challenge that notion...



Forbes Residences will use the space we create in the sky for more than just homes...

Gardens and playgrounds will create even more spaces for birds and animals, whilst solving water and energy needs



It will create its own **Eco-system...
with a beautiful landscape of native
plants, attracting **birds, insects and
animals** as it treats **waste water for
use in the gardens****



Every three floors will have a vibrant Skygarden

The segmentation of the building into separate **three storey neighbourhoods** facilitates a sense of community. Interactions are kept intimate, with neighbours able to build **quality relationships** with each other.



The design and layout references and extends Applecross vertically

The Skygardens will be shared by **21 apartments**. There are **21 dwellings on the average Applecross street block**. The vertical spacing of the trees in each Skygarden also references the **distance between trees at street level**.



It's a vertical Applecross in the sky, speaking to the past by giving us what we need for the future

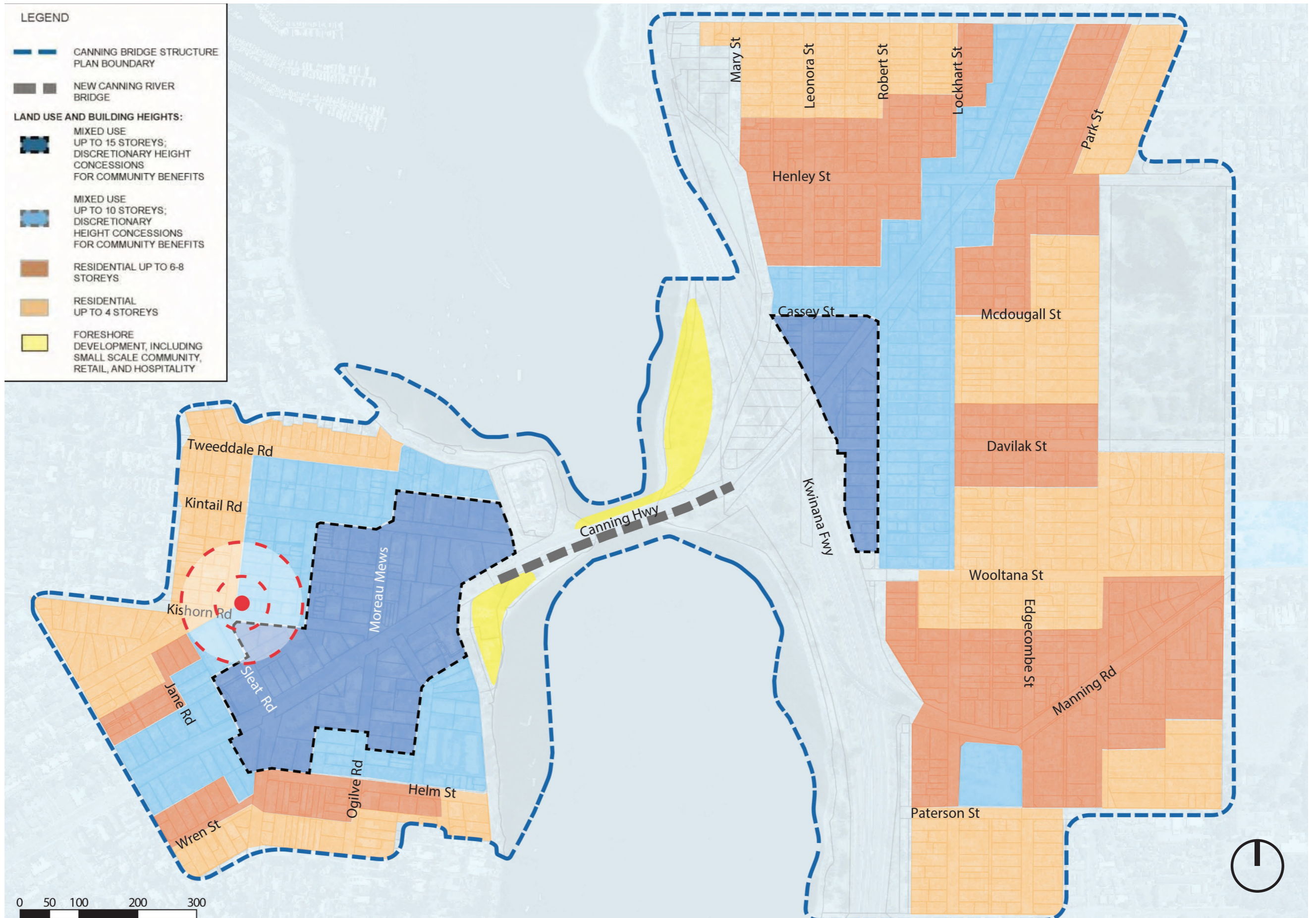
Cascading gardens relate to lower zone
F&B on ca
Pavilions allow us

SITE **10-14 Forbes Road & 40A, B, C Kishorn Road** **Apptecross**

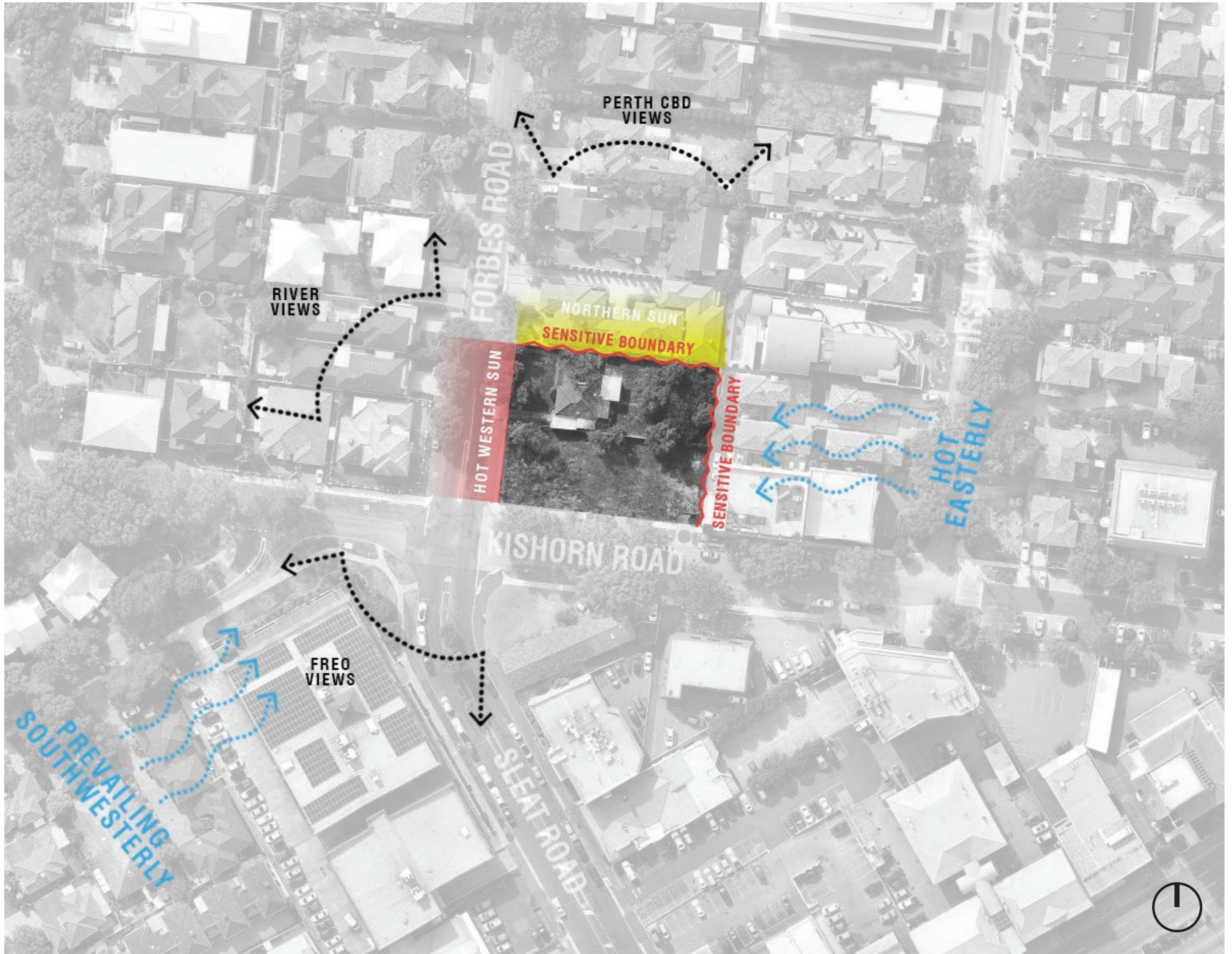


SITE

Canning bridge Activity Centre Plan



SITE Analysis

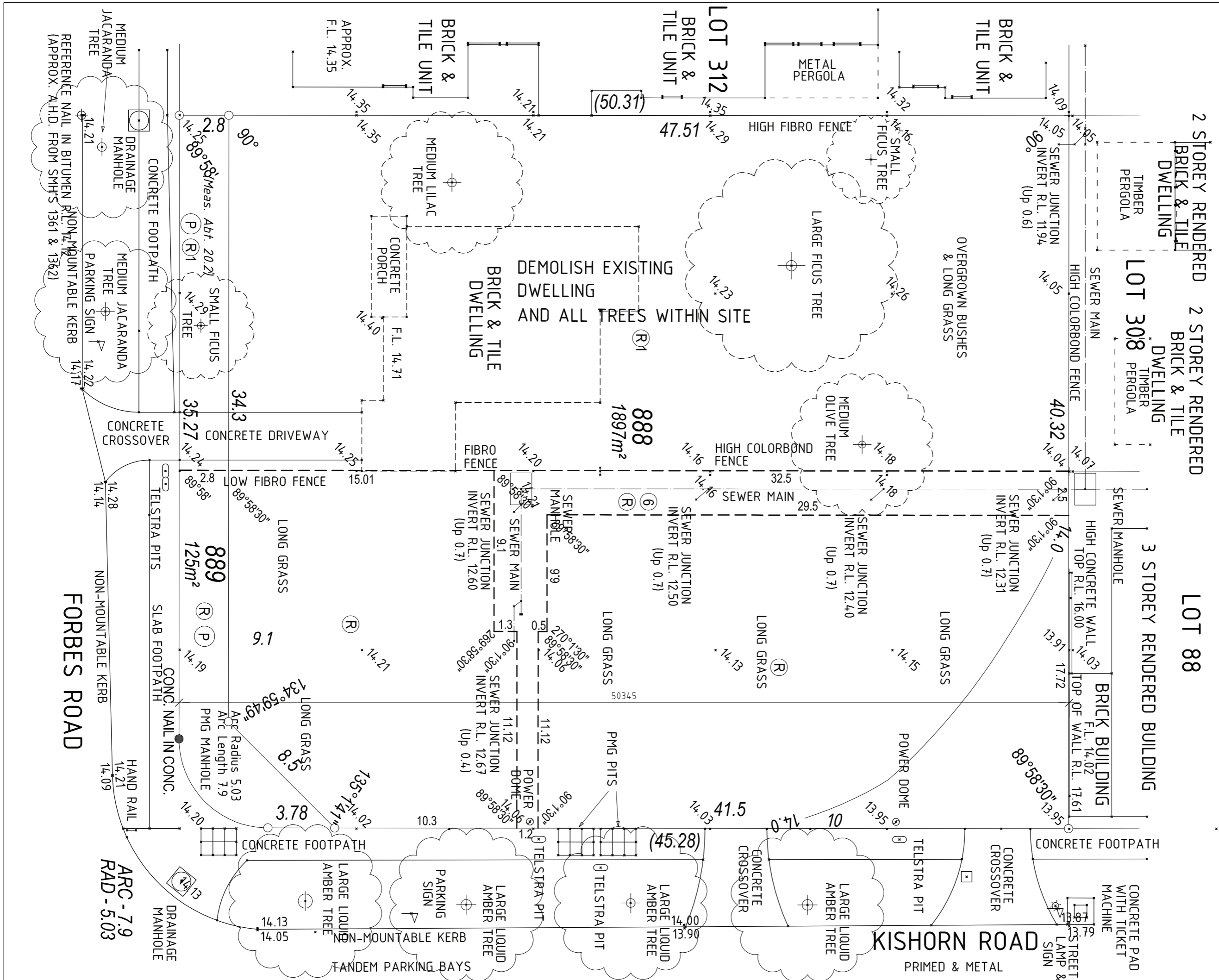


REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

CARLTON SURVEYS
 Licensed Surveyors
 SUITE 4, 160 BURSWOOD ROAD,
 BURSWOOD, W.A., 6100.
 TEL 9361 5358 FAX 9361 3457
 E-mail : carlton@carlton-surveys.com.au

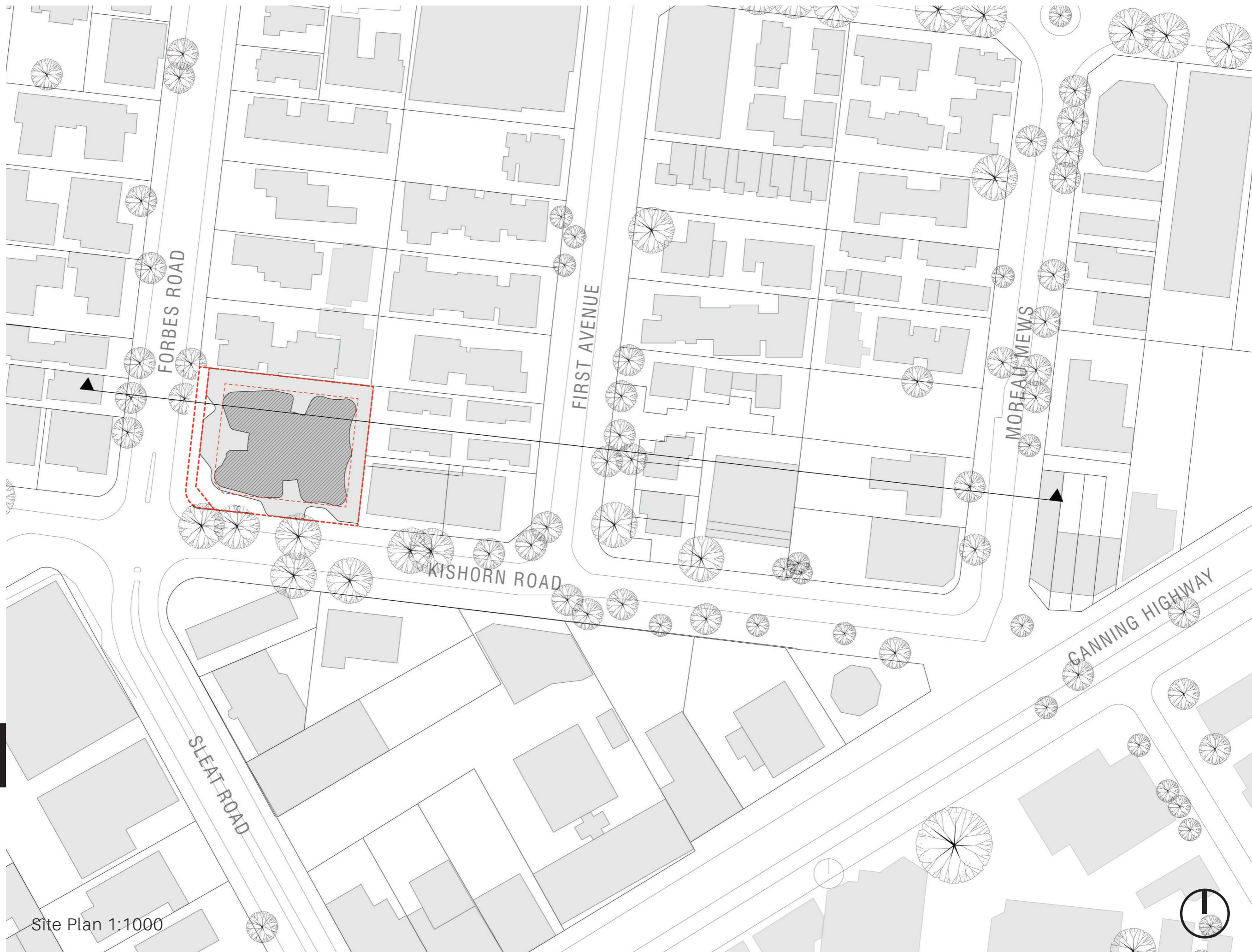
CONTOUR AND FEATURE
 SURVEY OF LOTS 311 &
 800 - 804 INCLUSIVE
 #10-14 FORBES ROAD &
 #40A-40C KISHORN RD,
 APPECROSS

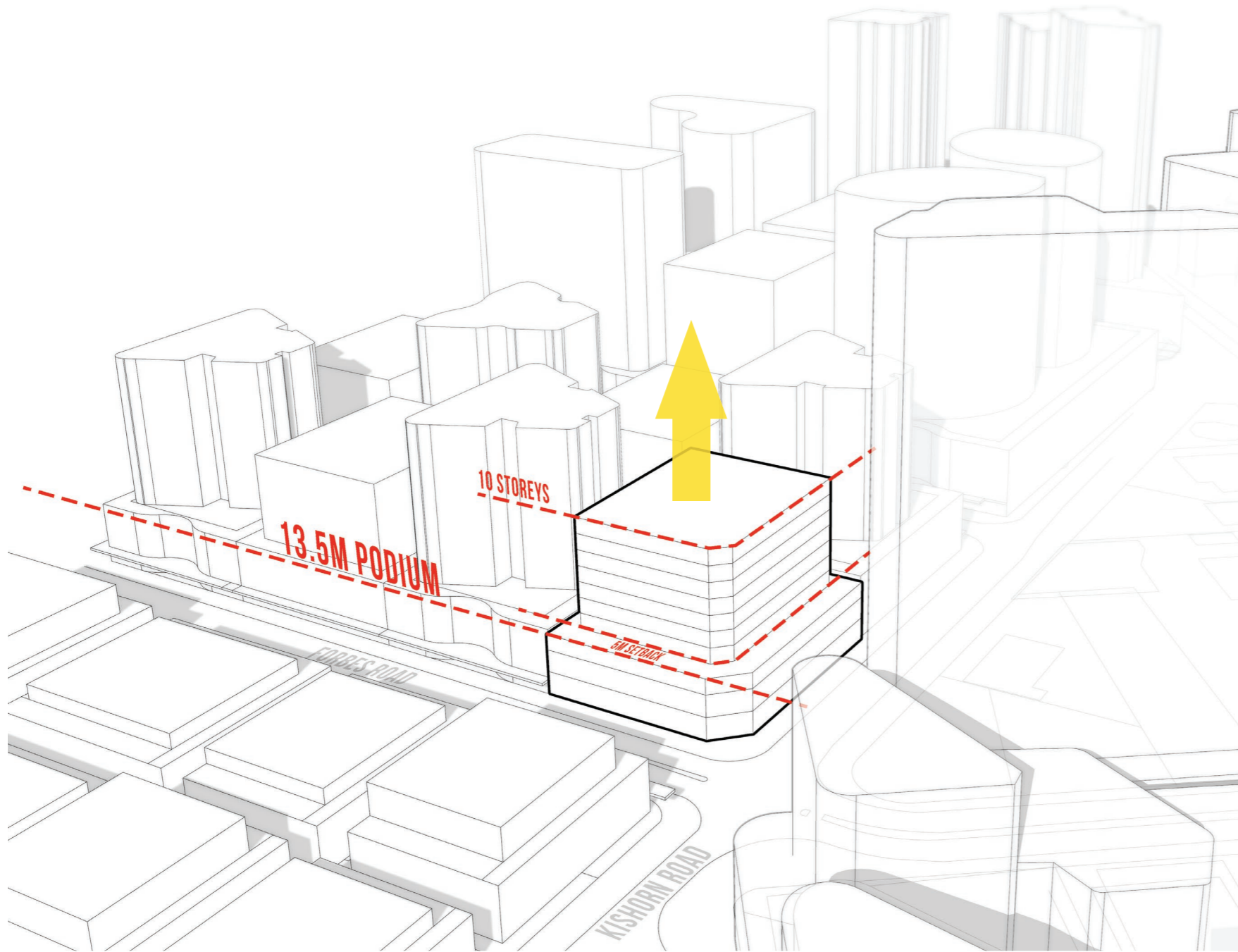
CLIENT	APEX VIEW PTY LTD
PROJECT	FORBES RESIDENCES
PROJECT ADDRESS	10-14 FORBES RD APPECROSS
MJA PROJECT NUMBER	18003
TRUE NORTH	PROJECT NORTH
SCALE	1:200 @ A3
STATUS	ISSUED FOR DA
DRAWING	EXISTING SITE SURVEY
DRAWING NO.	DA.01
DRAFTER	MEC
CHECKED	MEC
REV.	2 17



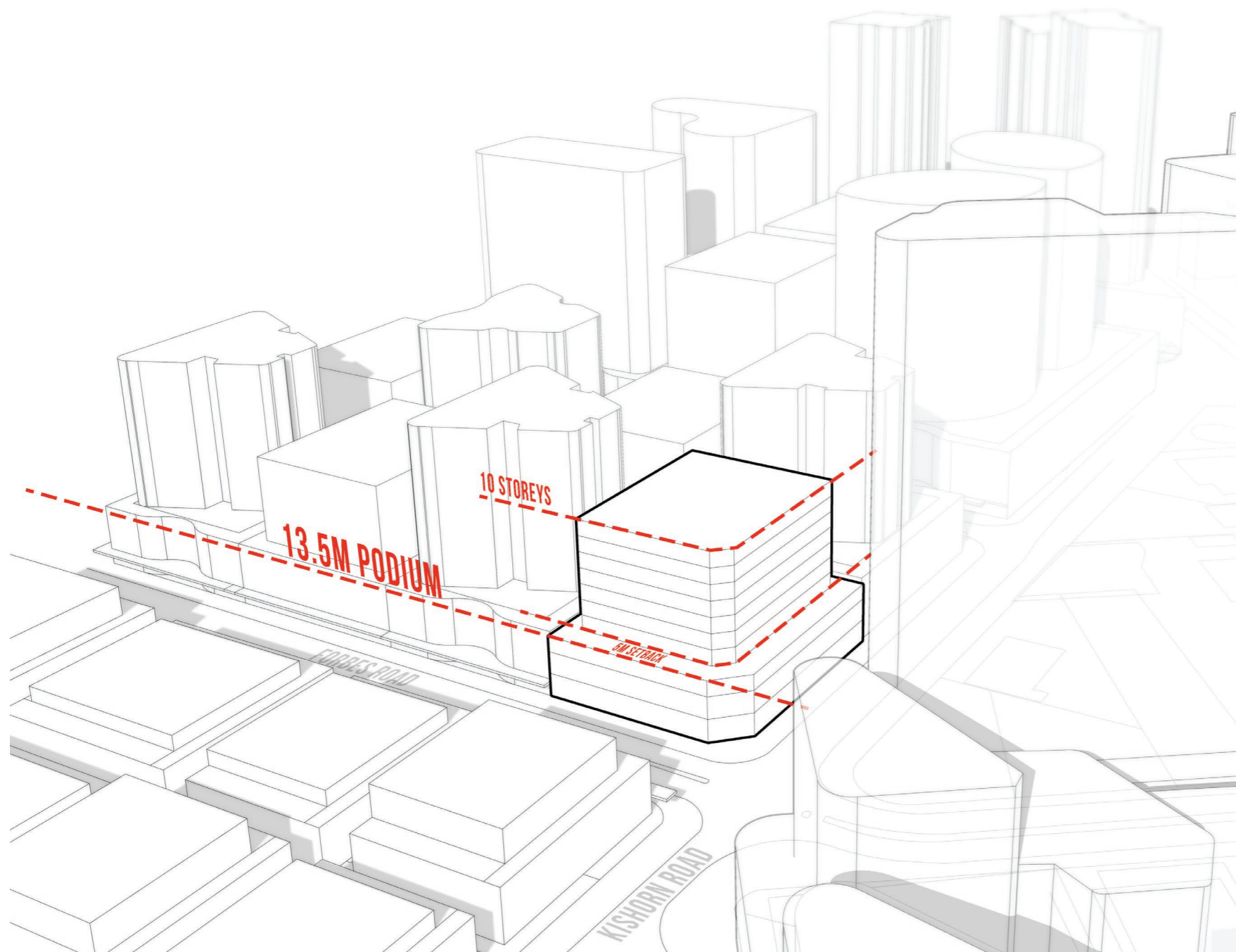
SITE Plan

Site Plan 1:1000



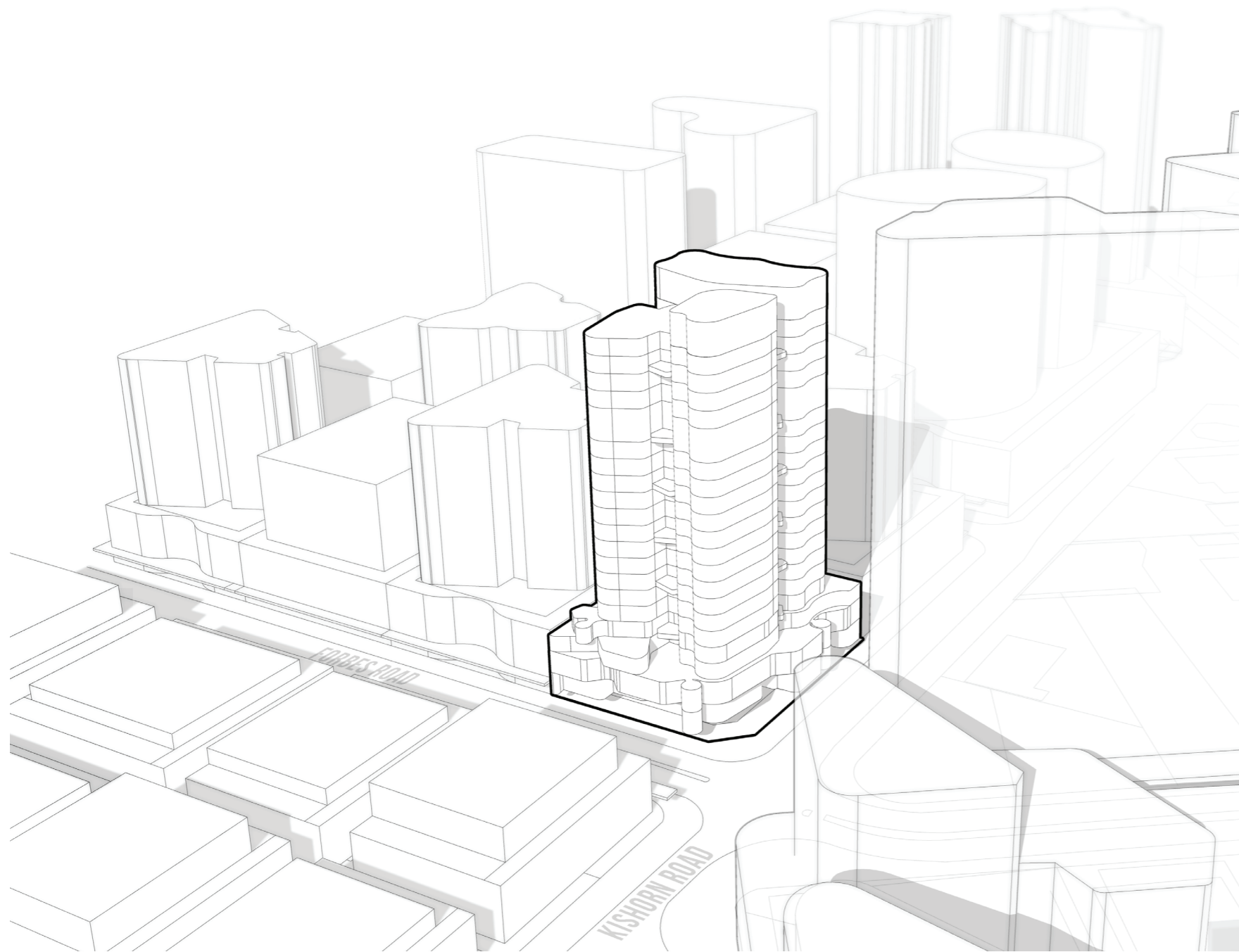


We understand that to go above 10 storeys we need discretion and must comply with all clauses of **element 21, plus at least four clauses of **element 22** of the Canning Bridge Activity Centre Plan (CBACP)**



A 10 storey compliant building in the M10 zone (built out to its maximum setbacks) has **15,988m² of total floor plate area***

**see TOTAL FLOOR PLATE COMPARISON table, page 41*



Forbes Residences has a total floor plate area of **23,182m²**

$$23182\text{m}^2 - 15988\text{m}^2 = 7,194\text{m}^2$$

Forbes Residences 10 Storey Complaint

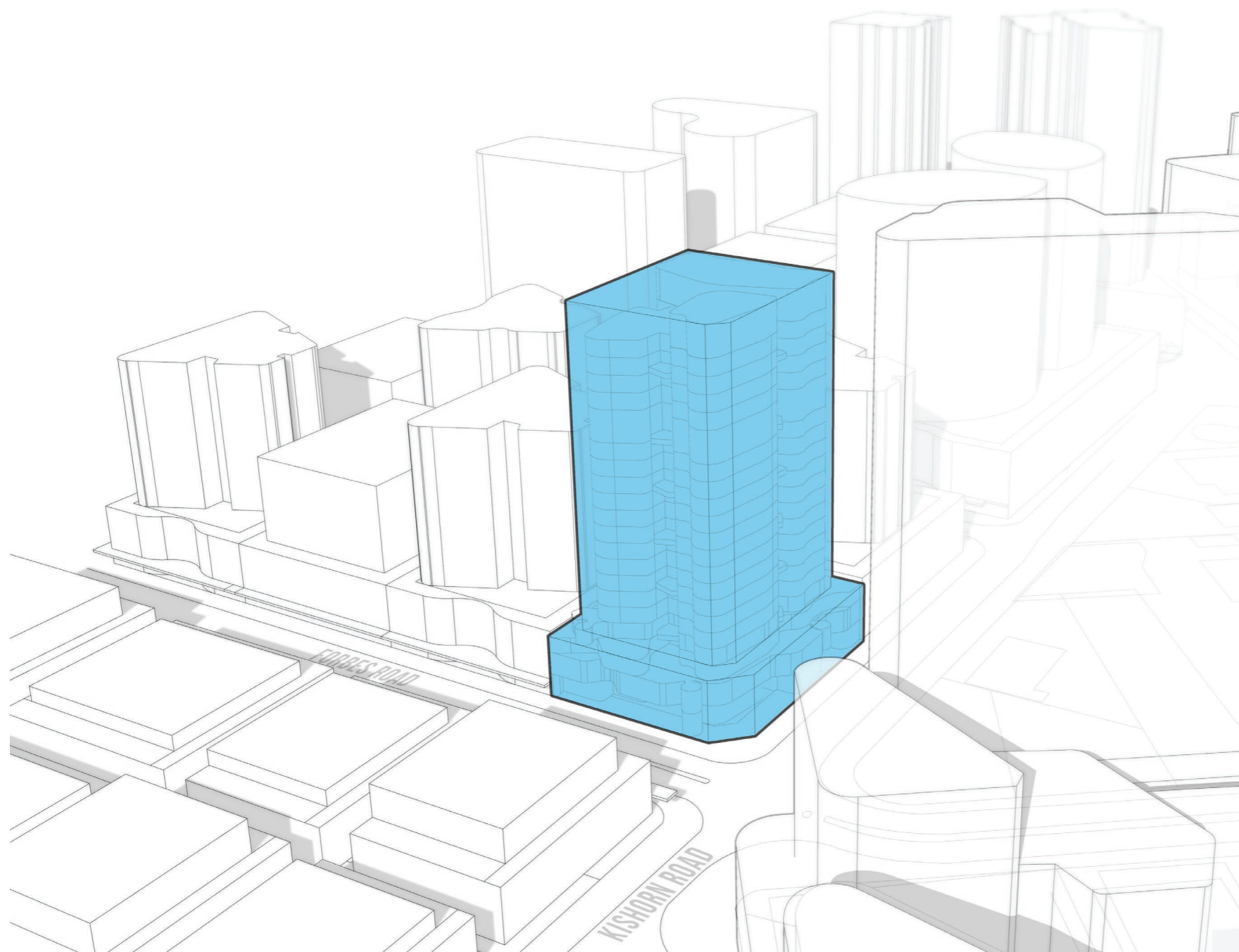
We therefore recognise that we have an increase in floor plate area of

7,194m²

over a compliant 10 storey building



**see TOTAL FLOOR PLATE COMPARISON table, page 41*



In response to this, Forbes Residences is **over & above** setback requirements, significantly reducing excess bulk and overshadowing.

The building is not only within **all required setbacks**, but it's sculpted form in fact results in an average setback increase of **4734.5m²**.

This can be subtracted from our initial increase of floor plate area:

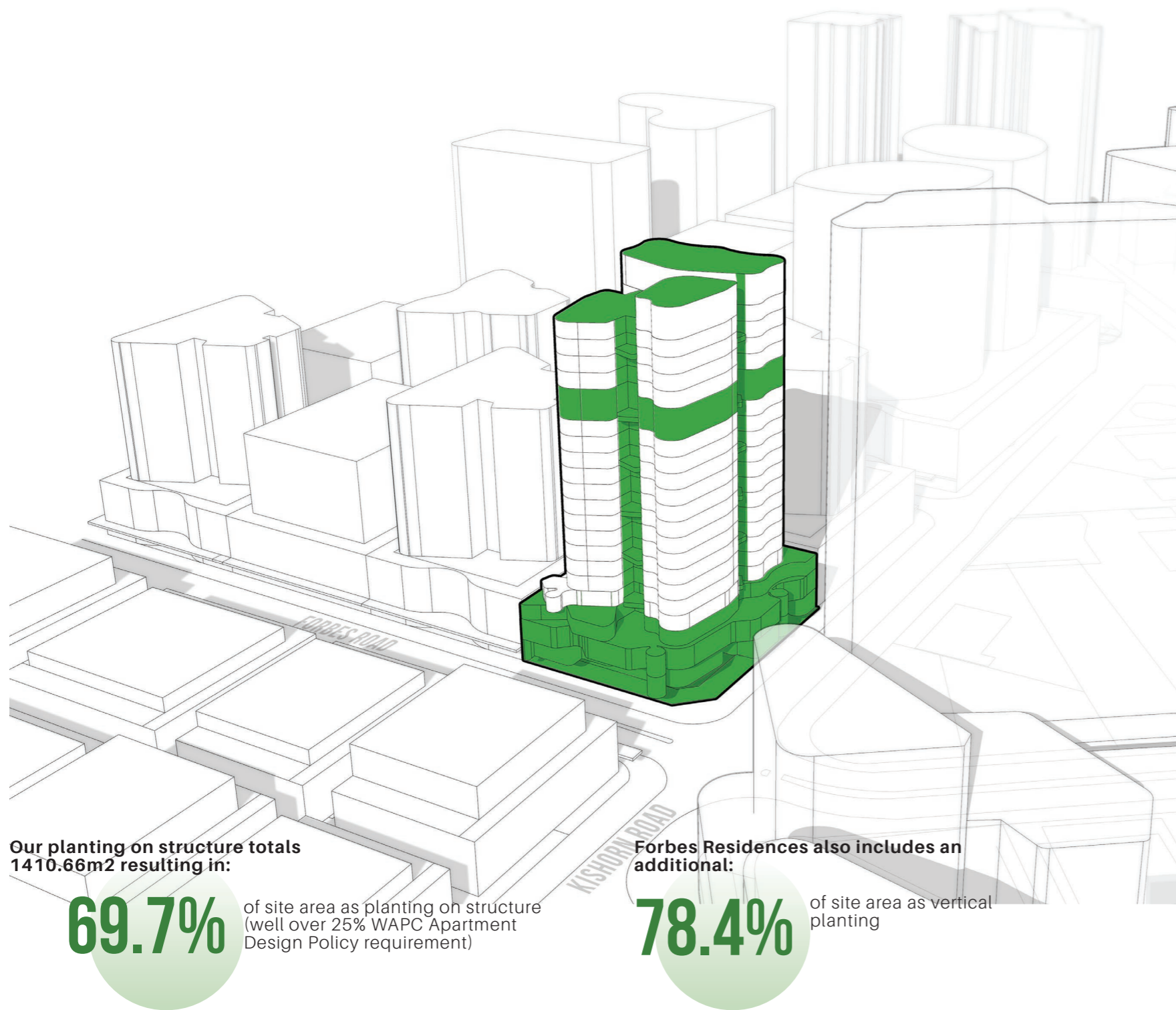
$$7194\text{m}^2 - 4734.5\text{m}^2$$

Increase of floor plate area (m²)

Averaged Setback Increase (m²)

$$= \mathbf{2,459.5\text{m}^2}$$

New increase of floor plate area



We are also over & above open space & landscaping, with a total landscaping area of 5703m² ... or 3680m² more than the minimum required in the CBACP

$$2,459.5\text{m}^2 - 3680\text{m}^2$$

Current increase of floor plate area (m²)

landscaping area increase (m²)

$$= -1,220.5\text{m}^2$$

New surplus of floor plate area

This equates to:







148% GREEN PLOT RATIO

*see LANDSCAPE AREAS table, page 51

This means that from a starting increase in floor plate area of 7,194m²...

...through considered design strategies we have not only reduced this number to ZERO but have in fact gone past it into the negative, which means we're actually now providing an additional surplus of +1,220.5m²

We meet all six requirements of Element 21, with:

<p>21.1 Exemplary design is proposed in the opinion of the Design Advisory Group; and</p>	 + Exemplary design (pending)
<p>21.2 For development in the M15 Zone, the site shall have a minimum area of 2,600 m²; or</p>	<p>(not applicable)</p>
<p>21.3 For development in the M10 Zone, the site shall have a minimum area of 2,000 m².</p>	 + Complies (site area, 2023m ²)
<p>21.4 In addition to Clause 21.1 and Clause 21.2 or 21.3, the applicant proposes the following:</p>	
<p>21.4.1 The proposed development has been designed with regard for solar access for adjacent properties taking into account outdoor living areas, major openings to habitable rooms, solar collectors and balconies.</p>	 + See Overshadowing Analysis - page 42
<p>21.4.2 The proposed development meets or exceeds a 5 Star rating under the national rating scheme of the Green Building Council of Australia.</p>	 + See Sustainability - page 56
<p>21.4.3 A traffic statement is submitted showing that the additional floorspace allowed will not unduly impact on the surrounding centre.</p>	 + See Traffic Management Report - Appendix
<p>21.4.4 The proposed development includes the provision of infrastructure which supports area wide resource efficiency, such as plant and equipment required to reduce the demand for either building or area wide service infrastructure</p>	 <ul style="list-style-type: none"> + Naturally ventilated basement via wind scoops + Naturally ventilated corridors & lobbies + Greywater dripline reticulation system + Three points of daylight to floor plate, reducing need for artificial lighting + Photo Voltaics <p>See more: Sustainability - page 56</p>

...and we meet **seven** requirements of **Element 22:**

Element 22.1.1 (1 of 7)

High quality **active street frontages**, furniture and landscaping

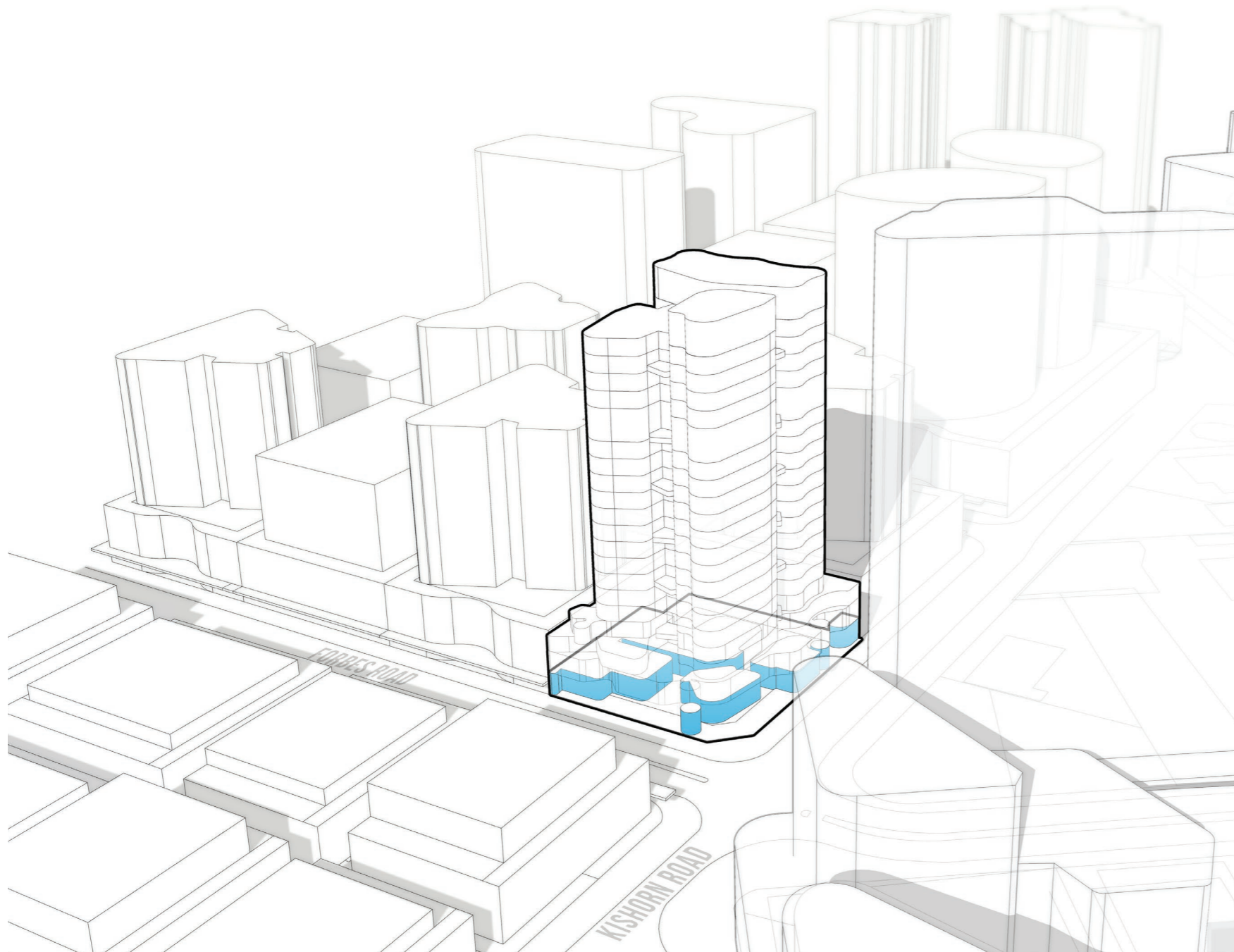
Compliant frontage:

76 metres
(82m - 6m crossover)

Our frontage:

151 lineal metres

By manipulating the contour of ground floor glazing and creating an island hospitality tenancy we can significantly extend the active frontage.



1,220.5m²
Current surplus of floor plate area

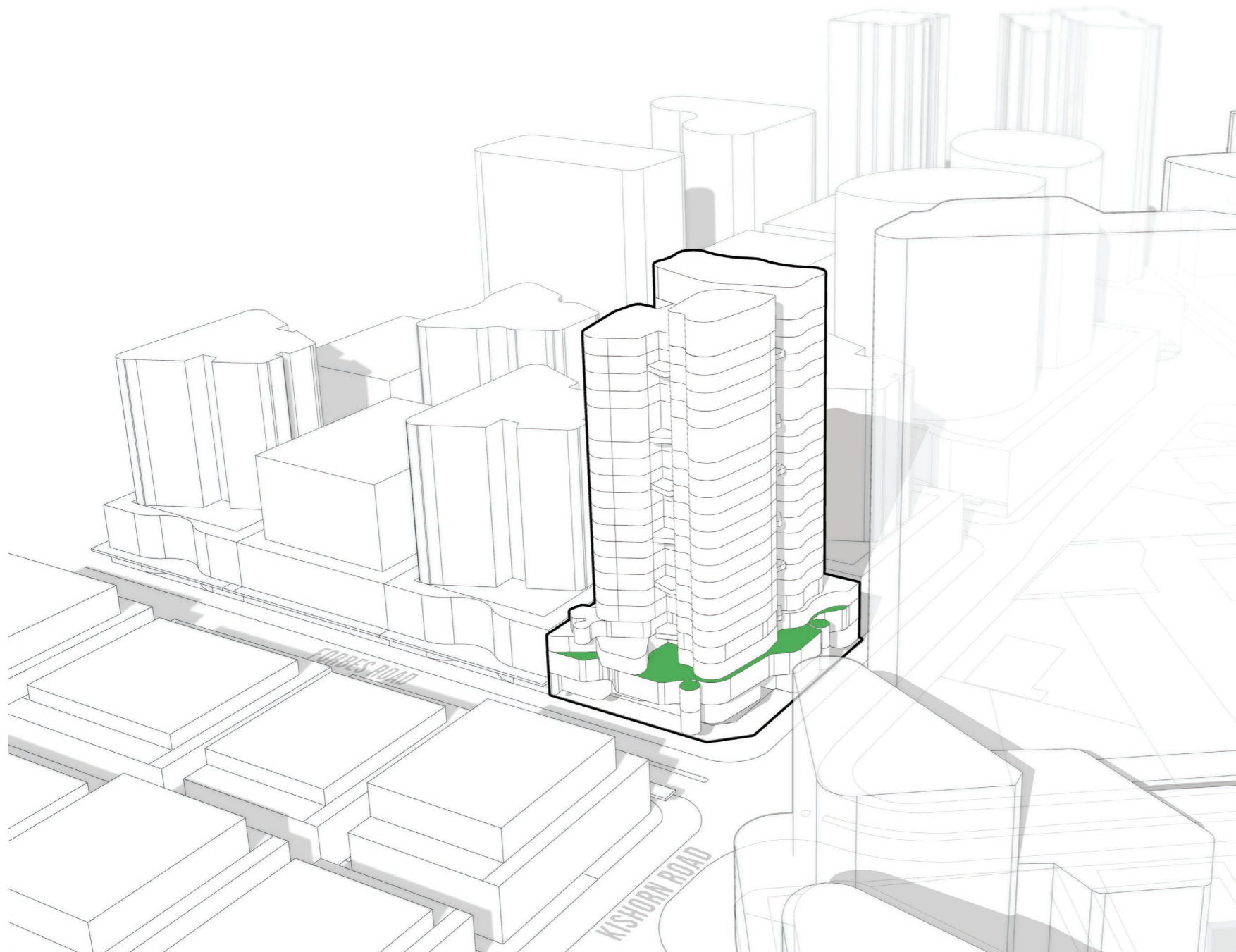
Provision of **landscaped spaces** and/or other facilities accessible to the public such as rooftop and/or **podium level gardens**

Community Garden on Level 1 Multiple landscaped areas on ground and first

If neighbours are coming to our corner cafe/bar why can't they take their coffee up to the podium and enjoy it up there too?

We believe a publicly accessible community garden that **wraps around the free venting podium** can provide an active use to the space and a break out point for members of the co-share.

Its location within the podium makes it **more intuitively accessible via a prominently placed public stair**; ideal for a general public who are not accustomed to having access to a private residential high-rise.



$$1220.5\text{m}^2 + 199\text{m}^2 + 300\text{m}^2$$

Current surplus of floor plate area

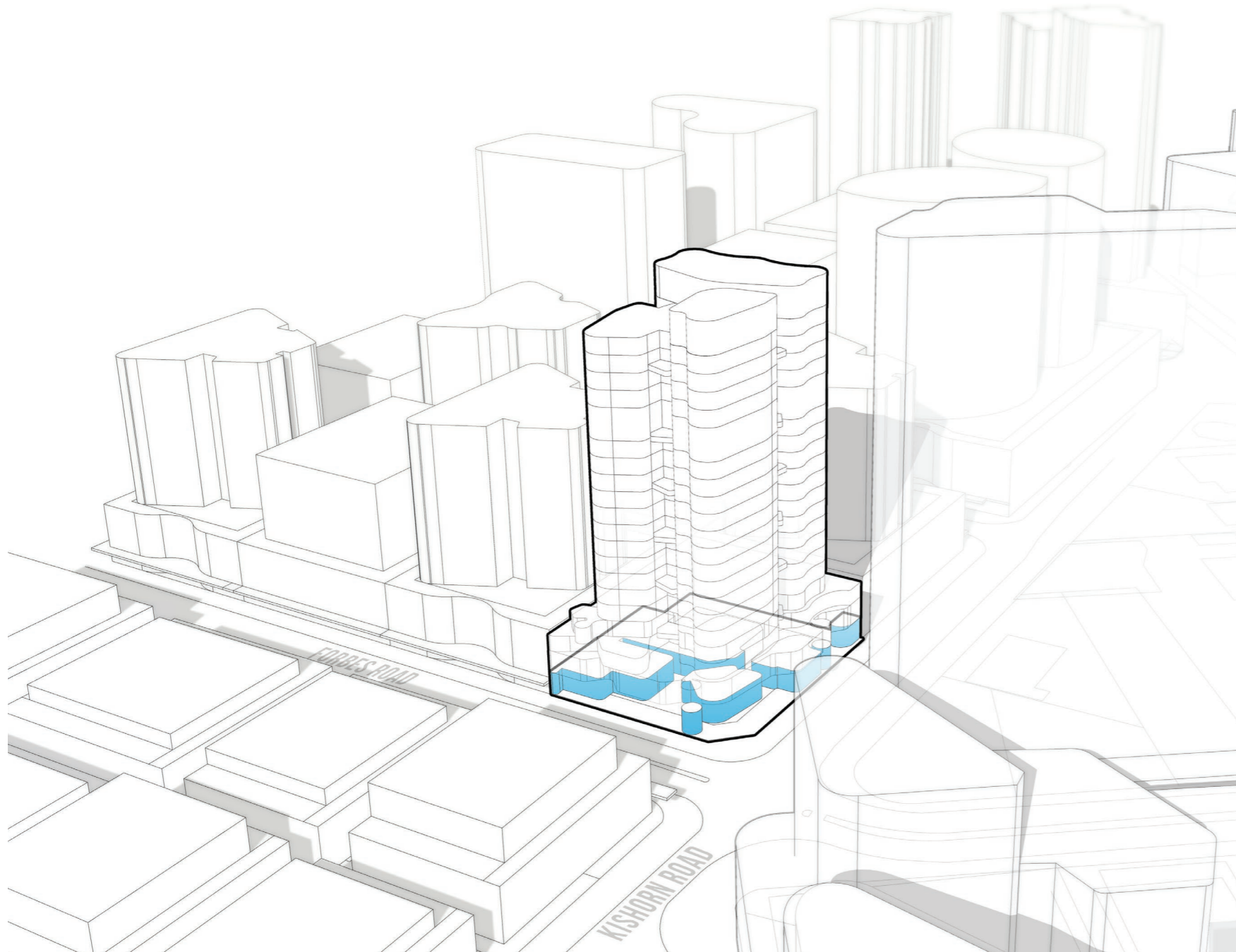
Community Garden

300m² alfresco & new public space on this prominent corner

$$= 1,719.5\text{m}^2$$

New surplus of floor plate area (incorporating community benefit areas)

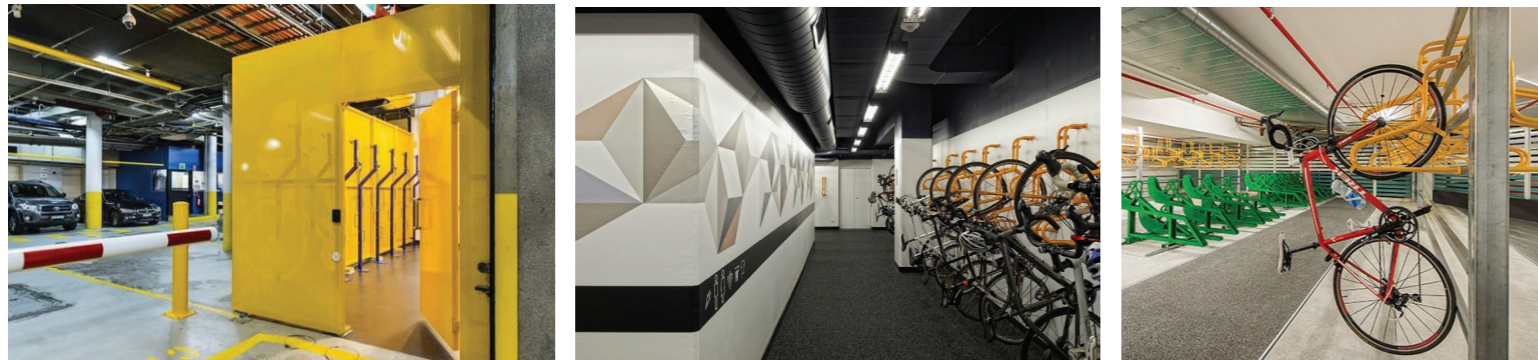
Provision of **public facilities** such as toilets, showers and sheltered bike storage.



Bike storage End of Trip (EoT) facilities

As the CBACP develops it's critical that there is increased infrastructure that can facilitate a **walking / riding / public transport** approach to life by residents and the public.

Forbes Residences accommodates this need by incorporating **extensive EoT facilities on the ground floor**, for both the general public and tenants of the building.



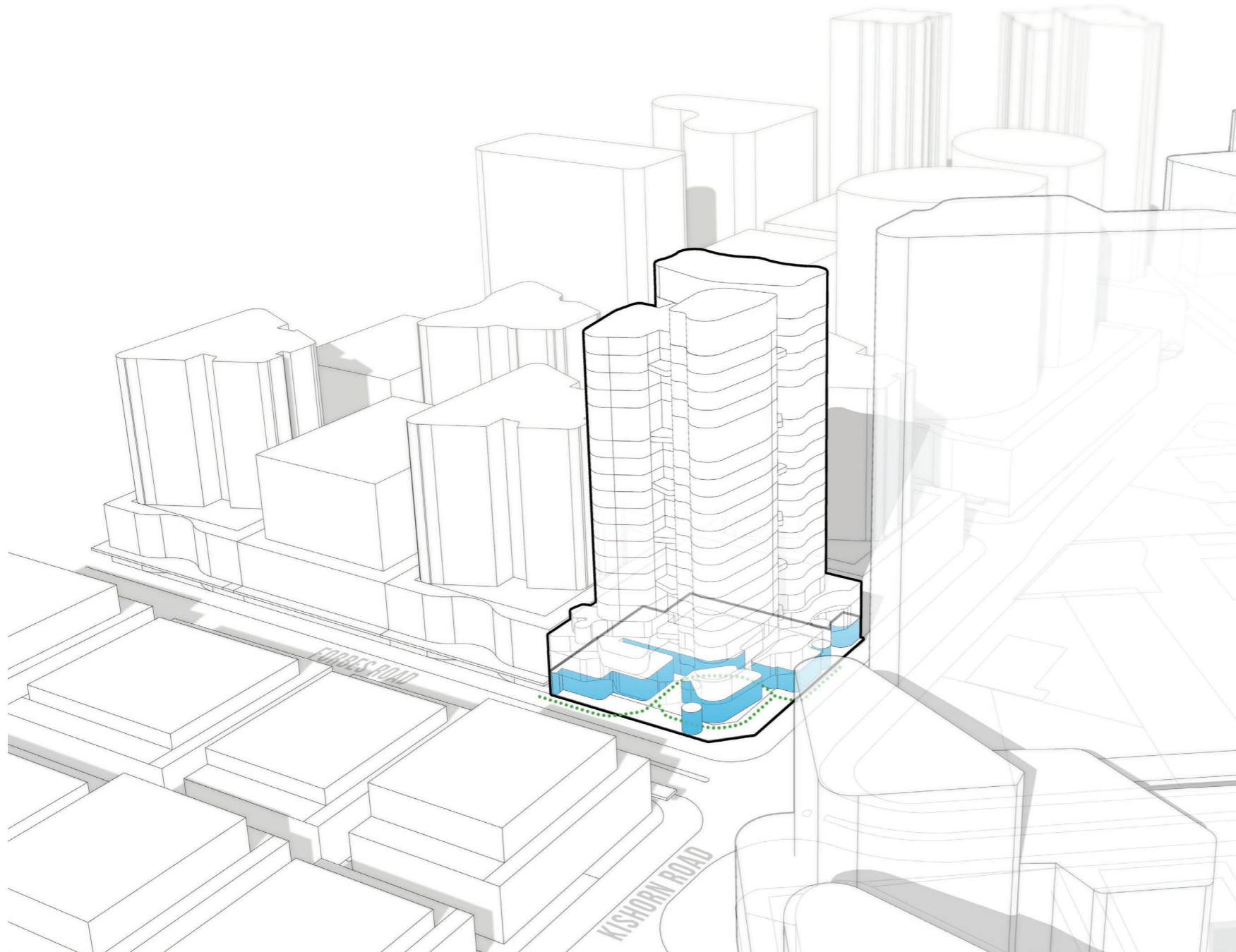
$$= 1,719.5\text{m}^2 + 87\text{m}^2$$

Current surplus of floor plate area EoT facilities

$$= 1,806.5\text{m}^2$$

New surplus of floor plate area
(incorporating community benefit areas)

Improvement to **pedestrian networks**



New pedestrian throughfares on ground New Planning Control Area land boundary adherence

The dynamic ground floor is catered to pedestrian movement, allowing an organic flow of foot traffic through the site via new pedestrian throughfares.

In addition to this, we are accommodating for any potential future planning by adhering to the new Planning Control Area land boundary.



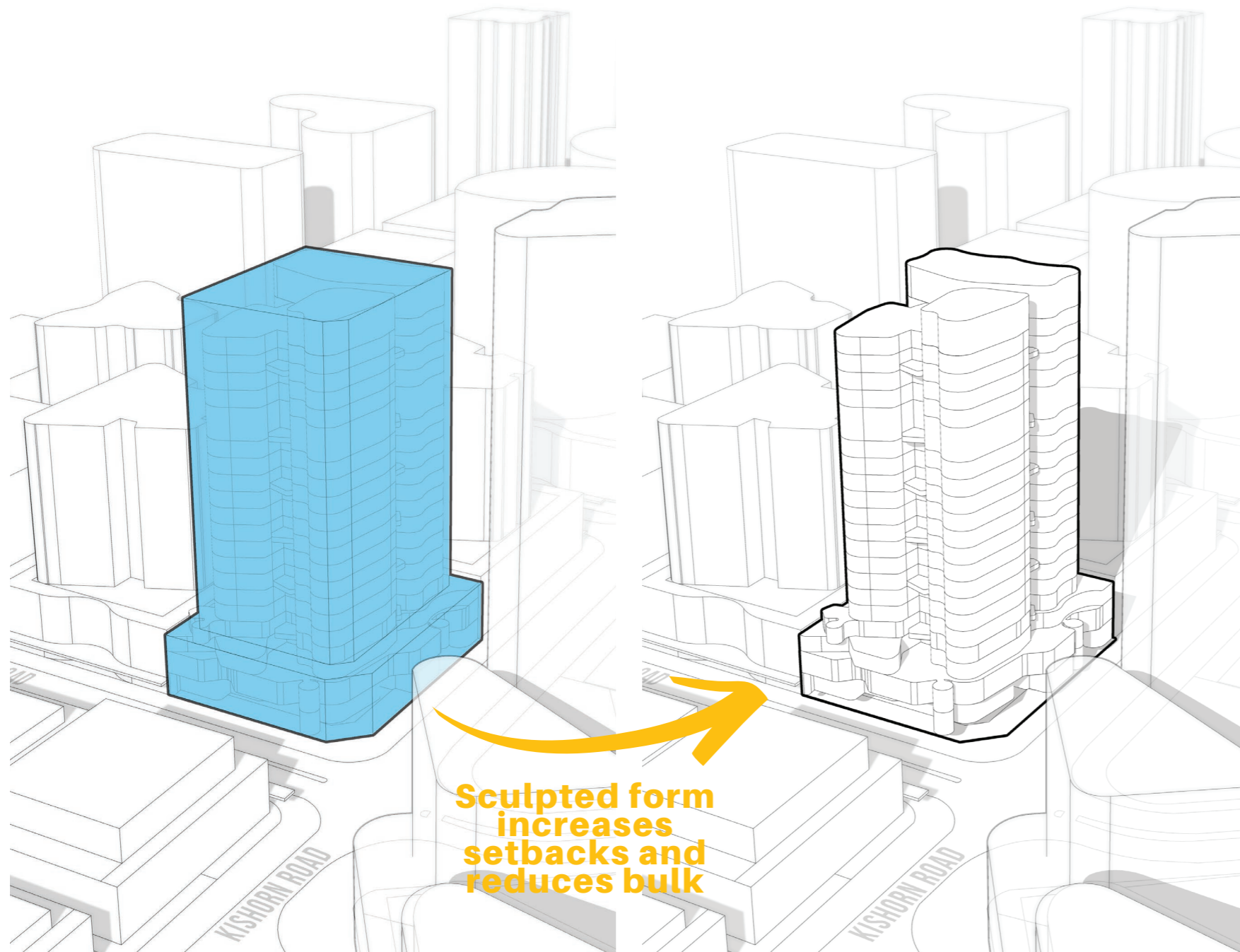
$$= 1,806.5\text{m}^2 + 291\text{m}^2$$

Current surplus of floor plate area Pedestrian Throughfare

$$= 2,097.5\text{m}^2$$

New surplus of floor plate area
(incorporating community benefit areas)

Provision of view corridors and/or mid-winter sunlight into adjacent properties

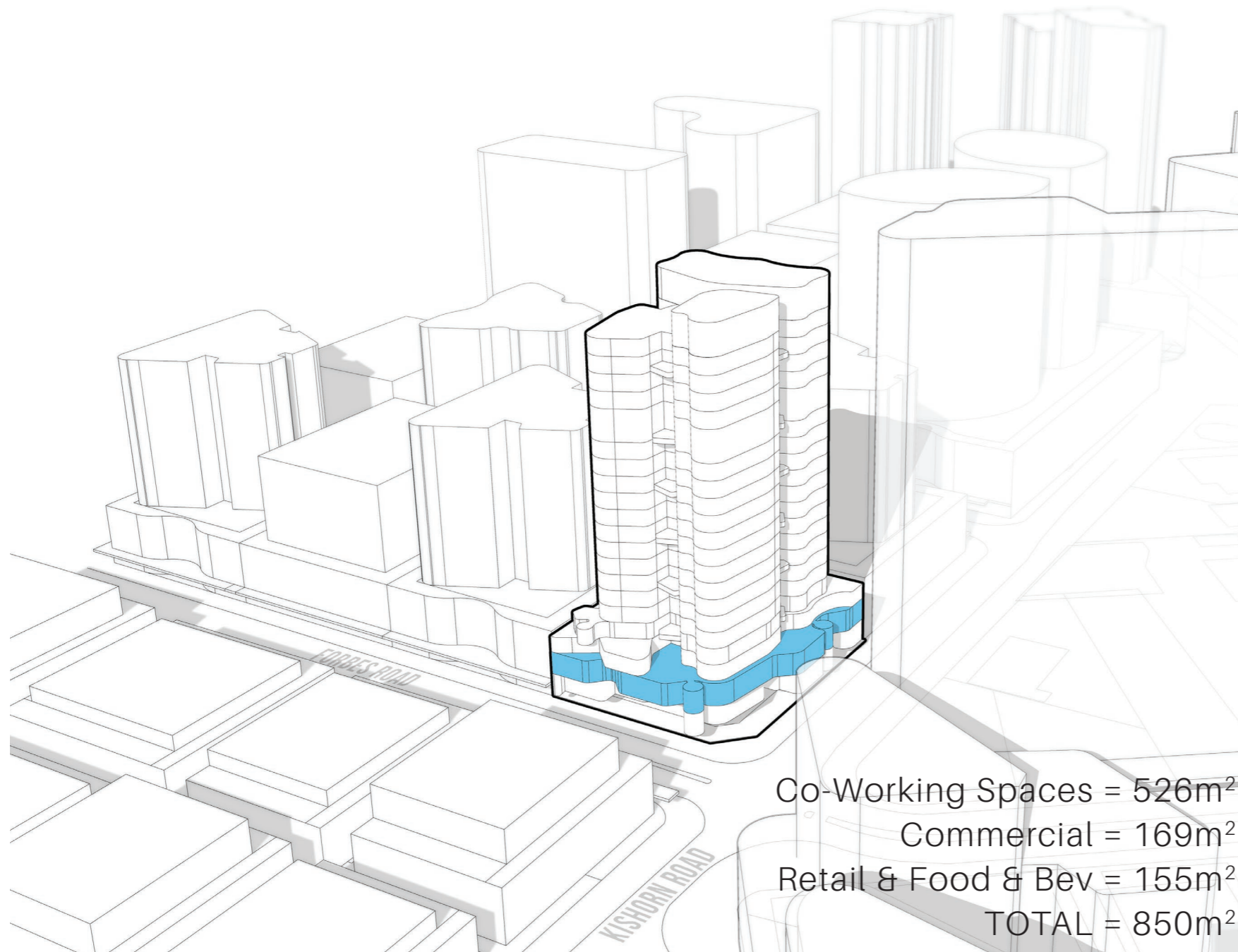


Sculpted built form reduces bulk

The contoured and sculpted built form of the building allows for a significant volume of the building to be removed. This reduced bulk optimises view corridors and sunlight access to neighbouring properties.

= 2,097.5m²
Current surplus of floor plate area
(incorporating community benefit areas)

Provision of community, communal and/or commercial meeting facilities.

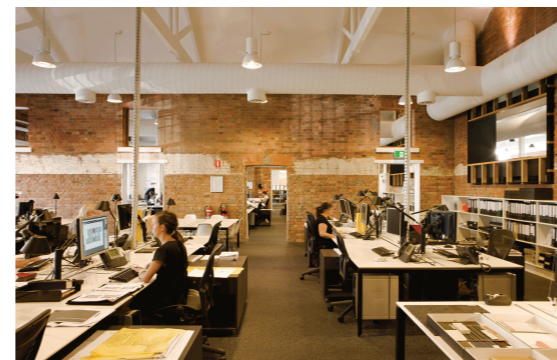


Co-Working Spaces = 526m²
Commercial = 169m²
Retail & Food & Bev = 155m²
TOTAL = 850m²

**Co-working spaces
Commercial spaces
Retail / Food & Bev**

In response to the public consultation and recommendation from the City, we have relocated the podium parking to the basement, allocating more prime podium space to the Applecross community.

Level one includes generous Co-Working & Commercial spaces, and an enlarged Community Garden.



= 2,097.5m² + 850m²

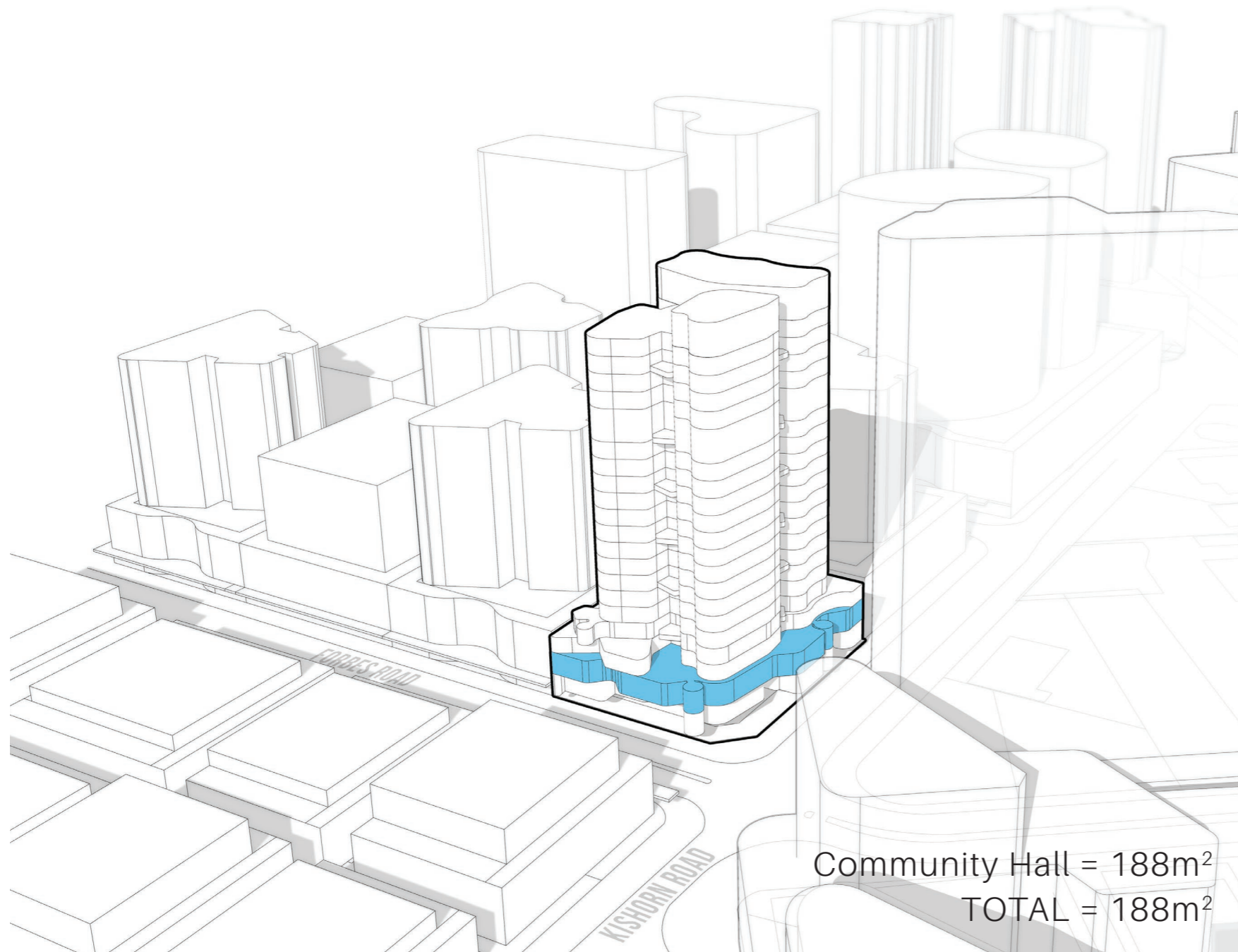
Current surplus of floor plate area

community, communal and/or commercial meeting facilities

= 2,947.5m²

New surplus of floor plate area (incorporating community benefit areas)

Provision of community, communal and/or commercial meeting facilities.



188m² Community Hall

In response recommendations from the DRP, we have relocated the podium parking to the basement, allocating more prime podium space to the Applecross community.

Doing this has allowed the addition of a 188m² publicly-oriented Community Hall. The Hall will be a **vibrant venue and home to an exciting roster of events**, from health seminars to yoga classes.

In addition to this, the peripheral garden landscaping on this level has been significantly increased, further integrating the building into it's surrounding environment, much more effectively than was possible with the previous scheme's podium level parking.



$$= 2,947.5m^2 + 188m^2$$

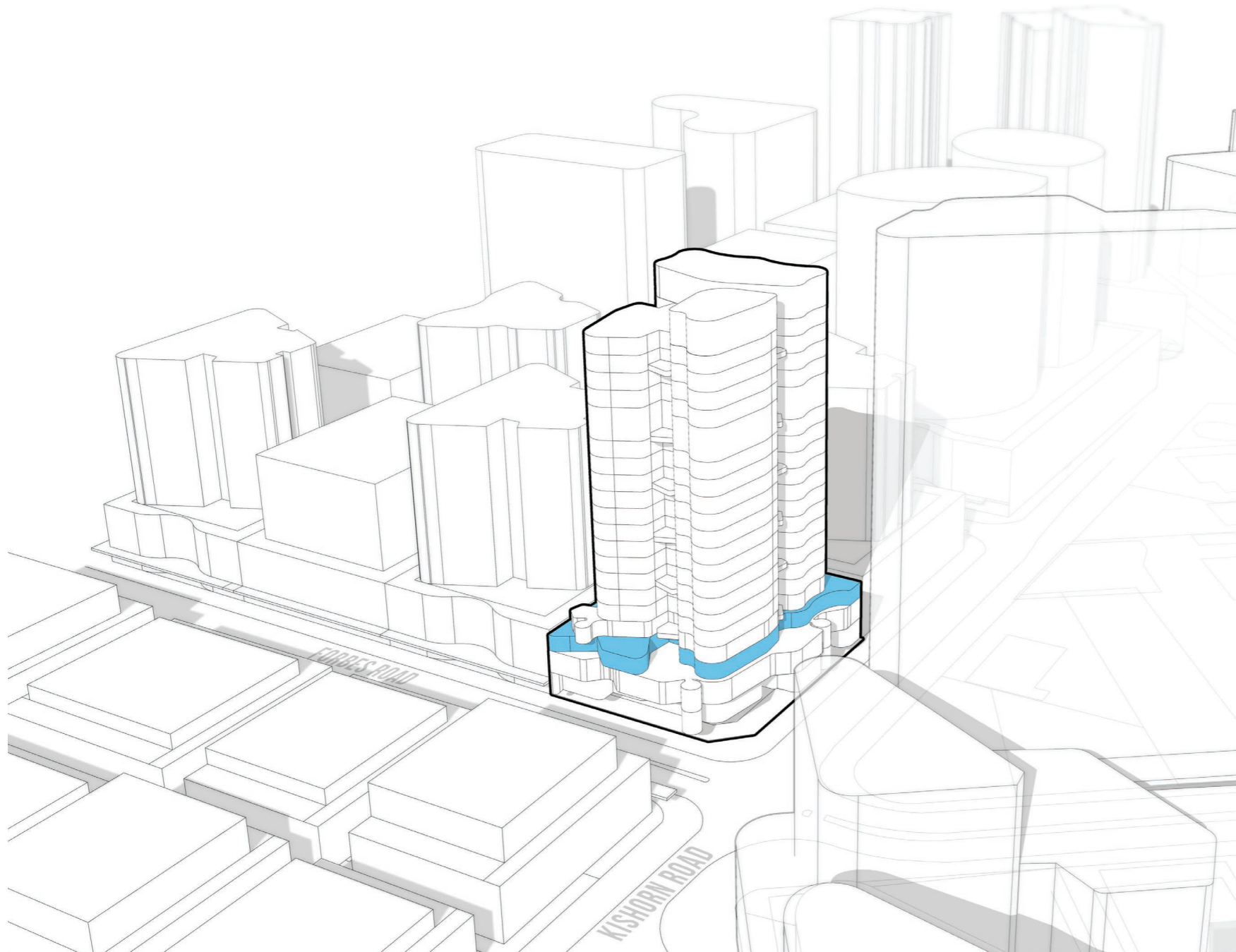
Current surplus of floor plate area

community, communal and/or commercial meeting facilities

$$= 3,135.5m^2$$

New surplus of floor plate area (incorporating community benefit areas)

The development comprises a hotel.

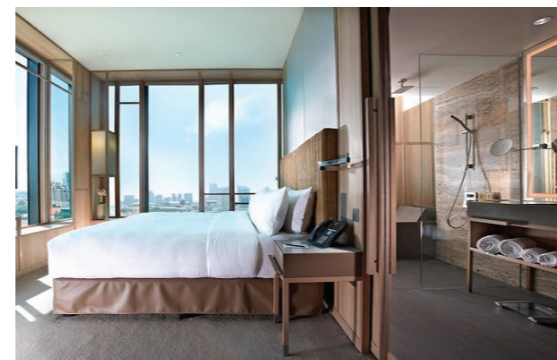


Short Stay Hotel

There is a **critical shortage** of short stay options in the city of Melville.

Increasingly around the world, tourists are interested in more **local/neighborhood stays** rather than in anonymous CBD hotels. Forbes Residences will localise these short stay tenants onto their own discrete floor on level 2, separate from permanent residents.

This boutique offer will **increase the amount of rooms** in the local area by **33%**.



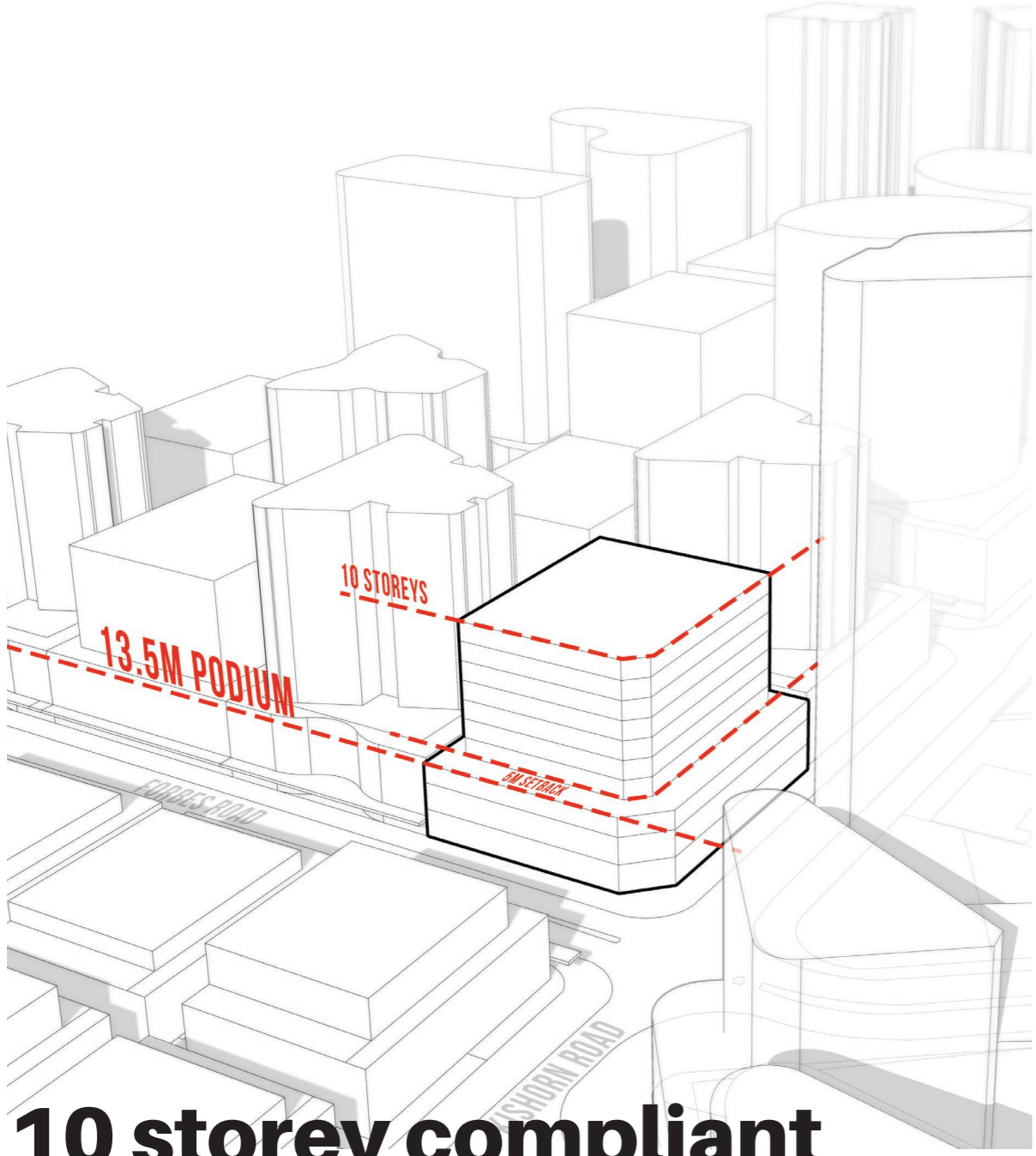
$$= 3,135.5\text{m}^2 + 1518\text{m}^2$$

Current surplus of floor plate area Short Stay Floor Plate

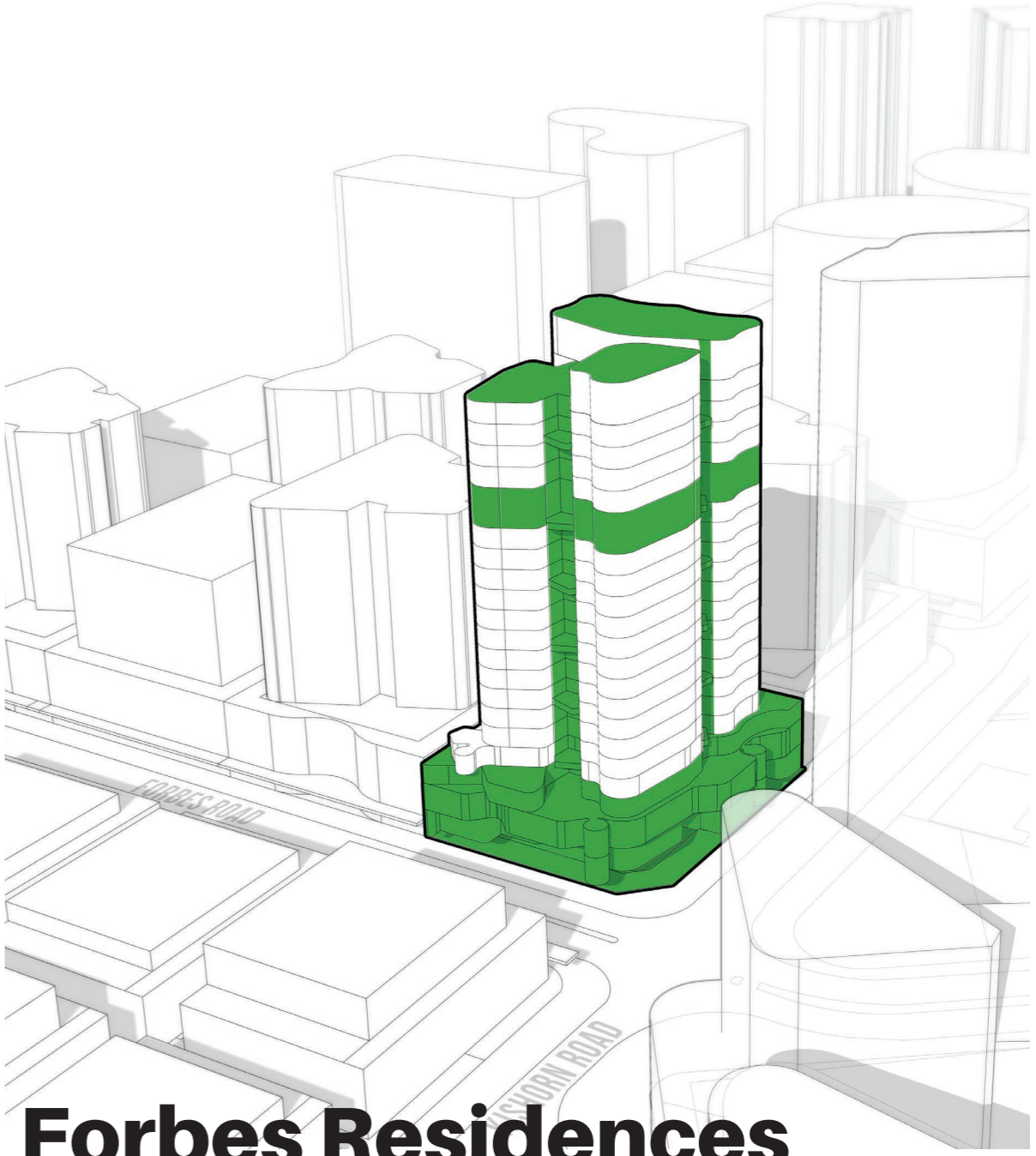
$$= 4,653.5\text{m}^2$$

New surplus of floor plate area
(incorporating community benefit areas)

So let's take another look at the comparison between the 10 storey compliant building and Forbes Residences...



10 storey compliant
15,988m² of total floor plate area



Forbes Residences
23,182m² of total floor plate area

1.

Forbes Residences	10 storey compliant
23,182	- 15,988
<hr/>	
= +7,194m² increase in floor plate area	

2.

From **+7,194m²** we can subtract the following three figures:

4734.5	- 3680	- 3433	=	<u>-4653.5m²</u>
averaged setback increase (m ²) (see pg.22)	landscape increase (m ²) (see pg.23)	element 22 surplus (m ²) <ul style="list-style-type: none">• community garden• public alfresco• public facilities (EoT) area• pedestrian throughfare• community & co-share areas• short stay area (see Appendix, pg.66)		

3.

This not only reduces the 7,194m² deficit to ZERO, but in fact gives an additional 4653.5m² back to the City of Melville and the community

Surplus of floor plate area (m ²)	Typical Floor Area (m ²)
4653.5	988
<hr/>	
= 4.71	



This is the equivalent to 4.71 floors of community benefit

In conclusion, we see community benefit as:

- + providing a significant **setback compliance & increase** through a considered built form, that reduces bulk and overshadowing
- + exemplary **greenery & landscaping**, that provides a landmark building that directly responds and contributes positively to the natural environment of Applecross
- + meeting seven requirements of element 22 by providing numerous **community oriented facilities**, such as an extended and vibrant street frontage, an exclusive Community Hall, a Community Garden, extensive and varied co-share & commercial spaces, a short stay hotel and public end of trip facilities

Imagine a building where...

Eleanor is a yoga instructor...

...and lives locally in Applecross. Every Tuesday and Thursday she walks to Forbes Residences to teach a public yoga class at the Community Hall on level one. She shares the hall with a weekly rotating roster of community classes and events.

Laura is a mum...

...who lives down the road from Forbes Residences. Every Thursday she takes her six-month-old for a playdate with her best friend and her ten-month-old, after grabbing a coffee at the Forbes Residences Café on the ground floor.

This Friday they're attending a parenting seminar in the Community Hall on level 1. Before the seminar they order a takeaway coffee and climb the public stairs to the Community Garden, where they let the little ones have a play while they wait for it to start.

Justin runs a small start-up...

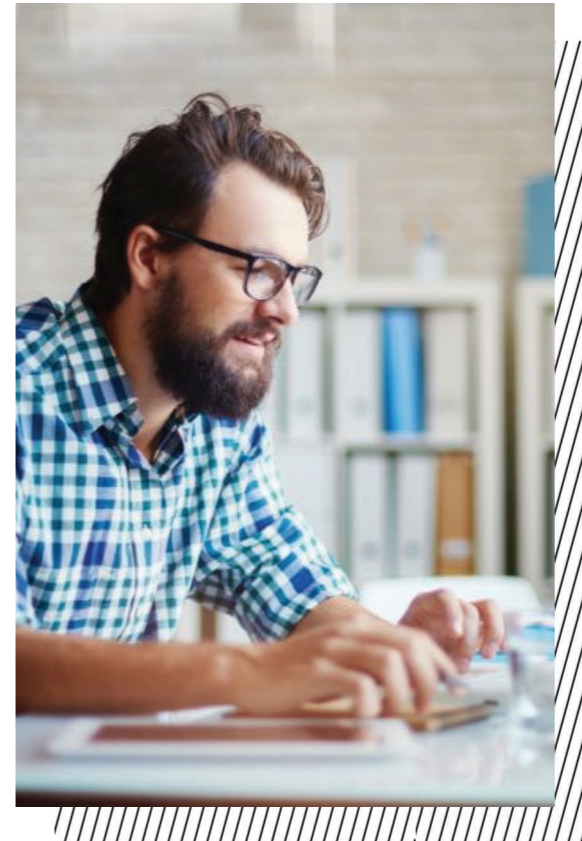
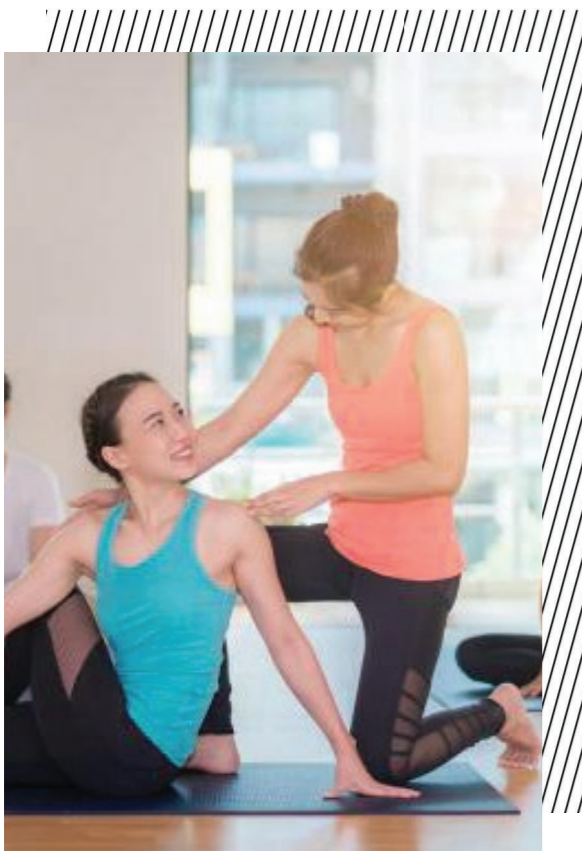
...developing mobile apps. He is just getting off the ground and is taking advantage of the co-working facilities at Forbes Residences. Each morning he hops on his bike and rides to the co-working space, using the public End-of-Trip facilities to freshen up.

Sometimes he uses Forbes Residences as a base, parking his bike there and catching a bus to the city for a meeting. Being at the very early stages of his start-up, Justin loves being able to use a vibrant, co-shared space at a minimal cost.

Elizabeth and Frank are visiting...

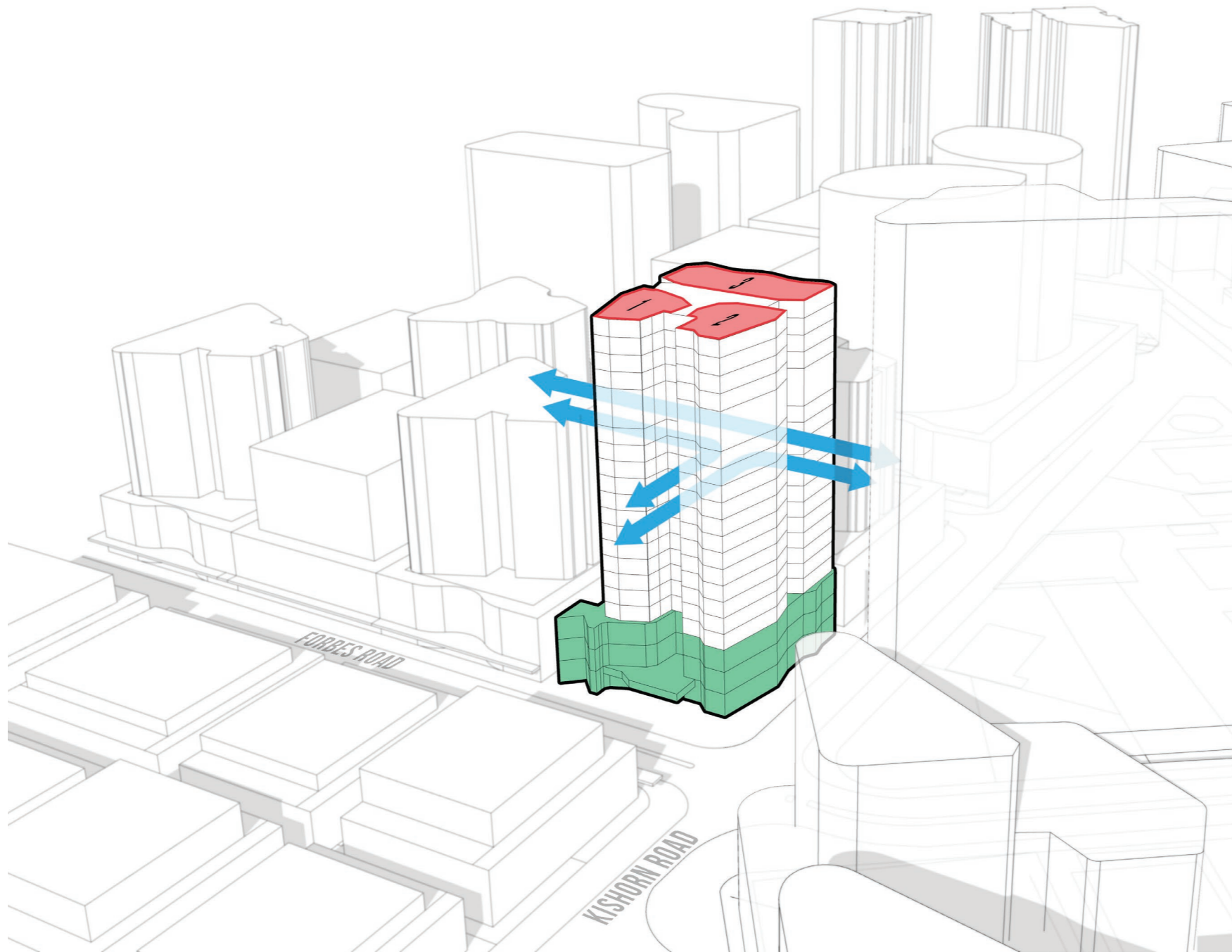
...from overseas, here to see their newly born grandson, Jack, whose parents live on Level 5. The convenience of being so close to their daughter and grandson, while also being able to give them (and have) their own space is extremely beneficial to them.

They love the convenience of taking the lift up to visit them each day and giving the tired parents a break by taking their older granddaughter, Julie, to the podium Community Garden on level 1.



This building will offer unique, inclusive opportunities that will benefit the **entire Applecross community.**

BUILT FORM+ SCALE



Tower

The tower is divided into a cluster of three "Jacaranda Petals", which allow the homes to be majority corner homes, with circulation spaces located at the perimeter. As shown in the setback analysis, this façade articulation also significantly reduces bulk.

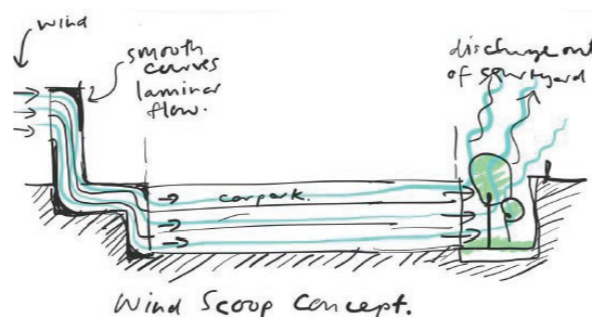
Natural Ventilation

The separation of the built form into three petals allows for the building to be naturally ventilated. Naturally vented corridors/lobbies can have a large effect on energy use - in a study by the City of Sydney, the common areas used up to 60% of the total energy use in highrise residential towers.

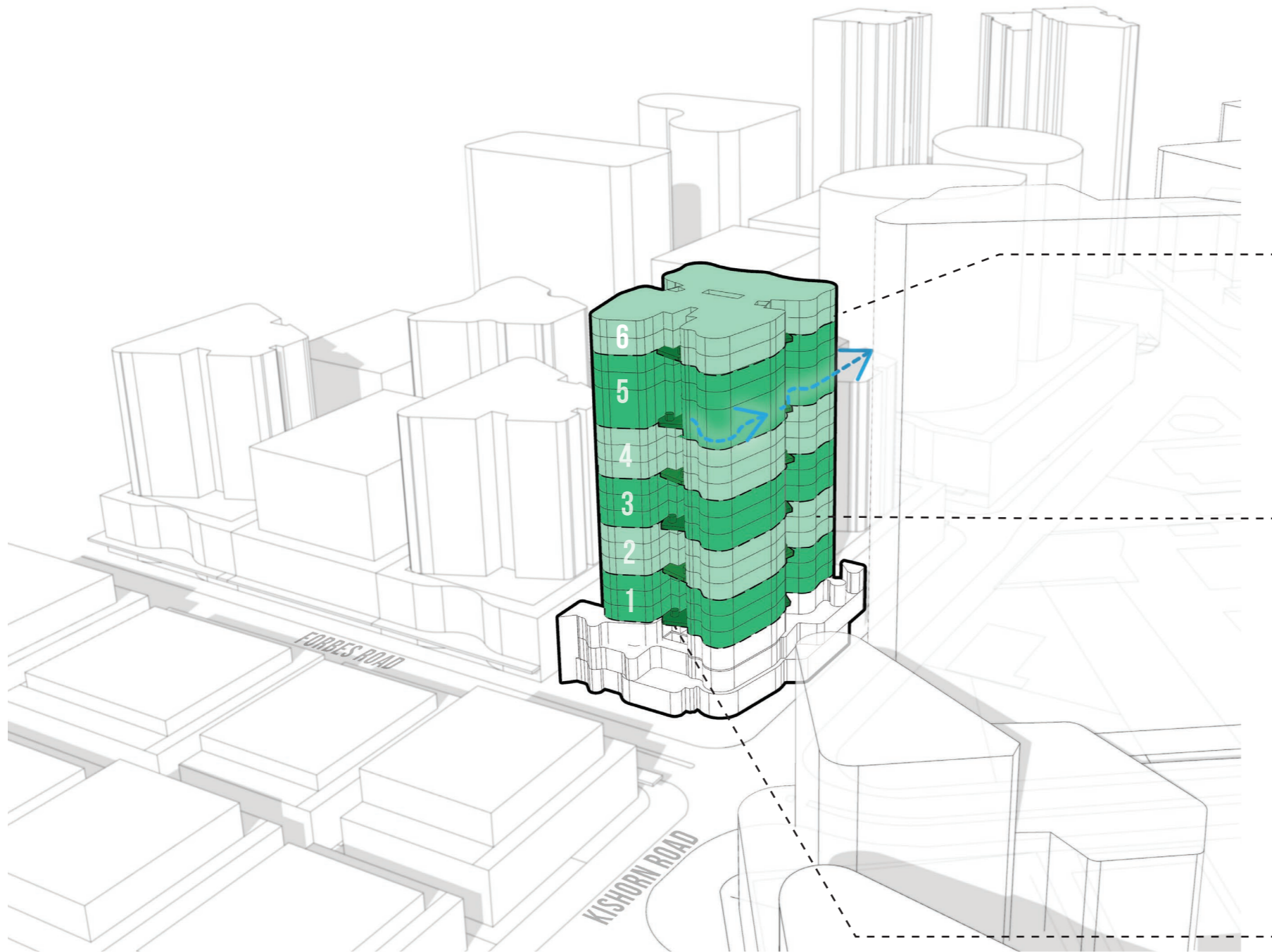
Podium

The first three levels are expressed as a planted facade that connects the street trees to the vertical gardens, with contoured & stepped planters that both enhance the corner and allow more space to plant trees.

Below ground windscoops are used to drive fresh air into the basement parking. This will reduce the long-term energy consumption.



BUILT FORM+ SCALE



Rounded Aesthetic

The **rounded shape** creates less turbulence and downdrafts as the **wind flows more smoothly** around the building.

Six Vertical Neighbourhoods

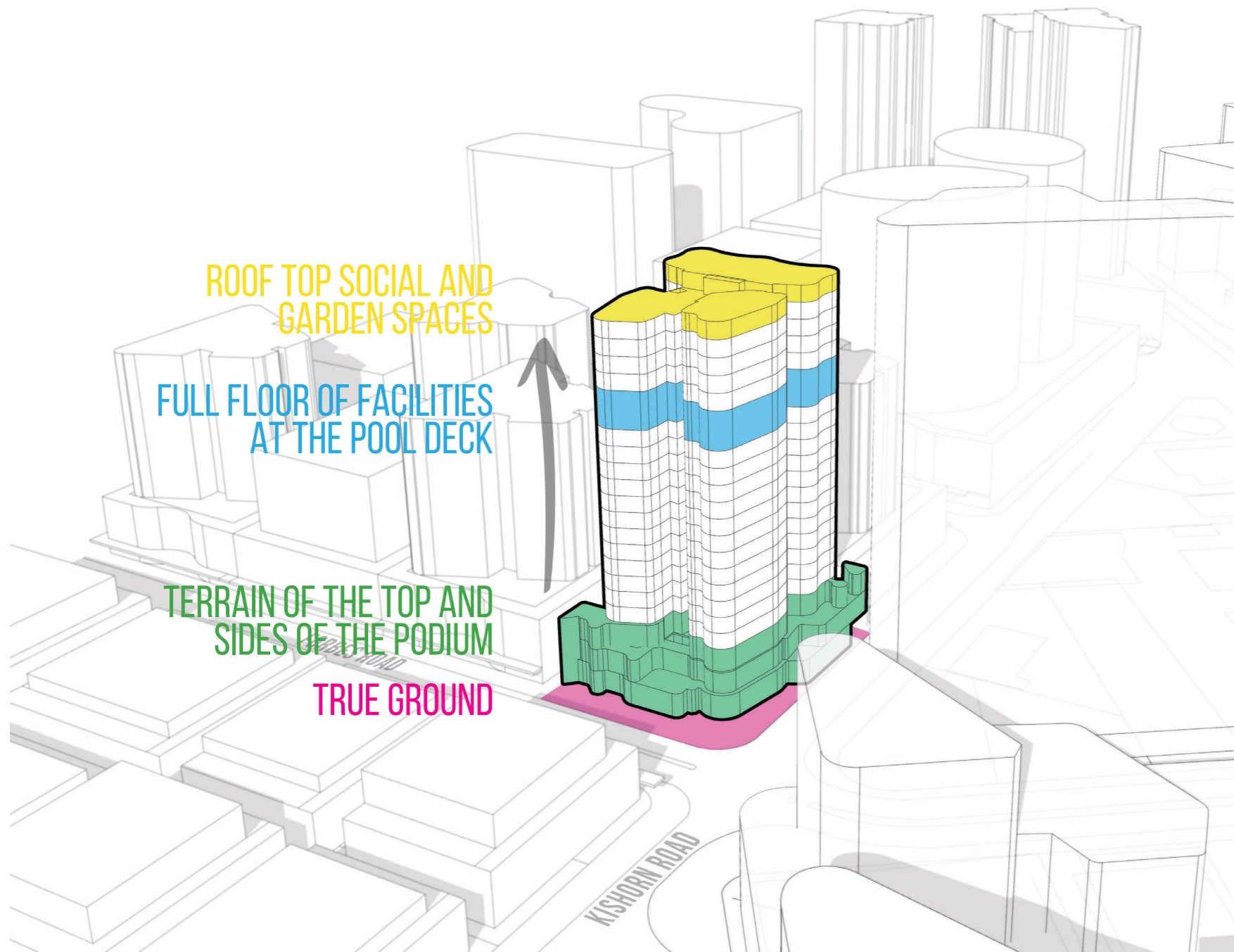
Naturally ventilated and lit lobbies which are divided primarily into **3-storey neighbourhoods**, each with their own Skygardens and character. In this development, rather than a tower of over 91 homes, it is a cluster of **6 vertical neighbourhoods**, each with approximately 15-20 homes.

Six Skygardens

The **skygardens** are located in recessed, protected pockets which create a more protected microclimate.



BUILT FORM+ SCALE



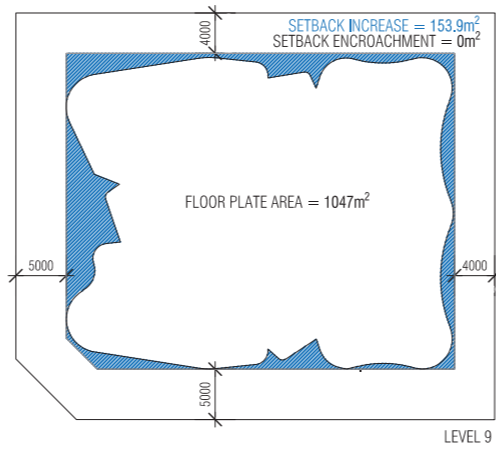
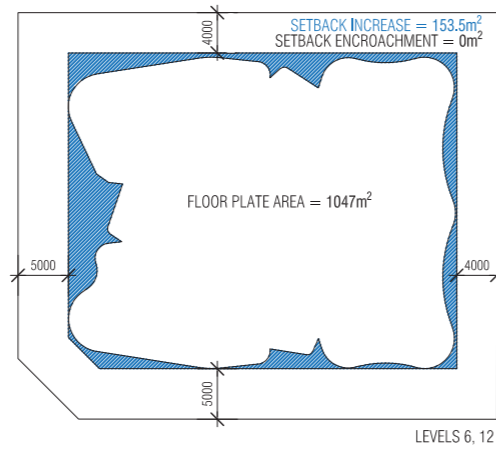
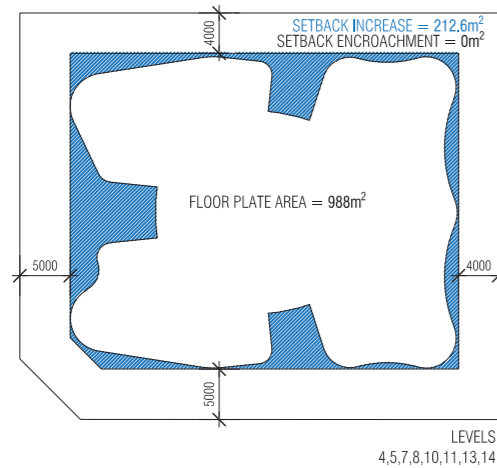
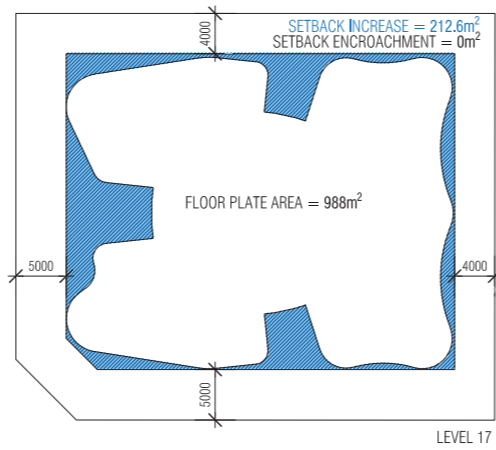
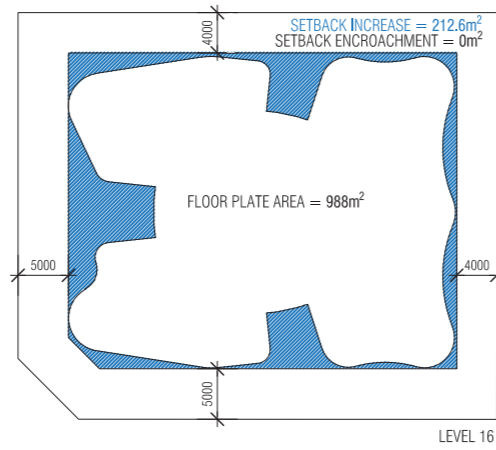
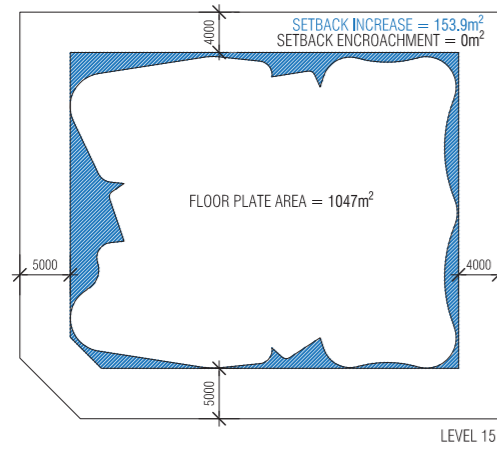
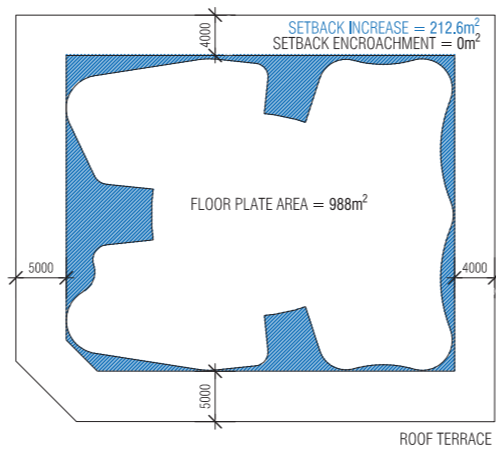
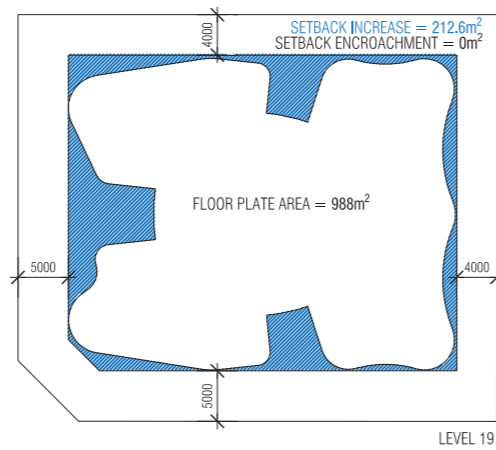
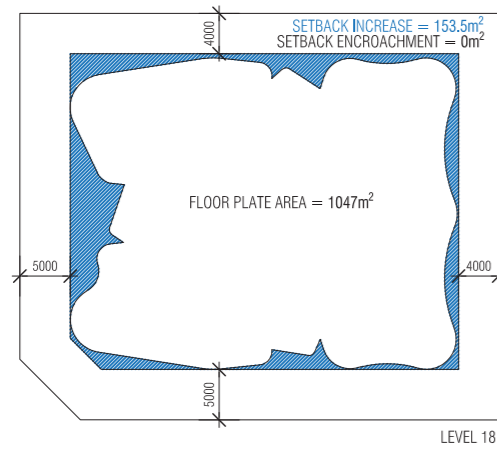
Multiple Ground Levels

The high amenity spaces are created through a series of "ground planes" where social activities take place.

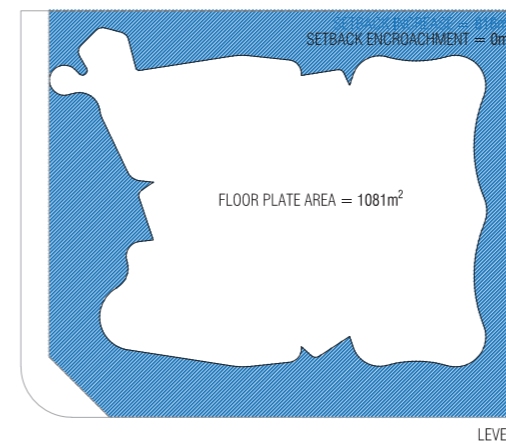
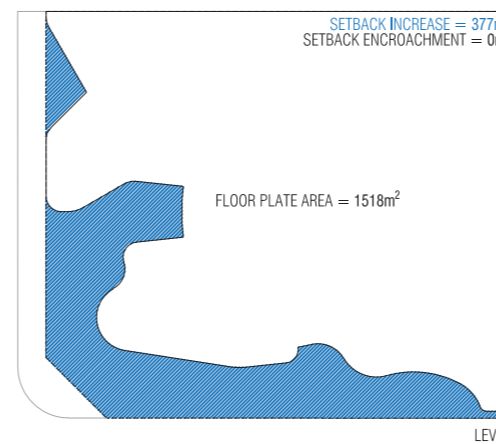
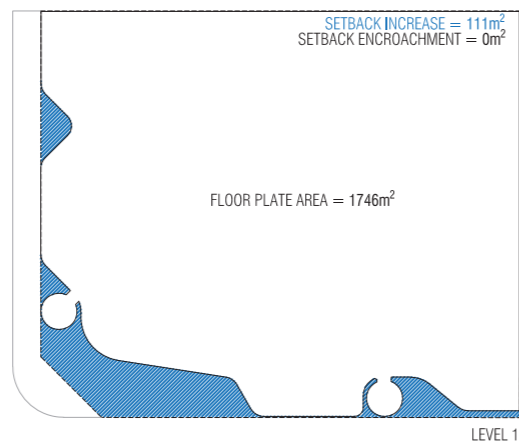
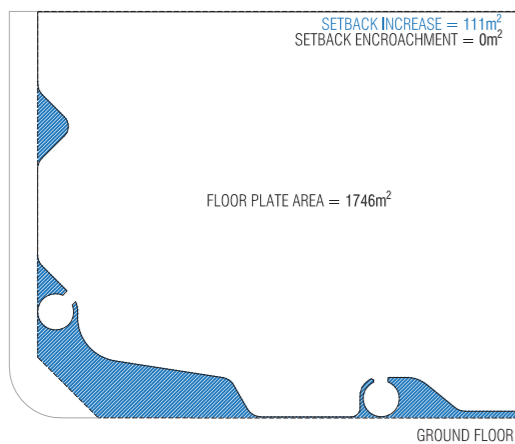


SETBACK ANALYSIS - FORBES RESIDENCES

TOWER



PODIUM



LEVEL	ENCROACHMENT	INCREASE	TOTAL
ROOF	0	212.6	212.6
19	0	212.6	212.6
18	0	153.5	153.5
17	0	212.6	212.6
16	0	212.6	212.6
15	0	153.9	153.9
14	0	212.6	212.6
13	0	212.6	212.6
12	0	153.5	153.5
11	0	212.6	212.6
10	0	212.6	212.6
9	0	153.9	153.9
8	0	212.6	212.6
7	0	212.6	212.6
6	0	153.5	153.5
5	0	212.6	212.6
4	0	212.6	212.6
3	0	816	816
2	0	377	377
1	0	111	111
G	0	111	111
TOTAL	0	4734.5	4734.5

TOTAL FLOOR PLATE COMPARISON

10 storey - 15 storey - Forbes Residences

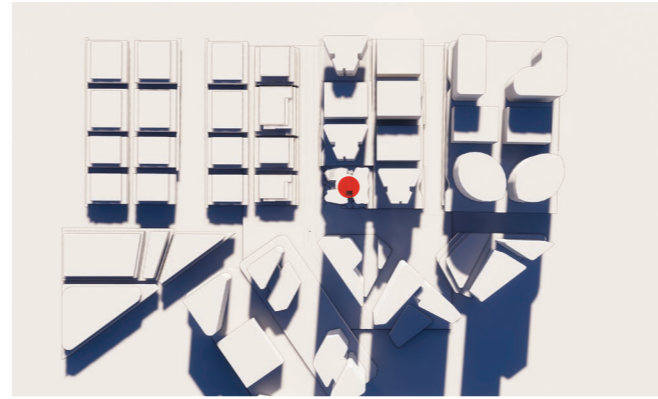
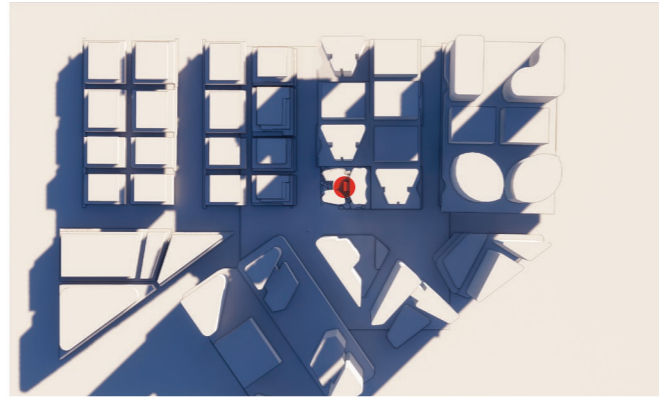
LEVEL	10 STOREY	15 STOREY	FORBES RESI
ROOF			988
19			988
18			1047
17			988
16			988
15		1200	1047
14		1200	988
13		1200	988
12		1200	1047
11		1200	988
10	1200	1200	988
9	1200	1200	1047
8	1200	1200	988
7	1200	1200	988
6	1200	1200	1047
5	1200	1200	988
4	1200	1200	988
3	1897	1897	1081
2	1897	1897	1518
1	1897	1897	1746
G	1897	1897	1746
TOTAL	15988	21988	23182

winter

Overshadowing
Analysis

**Forbes
Residences**

10 Storey
Compliant

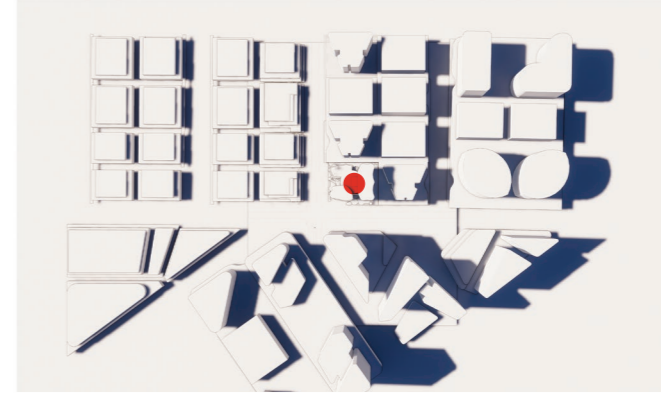
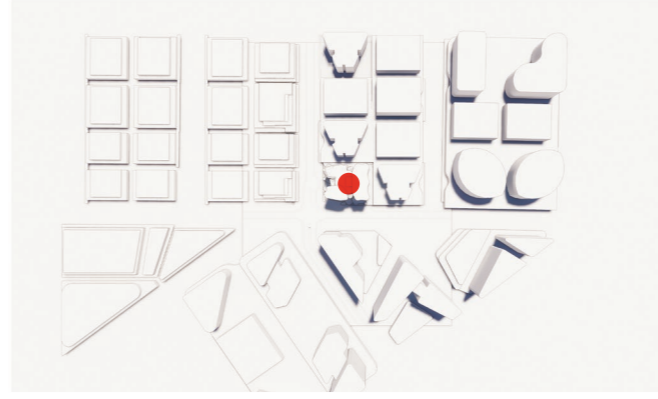
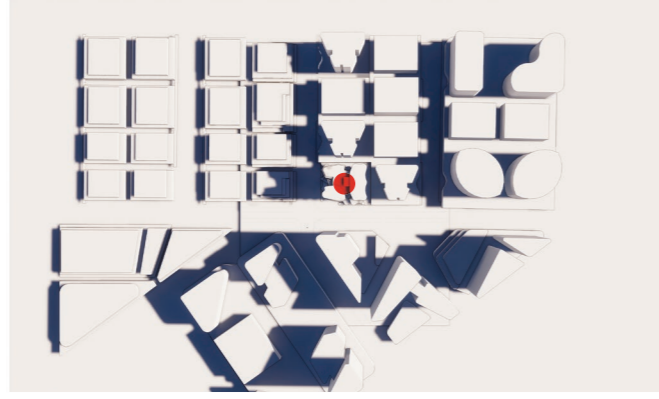


summer

Overshadowing
Analysis

**Forbes
Residences**

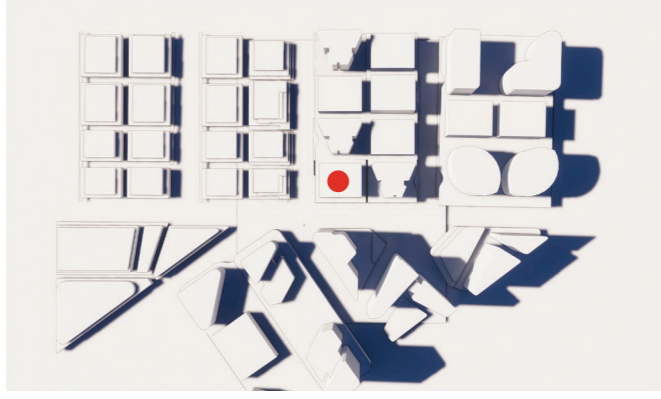
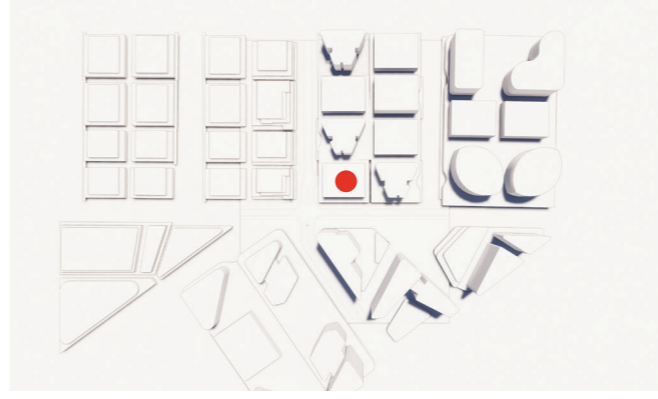
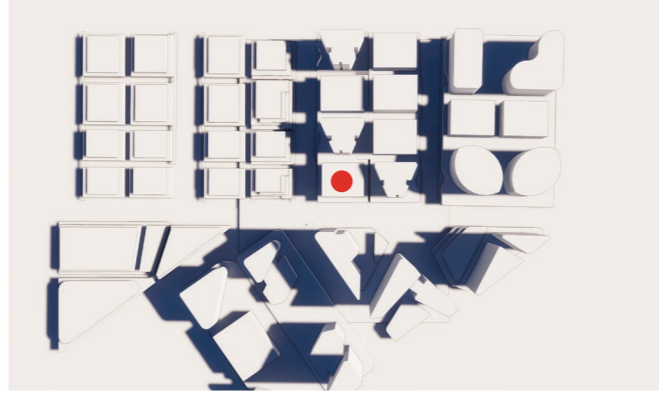
10 Storey
Compliant



9am

12pm

3pm





PEDESTRIAN WIND ENVIRONMENT STATEMENT

APPLECROSS, CORNER OF KISHORN AND FORBES ROAD,
PERTH

WE212-01F02(REV0)- WS REPORT

SEPTEMBER 18, 2018

Prepared for:

Apex View Pty Ltd

15 McCabe Street,
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Sydney | Abu Dhabi | London | Melbourne | Mumbai | New York | Hong Kong | Singapore

10_Principles

BUILT FORM+ SCALE

Wind Analysis

** Please see Appendix for full Wind Report **

- + The WindTech reports states that the scheme is 'relatively exposed' to the three predominant wind directions for the Perth region - the easterly, south-west, and westerly winds
- + However **suitable wind conditions can be met** with the **implementation of wind treatments** at trafficable areas within the scheme
- + These solutions will be **developed and implemented** through design development to achieve optimal outcomes



Street analysis_
Pedestrian & Vehicle Entrance from Kishorn Road



Street analysis_
Entrance from Forbes Road



FORBES RESIDENCES

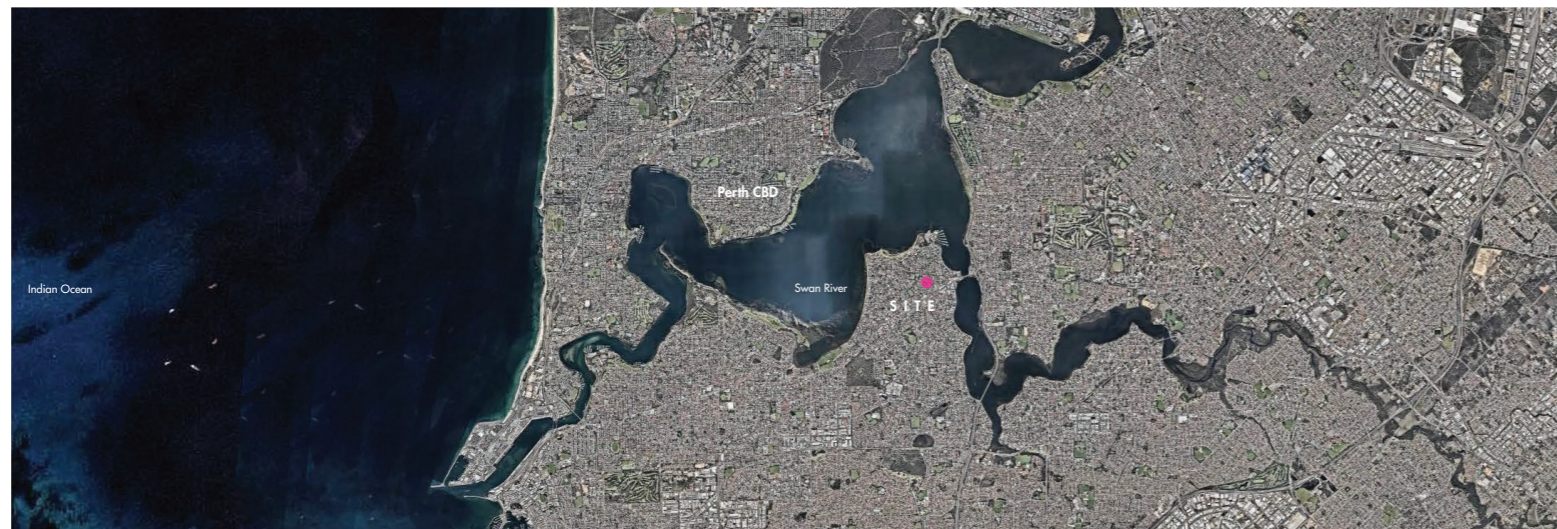
10_Principles

LANDSCAPE QUALITY

Landscape Design Report

FORBES Residences
Applecross, Western Australia

Landscape Schematic
DA Submission Issue - 181116



FORBES RESIDENCES
APPLECROSS

W O H A x M J A | C A P A
architecture | landscape
design

Landscape architects CAPA have provided a detailed landscape strategy, with the following three key issues of concern being addressing in the following pages:

1. **Overall
Landscape
Strategy**
2. **Water
Efficient
Landscapes**
3. **Wind
Initiatives**

These three issues will demonstrate how the landscaping in this scheme will be achieved **in the Perth climate.**

1. Overall Landscape Strategy

Considered Plant Selection:

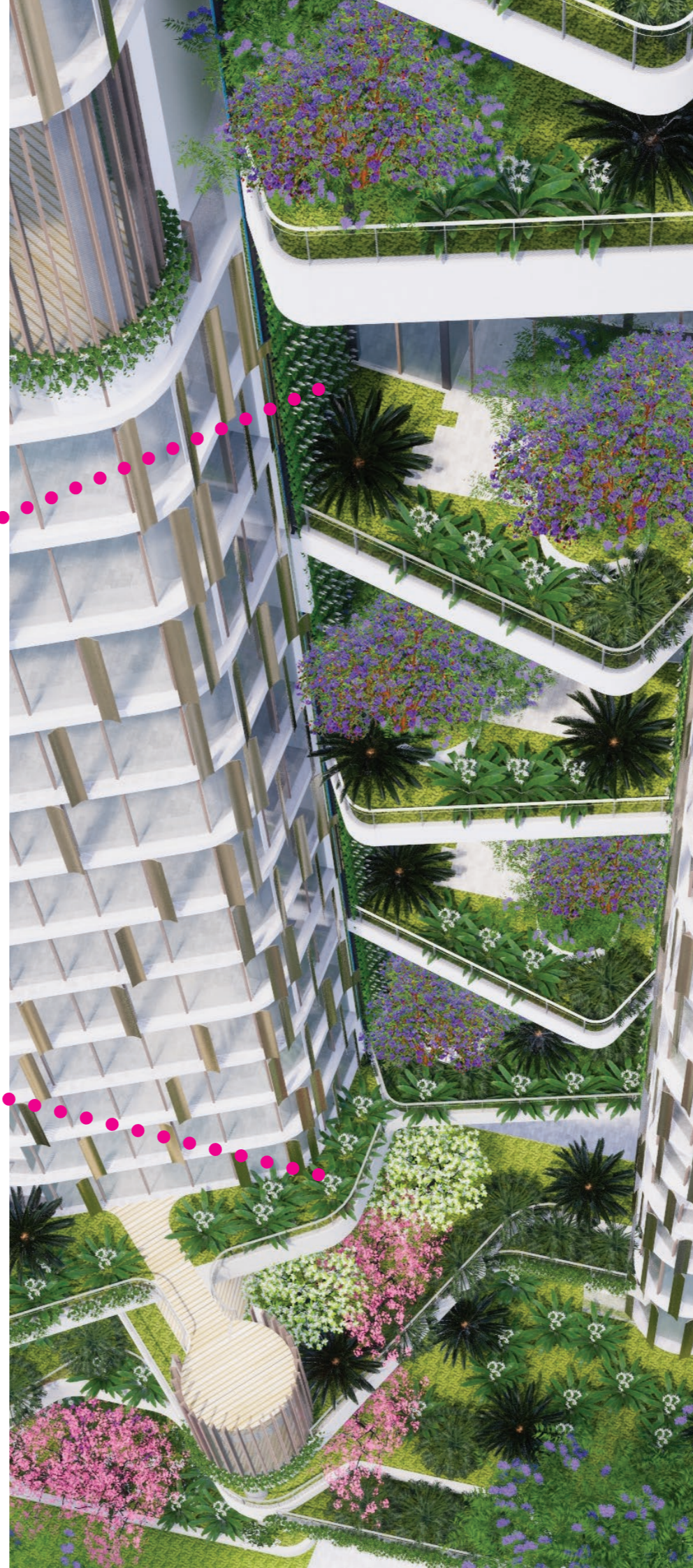
Vertical Planting

Plant selections will be resilient clinging type affixed to the trellis structure

Linear planters placed every 1.5m in height, behind a fixed trellis system set off from the building to allow ease of maintenance access behind

Ground & Podium Levels

resilient & low maintenance native plants selected



Other Considerations:

Continuing input and expertise

...during design development and input by a specialised vertical softscape engineer

Final analysis

...and accompanying certification be submitted as part of the Building License Issue as a commitment to provide a system that will provide a sustained outcome

The project's team approach is to include the right expertise, appropriate system, evaluate proven examples of installed examples that have thrived over a reasonable period of time in Perth.

2. Water Efficient Landscapes



A four tiered strategy:

1. Plant selections (low water requirement)

- + In principle, the majority of the softscape ground planting selections are endemic and **have a low water requirement**
- + The scheme will also include some feature exotics; offering **flowering, deciduous trees** and shade qualities

2. Reduced evaporation losses

- + The majority of plantings are located in **raised planters** reducing water evaporation loss
- + Gravel mulching selected for wind will also provide a **blanket layer** for reducing water evaporation
- + Irrigation is provided **below the mulch layer** which offers greatly improved efficiency

3. Efficient water supply

- + All plantings will be irrigated via efficient **inline drip irrigation system** which will cater for water mains and recycled water supply
- + Where achievable, the plantings will be **hydro-zoned** according to water requirements, allowing the reticulation to the endemic plantings to be **separately controlled and greatly reduced** following their establishment period

4. Water recycling

- + The project will also include infrastructure and provision for a significant capacity for **re-using water for irrigation**, consistent with WA Health Department guidelines for multi-residential developments and use
- + **A grey water recycling system** has been appropriately sized for a maximum of 5000L per day, that will collect water from Short Stay Accommodations shower and handbasins and EoT shower facilities. The ozone treated water will be dispelled via the dripline.

3. Wind Initiatives



Skygardens

Landscaping elements benefit from the recessed design of the Skygardens

Skygarden trees will be permanently guyed with vertically tensioned wiring supports and collars





Smaller trees to the podium areas will be guyed with stainless tripod arrangement

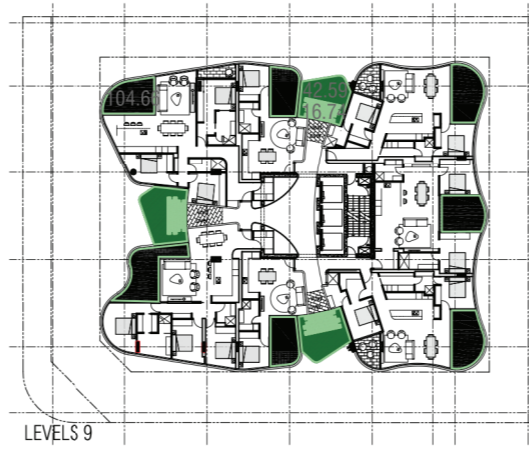
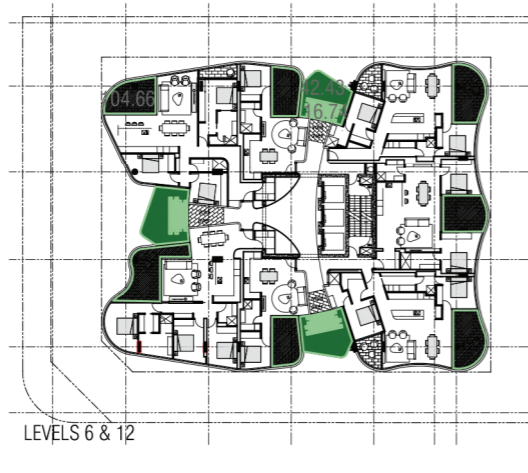
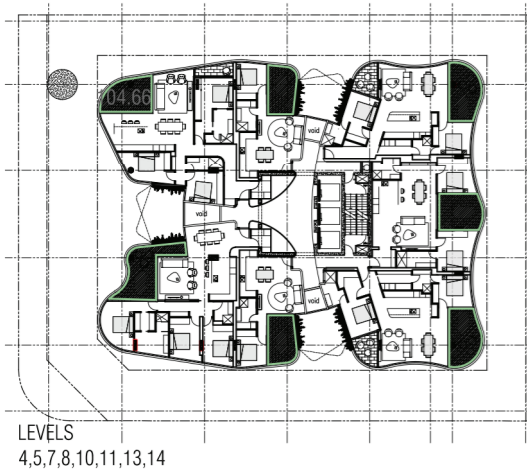
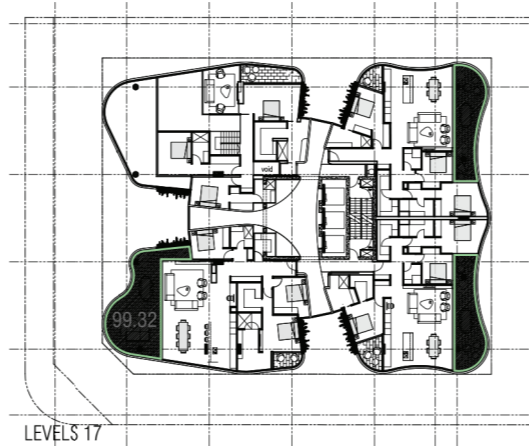
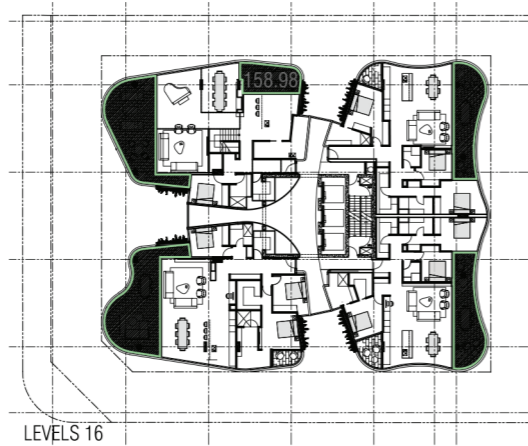
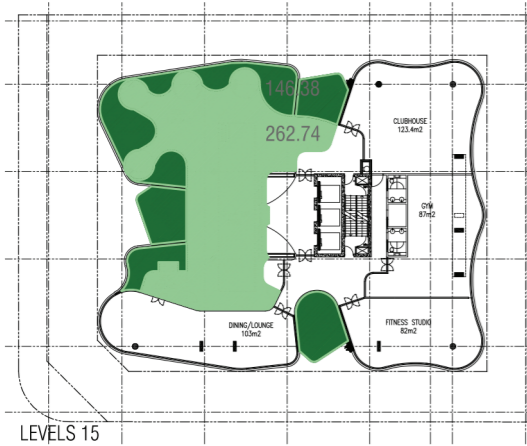
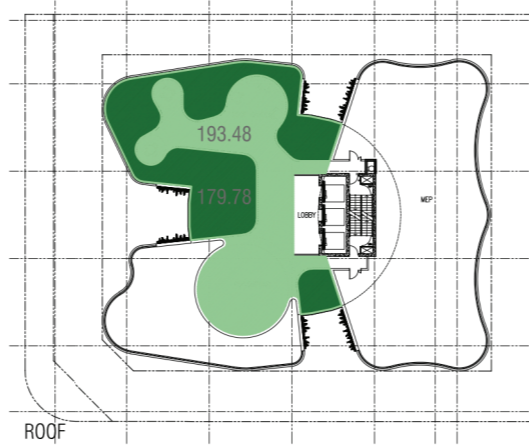
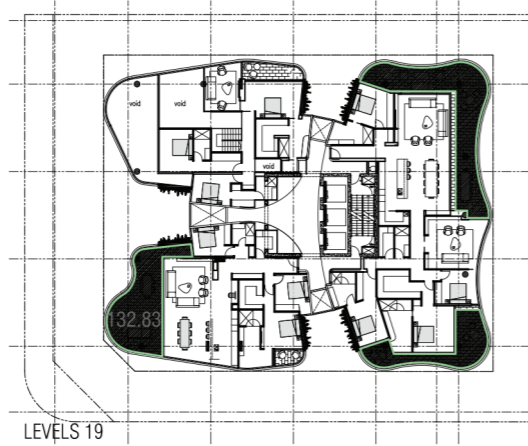
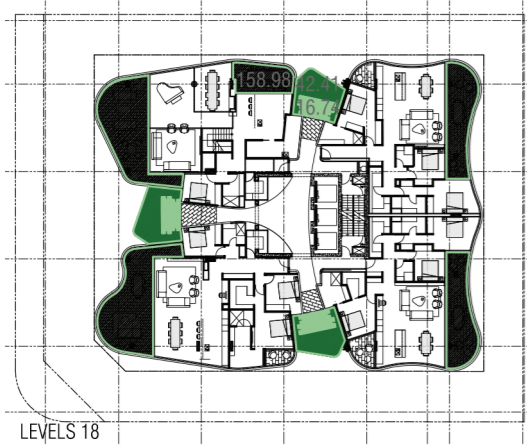
Vertical Trellis'

Vertical trellis elements will require considered planting selection to optimise solar access and wind protection

Each of these trellis arrangements will be tested during design development

LANDSCAPE CALCULATIONS

-  LANDSCAPE AREA
-  PLANTING ON STRUCTURE (as deep soil alternative)
-  DEEP SOIL
-  BALCONIES > 12M2



HORIZONTAL LANDSCAPE AREAS

LEVEL	LANDSCAPE D ZONES (m2)	PLANTING ON STRUCTURE	DEEP SOIL	TOTAL LANDSCAPE AREA/LEVEL (m2)
ROOF	193.48	179.78	-	373.26
18	16.74	42.41	-	59.15
15	262.74	146.38	-	409.12
12	16.74	42.43	-	59.17
9	16.74	42.59	-	59.33
6	16.74	42.43	-	59.17
3	16.74	42.59	-	59.33
2	39.46	311.14	-	350.6
1	199.47	384.11	-	583.58
G	122	85.79	91.01	298.8
TOTAL	900.85	1319.65	91.01	2311.51

TOTAL HORIZONTAL LANDSCAPE AREA = 2311.51m²

BALCONIES > 12M2

LEVEL	PLANTING ON STRUCTURE
ROOF	-
19	132.83
18	158.98
17	99.32
16	158.98
15	-
14	104.66
13	104.66
12	104.66
11	104.66
10	104.66
9	104.66
8	104.66
7	104.66
6	104.66
5	104.66
4	104.66
3	103.65
2	-
1	-
G	-
TOTAL	1805.02

TOTAL BALCONY OVER 12M2 AREA = 1805m²

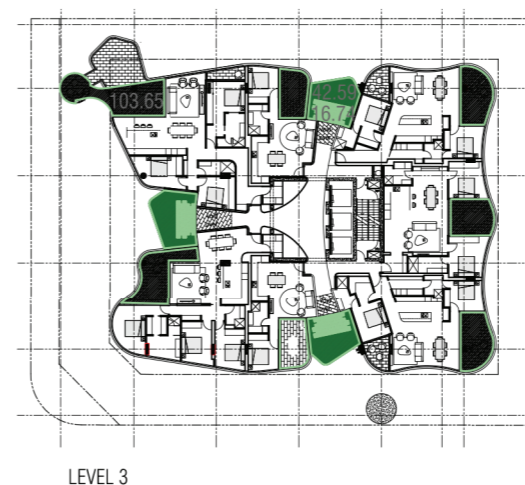
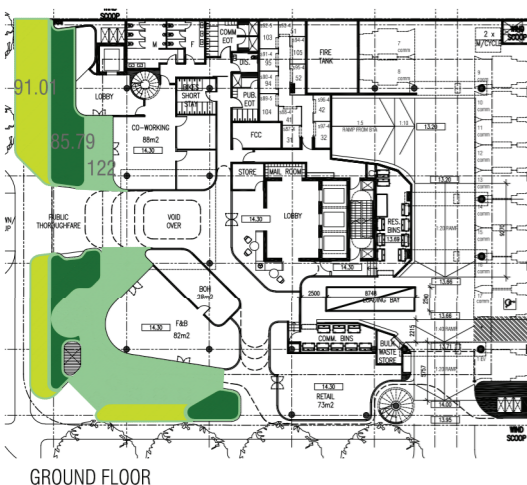
VERTICAL LANDSCAPE AREAS

LEVEL	PLANTING ON STRUCTURE
ROOF	-
19	243.22
18	-
17	-
16	255.84
15	-
14	-
13	210.76
12	-
11	-
10	-
9	-
8	-
7	643
6	-
5	-
4	-
3	-
2	53.82
1	180.2
G	-
TOTAL	1586.84

TOTAL VERTICAL LANDSCAPE AREA = 1587m²

TOWER

PODIUM



CBACP REQUIREMENTS

$$\begin{aligned}
 & (\text{BALC} + \text{VERT} + \text{HORIZ}) / \text{SITE AREA} \\
 &= (1805\text{m}^2 + 1587\text{m}^2 + 2311.5\text{m}^2) / 2023\text{m}^2 \\
 &= 5703.5 / 2023 \\
 &= 2.82
 \end{aligned}$$

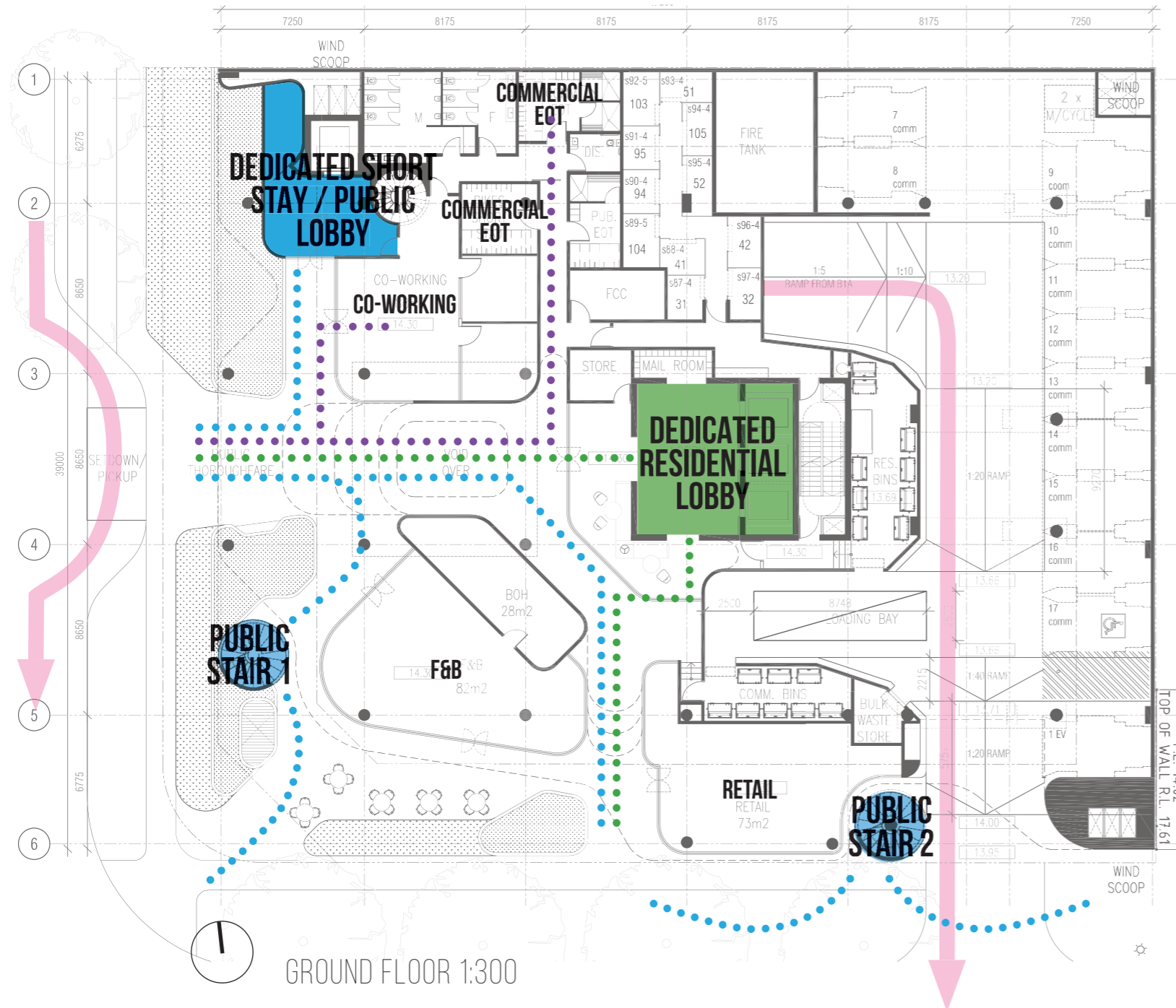
282% OF THE MINIMUM REQUIRED IN THE CBACP (Clause 10.3)

WAPC APARTMENT DESIGN POLICY REQUIREMENTS

$$\begin{aligned}
 & (\text{HORIZ. PLANTING ON STRUCTURE} + \text{DEEP SOIL}) / \text{SITE AREA} \\
 &= (1319.65\text{m}^2 + 91\text{m}^2) / 2023\text{m}^2 \\
 &= 1410.66 / 2023 \\
 &= 0.70 \text{ OR } 70\%
 \end{aligned}$$





45% MORE THAN THE MINIMUM REQUIRED 25% IN THE WAPC (Clause 3.4.1)

FUNCTIONALITY+ BUILD QUALITY

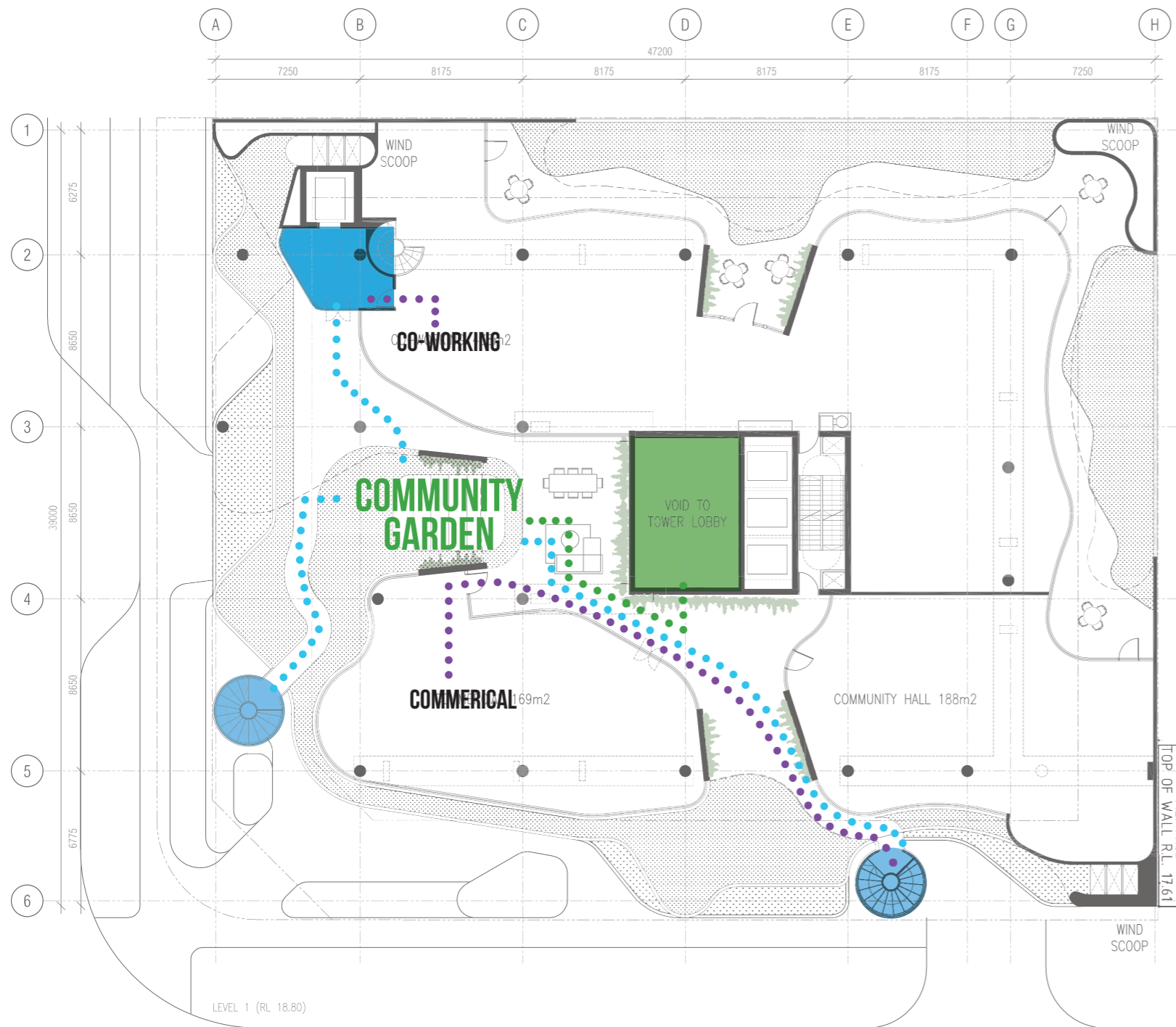


A Highly Functional Ground Floor..

- + The streetscape interface balances, **SHORT STAY**, **COMMERCIAL**, **RESIDENTIAL** and **PUBLIC** access requirements
- + Well considered plan facilitates pedestrian flow across site
- + Vehicle access is separated, reducing potential conflict (drop-offs via Forbes Road and residential and short stay parking entrance via Kishorn Road)
- + Separate, dedicated entry lobbies separates private residential from short stay / public access
- + Universally accessible ground floor, no ramps required

-  Commercial
-  Residential
-  Public & Short Stay
-  Vehicle

FUNCTIONALITY+ BUILD QUALITY



...Leading to a Highly Communal Level 1

- + Pedestrian friendly access to Level 1 amenities
- + Attractive public garden space and terrace
- + Productive co-working environment
- + Multiple passive surveillance points for heightened security

- Commercial
- Residential
- Public

LEVEL 1, 1:300



Assets | Engineering | Environment | Noise | Spatial | Waste

Waste Management Plan

10-14 Forbes Road and 40A, B & C Kishorn Road, Applecross

Prepared for Apex View Pty Ltd

January 2019

Project Number: TW18037

10_Principles

FUNCTIONALITY+ BUILD QUALITY

Waste Management Plan

Please see Appendix for full Waste Report

Conclusions:

According to the Talis report the proposal provides **a sufficiently large Bin Storage Area**

...for collection and storage of refuse and recyclables based on the anticipated waste generation rates and a suitable configuration of receptacles

The above is achieved using:

Residential Waste

- + Five 660L refuse receptacles, collected by the City three times each week; and
- + Three 660L recyclables receptacles, collected by the City three times each week

Commercial Waste

- + Four 660L refuse receptacles, collected by the City three times each week; and
- + Two 660L recyclables receptacles, collected by the City three times each week



Proposed Mixed Use Development
Lots 10-14 Forbes Road & 40A, B, C
Kishorn Road, Applecross
Transport Impact Statement

PREPARED FOR:
Apex View Pty Ltd

November 2018

10_Principles

FUNCTIONALITY+ BUILD QUALITY

Transport Impact Statement

Conclusions:

"The traffic analysis undertaken in this report shows that the traffic generation of the proposed development is conservatively estimated to be in order of about 664 daily and 68/50 peak hour trips during AM/PM peak (both inbound and outbound). **Accordingly, the traffic impact of the proposal on the surrounding road network will be insignificant.**

No particular transport or safety issues have been identified for the proposed development.

Finally, it is concluded that the traffic-related issues should **not form an impediment to the approval** of the proposed development."



10_Principles

SUSTAINABILITY

Beyond Five Star Greenstar

UNIQUE TO PERTH, PASSIVE HIGHRISE

We are committed to a minimum 5 star greenstar rating but what we want to do is take on some of the some critical aspects of energy use which fall through the cracks of rating tools.

Communal lobby areas in towers often don't have access to light and are rarely naturally vented so significant energy is wasted heating them in summer in the early morning and cooling in winter in the late afternoon to maintain 23.5° climate control. City of Sydney research has found that 60% of energy use is in common areas.

This proposal allows three points of daylight to the floorplate as well as three points of venting via mechanically operated louvres which will remain open unless in fire mode.

The floorplate's unique shape also maximises external wall surface and potential for daylighting to apartments, thus reducing the need for artificial lighting during the day for the residents.





10_Principles

SUSTAINABILITY

An Integrated Landscape

As mentioned previously, we are **OVER+ABOVE** green plot ratio with **148%** of site area allocated to planting.

If you relate this to the requirements of the CBACP we are:

282%

of the minimum landscaping required in **CLAUSE 10.3**

(total planting) / (site area)
5703.5 / 2023
= 2.82
OR 282% of the minimum 100% of site area required in Clause 10.3 of the CBACP

We want to change the public perception that buildings destroy nature. We want people to see buildings that **integrate, restore and expand the natural environment.**



10_Principles **AMENITY**

Comfortable, Engaging spaces

- + Unique floorplate shape allows for three points of venting via mechanically operated louvres
- + Unique floorplate shape maximises external wall surface and daylight to apartments
- + Six Skygardens shared over multiple levels each provide community gardens and greenery
- + Dual aspect apartments
- + Large terraces open directly from indoor living areas
- + Visual privacy enforced throughout, with no cross-views between apartments
- + High quality fixtures and fitting to reduce ongoing costs
- + Communal facilities provide areas for larger gatherings
- + Full height glazing

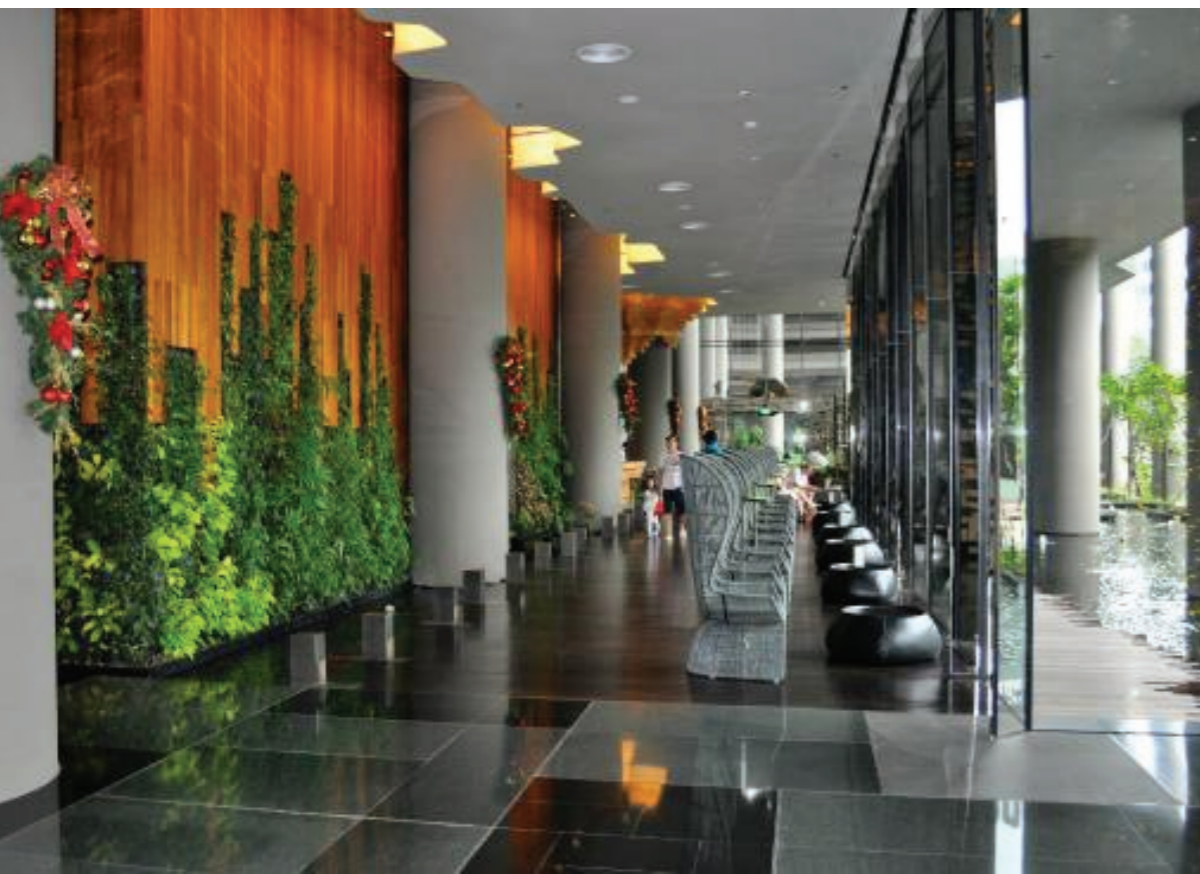


10_Principles

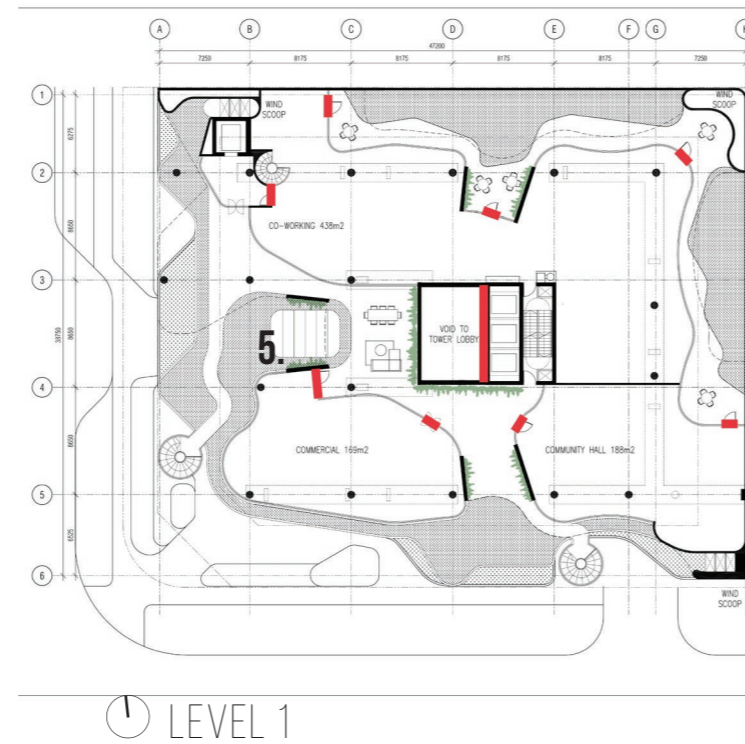
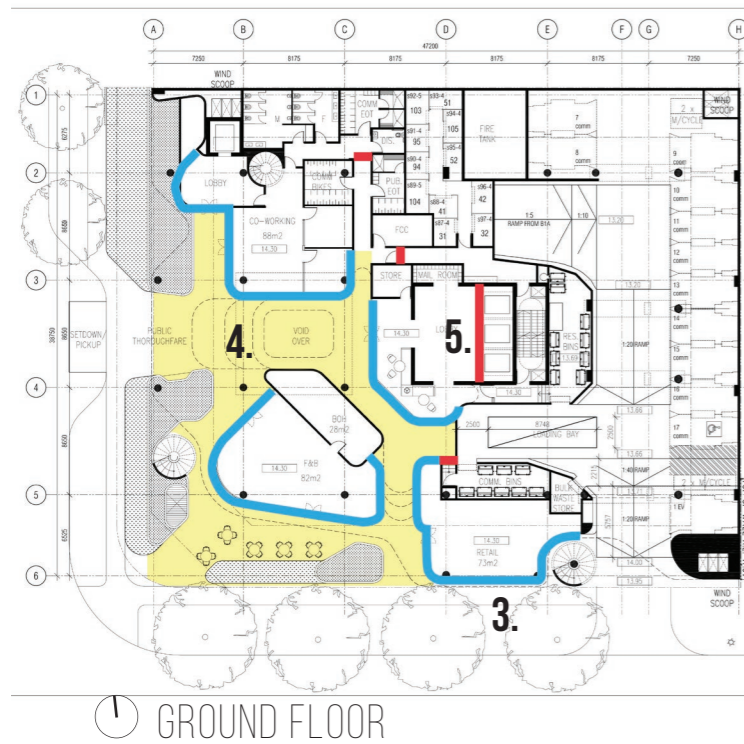
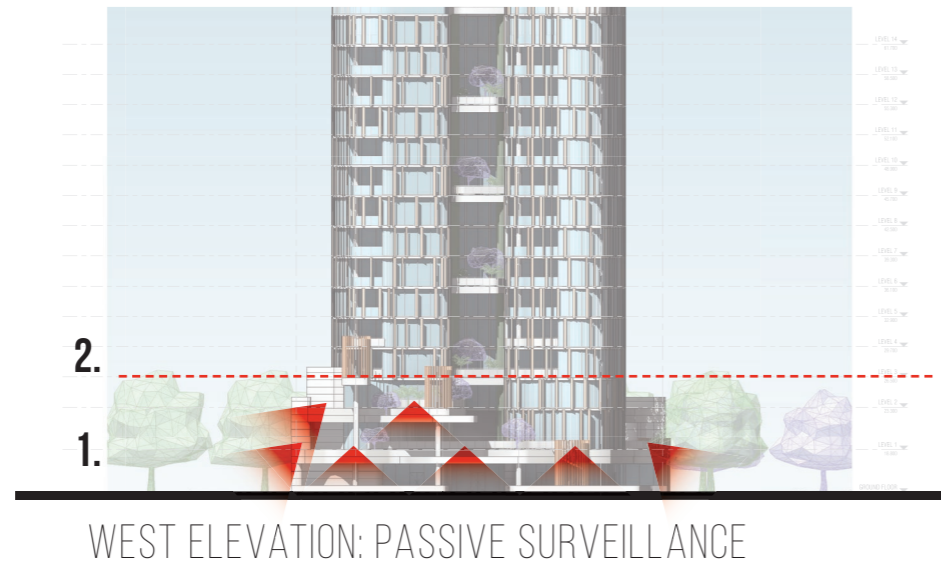
LEGIBILITY

Effective Communication

- + Clear separation of residential, short stay, and commercial entries
- + Opportunities for integrated signage within built form
- + Sight lines considered at pedestrian & vehicle entries
- + Open core facilitates wayfinding on apartment levels

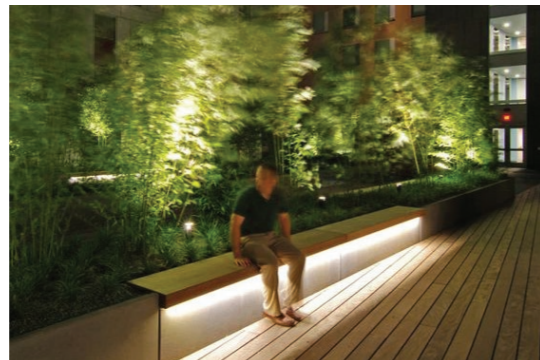
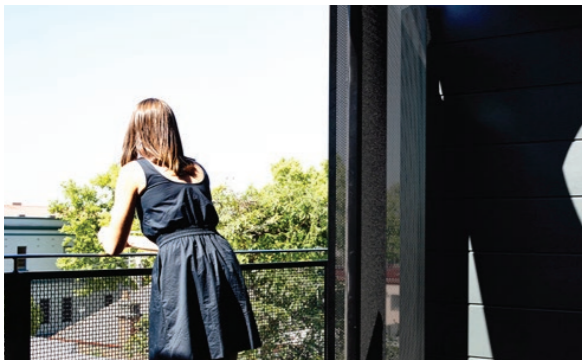


10_Principles SAFETY

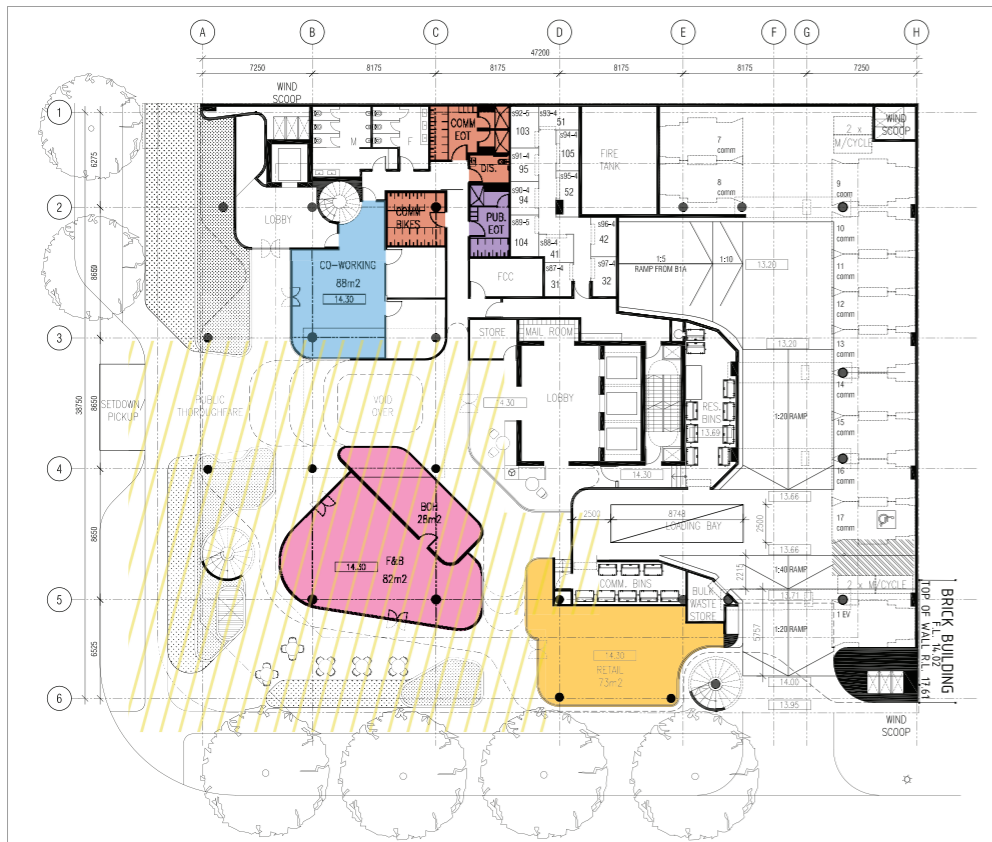


Safe & Secure

1. Strong passive surveillance from podium levels
2. Residences and Short Stay apartments buffered from ground floor by two storeys
3. Commercial frontages maximise glazing to street
4. Well lit and active ground floor
5. Secured entrances with no entrapment spaces



PUBLIC COMMUNITY

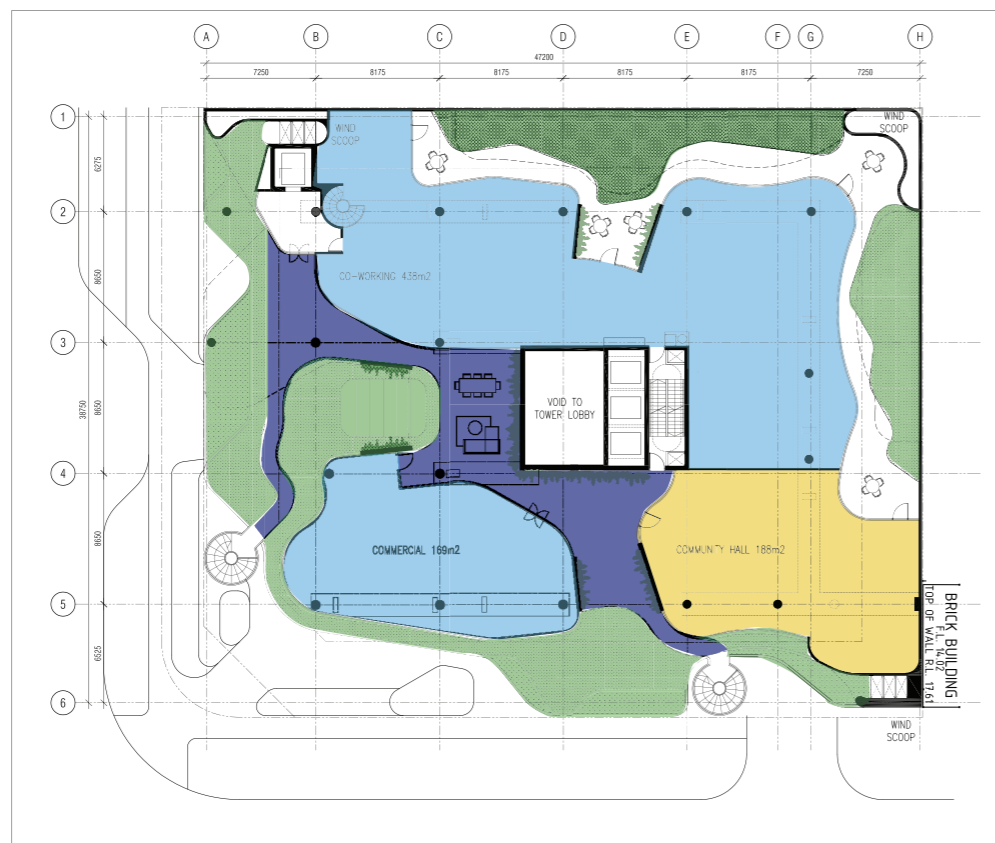


- Commercial Co-Working
- Commercial EOT
- Public EOT
- Food & Beverage
- Retail
- Verandah Garden improves pedestrian environment

GROUND FLOOR

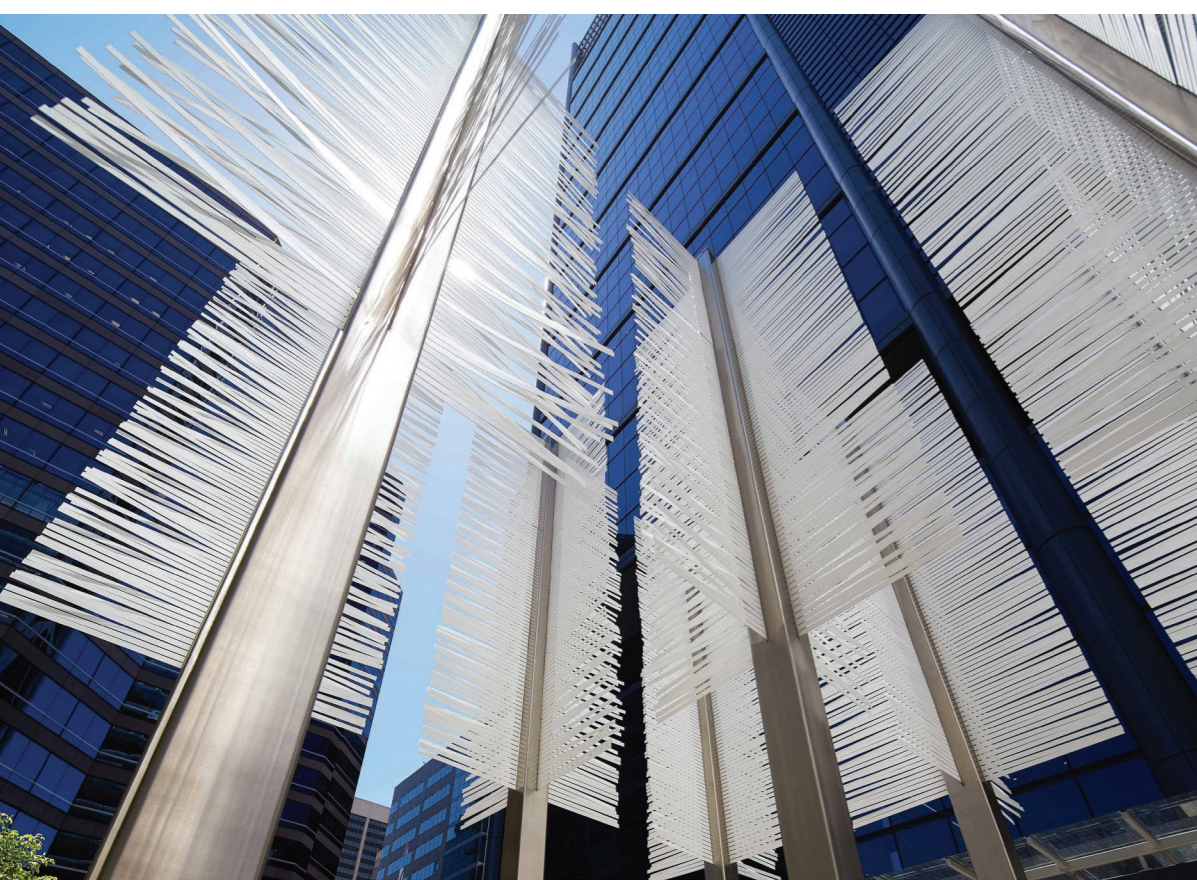
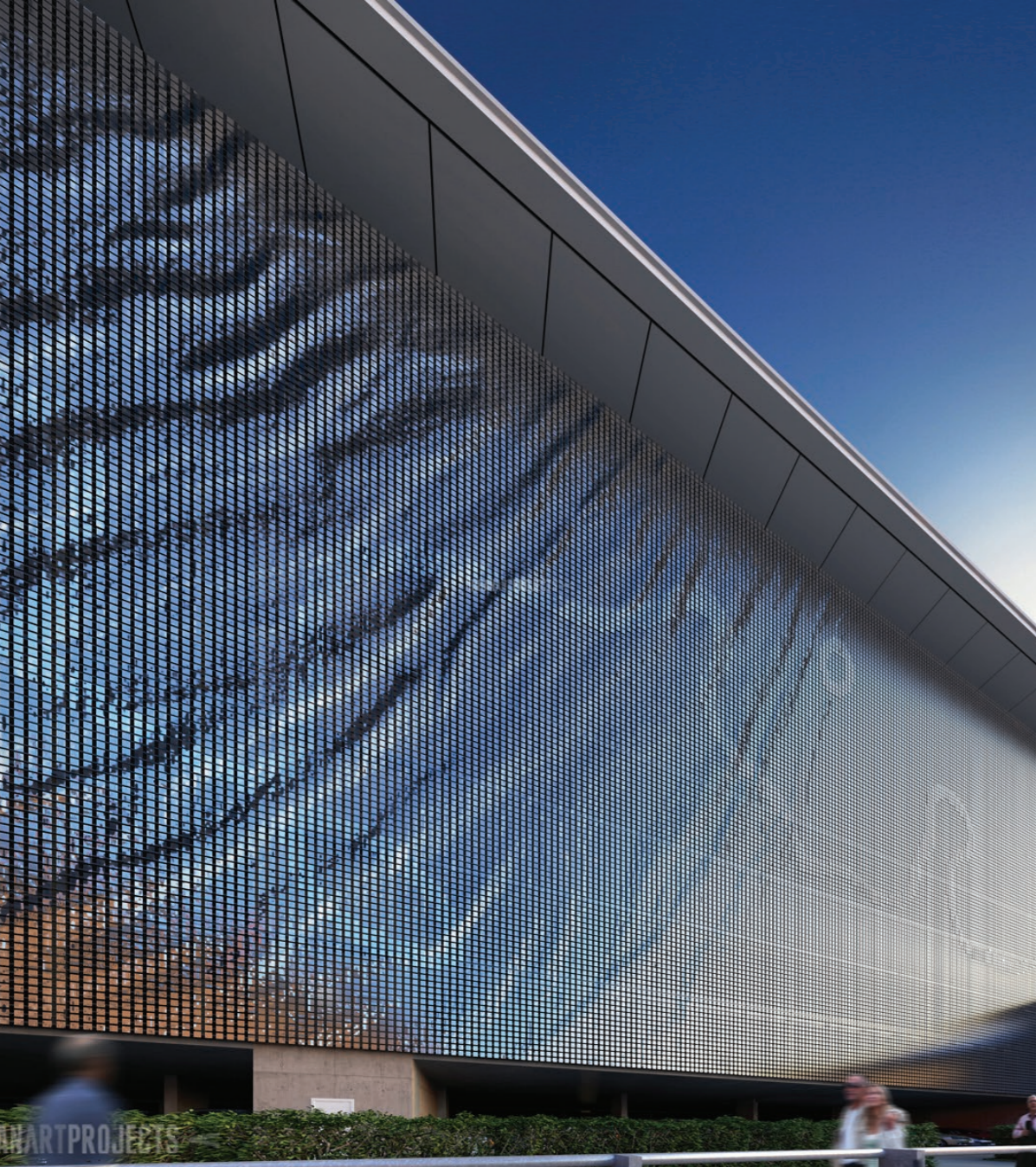
Ground Floor & Level 1

- + Ground floor Verandah Garden creates better pedestrian environment
- + Active commercial tenancies create a safer environment
- + Co-working space enables flexible working arrangements
- + Public gardens encourage community engagement



- Commercial / Co-Working
- Public Community Garden
- Public Community Terrace
- Public Community Hall

LEVEL 1



10_Principles

PUBLIC COMMUNITY

Inspiring Public Artwork

With the emphasis on natural systems and sustainability, an artwork that makes visible the processes in the building is desired.

Some options include kinetic sculptures as part of the wind scoops that show the wind.

We believe the best location for public art is for it to clad the SW corner of the podium above the F&B. The rippling surface would be animated by the prevailing wind and create endless interest for the alfresco diners.

As per the guidelines of the CBACP, this concept will be developed and fine tuned with a recognised artist.

RESIDENTIAL COMMUNITY

Live / Work / Play

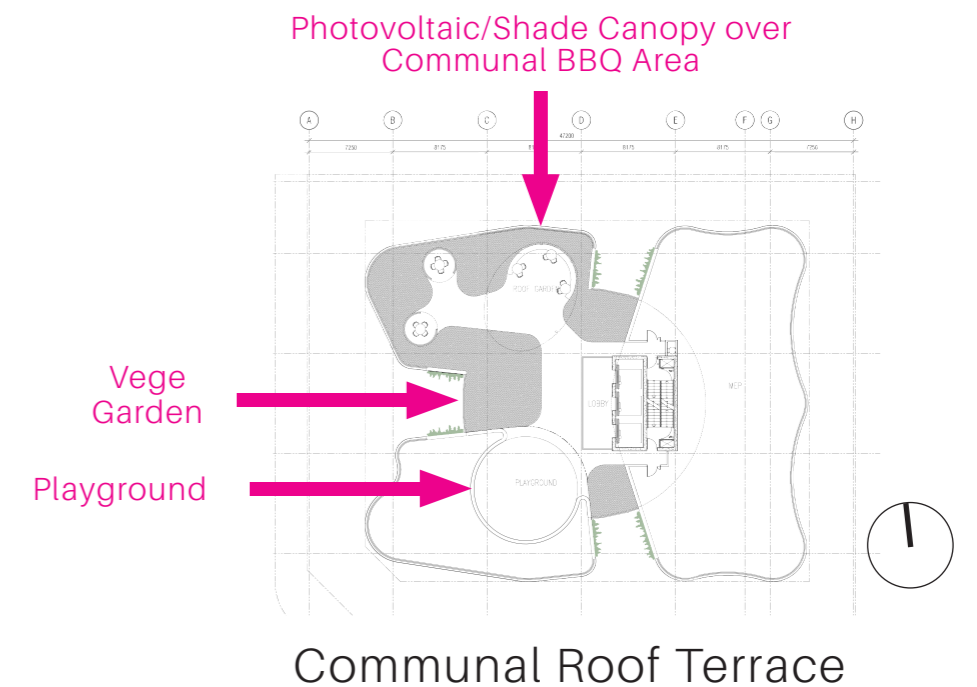
- + Diverse mix of apartments sizes and types
- + Six Skygardens localise community interactions within the building
- + Neighbourhoods of ~21 homes over three floors share a lobby & Skygarden. 21 homes is the average number of houses on a typical Applecross suburban street block
- + Roof Terrace provides opportunity for residents to meet and socialise with their neighbours



SKYGARDENS



ROOF TERRACE





10_Principles

AESTHETICS

Landmark Design

- + The curved floor plate is comprised of three petals, evoking the organic form of a Jacaranda blossom
- + The greenery of the building's vegetation is a significant part of its aesthetic, starting with the lush greenery of the podium base and running up the recesses of the facade between the petals, accentuated by Skygardens at approximately every third floor
- + The contoured levels of the podium create a distinctive interface and transition between the ground and tower and facilitates public engagement by opening up views and allowing public access to above ground levels



SO WHATS THE SCORE?

1 Green Plot Ratio

The amount of landscaped surfaces compared to a development's site area.

The measurement includes all new and preserved vegetation, vertical and horizontal landscaping, water features, lawns and trees, raised planters, and urban farms.

All buildings need to encourage bio-diversity, reduce the urban heat island effect, provide shade and cooling, improve air quality, soften the harshness of the cityscape, restore wildlife habitats, and re-connect people with nature.

✓ 148%

2 Community Plot Ratio

The amount of community space allocated within a development's site area.

The measurement includes fully public areas, semi-private communal spaces, care centres, libraries, restaurants, cafés, and community centres.

The amenity of an urban precinct is largely determined by the quantity and quality of its community spaces. The buildings should encourage human interaction and facilitate social gatherings. Human scale, accessibility, and inclusivity, are crucial to the success of community integration.

✓ 170%

3 Civic Generosity Index

The extent to which a development encourages and facilitates the public life of a city.

The index rates the value of a development's public attributes, such as urban connections, shared relaxation areas, sheltered walkways, gardens, and artworks.

In a sociable city, buildings should be judged by their 'human' characteristics...are they friendly, generous, and accommodating?

✓ 5/5

4 Ecosystem Contribution Index

The degree to which a development supplements a city's ecosystem.

The index rates a building's capacity to maintain connections between natural habitats; its intention to provide food, water and shelter for local wildlife, and settings for native plants; and its implementation of an environmentally sensitive method for water management.

As land in cities can be more successfully adapted for wildlife preservation than that of agricultural zones, building developments now play a key role in regenerating a city's (and a region's) ecological processes. In order to reverse the unprecedented environmental degradation caused by rapid urbanisation, a city's architects, planners, and developers must view buildings as homes for flora and fauna, as well as people.

✓ 60-80%

5 Self-Sufficiency Index

A development's capacity to provide its own energy, food and water.

The index rates the success of a development's energy, food and water production; the amount of its surfaces allocated to solar collection and urban farming; and the extent of its systems for recycling and harvesting natural resources.

In a sustainable city, buildings must aim to be completely self-sufficient... they must produce as much energy as they consume, and preferably more, in order to compensate for existing high-maintenance buildings.

TBC...



APPENDIX

- + Element 22 surplus area calculation
- + Wind Analysis
- + Waste Management
- + Architectural Drawings

Total **element 22** floor area surplus:

$$\begin{array}{ccccccc} \mathbf{199m^2} & + & \mathbf{300m^2} & + & \mathbf{87m^2} & + & \mathbf{291m^2} & + & \mathbf{850m^2} & + & \mathbf{188m^2} & + & \mathbf{1518m^2} \\ \text{Community} & & \text{300m}^2 \text{ alfresco} & & \text{EoT facilities} & & \text{Pedestrian} & & \text{Commercial} & & \text{Community Hall} & & \text{Short Stay Floor Plate} \\ \text{Garden} & & \text{\& new public} & & & & \text{Throughfare} & & \text{Co-working} & & & & \\ & & \text{space on this} & & & & & & \text{Retail / F\&B} & & & & \\ & & \text{prominent} & & & & & & & & & & \\ & & \text{corner} & & & & & & & & & & \end{array}$$

= 3433m²
of element 22 surplus



PEDESTRIAN WIND ENVIRONMENT STATEMENT
APPLECROSS, CORNER OF KISHORN AND FORBES ROAD,
PERTH

WE212-01F02(REV0)- WS REPORT
SEPTEMBER 18, 2018

Prepared for:
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Appendix

WIND ANALYSIS

DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
September 18, 2018	Initial.	0	BH	SWR	JG

The work presented in this document was carried out in accordance with the Windtech Consultants Quality Assurance System, which is based on International Standard ISO 9001.

This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for our Client's particular requirements which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Windtech Consultants. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

EXECUTIVE SUMMARY

This report is in relation to the proposed development located on the corner of Kishorn and Forbes Road, Applecross and presents an opinion on the likely impact of the proposed design on the local wind environment on the critical outdoor areas within and around the subject development. The effect of wind activity is examined for the three predominant wind directions for the Perth region; namely the easterly, south-west, and westerly winds. The analysis of the wind effects relating to the proposed development was carried out in the context of the local wind climate, building morphology and land topography.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the latest architectural drawings. No wind tunnel testing has been undertaken for the subject development, and hence 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 on our extensive experience in the study of wind environment effects.

The results of this assessment indicate that the development is relatively exposed due to the minimal shielding from the three prevailing wind directions affecting the site; east, south-west, and west. As a result, there are expected adverse wind effects within certain areas of the development. It is expected that suitable wind conditions can be achieved through all trafficable areas within and around the site with the treatments recommended in this report, which are summarised below:

- Inclusion of densely foliating evergreen trees along the pedestrian footpath areas and shrubs within the planter areas along the southern and western aspects.
- An impermeable awning above the south-west ground floor seating area.
- A baffle screen design within the through site link on the ground floor.
- An awning over the exposed balcony areas on Level 1.
- An awning over the eastern and northern aspects of the podium on Level 2.
- Inclusion of screening (2.0m to full-height) along two aspects of the balcony areas on Level 16-19, with an impermeable balustrade along the perimeters.
- Inclusion of perimeter screening (1.5-2.0m high) along the communal area balcony on Level 15.
- Inclusion of perimeter screening (minimum 2.0m high) of the Roof terrace area, as well as densely foliating evergreen shrubs within the planter regions (capable of growing 1.5-2.0m).

It should be noted that for any tree planting and landscaping to be effective as a wind ameliorative device, the species selected should be of an evergreen variety and densely foliating. Trees should be planted in clusters with interlocking canopies to help absorb the wind as a tree in isolation can be impacted by stronger wind conditions.

Wind tunnel testing is recommended to be undertaken to assess the wind conditions within and around the subject development. This will provide a quantitative analysis of the wind conditions and determine the extent of the abovementioned wind mitigation treatments to ensure suitable wind conditions are achieved.

CONTENTS

1	Introduction	1
2	Description of the Development and Surroundings	2
3	Regional Wind	4
4	Wind Effects on People	6
5	Results and Discussion	7
	5.1 Ground Level Areas	7
	5.2 Podium and Balcony Areas	8
	5.3 Outdoor Communal Areas	8
6	References	10

1 INTRODUCTION

An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development has been carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects.

No wind tunnel testing has been undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, and any recommendations in this report are made only in-principle.

2 DESCRIPTION OF THE DEVELOPMENT AND SURROUNDINGS

The development site is bounded by Forbes Road to the west, Kishorn Road to the south, and low-rise residential and retail to the north and east. The site is predominantly surrounded by low-rise residential/retail buildings, with the Swan River lying further to the east, north, and west. A survey of the land topography indicates there are no major elevation changes in the region surrounding the site, only a gentle slope down towards Swan River to the east. An aerial image of the subject site and the local surroundings is shown in Figure 1.

The proposed development is a mixed-use building comprising of retail on the Ground floor, residential apartments above, and communal floors on Level 15 and the Roof. The overall height of the development is twenty-one floors inclusive of Ground.

The critical trafficable areas associated with the proposed development, which are the focus of this assessment with regards to wind effects, are detailed as follows:

- Pedestrian footpaths and site entrances along Forbes Road and Kishorn Road,
- Ground floor seating area along the south-west corner of the development,
- Main entrance lobby area,
- Balcony and podium areas on Level 1-2,
- Private balcony areas on Level 3-14 and Level 16-19,
- Skygarden areas on Level 3, 6, 9, 12, 15, 16, and 19, and
- Outdoor communal areas on Level 15 and the Roof.



Figure 1: Aerial Image of the Site Location

3 REGIONAL WIND

The Perth region is governed by three principal wind directions, and these can potentially affect the subject development. These winds prevail from the east, south-west and west. A summary of the principal time of occurrence of these winds throughout the year is presented in Table 1 below. This summary is based on an analysis of wind rose data obtained by the Bureau of Meteorology from Perth Airport, from 1944 to 2006.

Table 1 Principal Time of Occurrence of Winds for Perth

Month	Wind Direction		
	Easterly	South-Westerly	Westerly
January	X	X	
February	X	X	
March	X	X	X
April	X	X	X
May	X		X
June			X
July			X
August		X	X
September	X	X	X
October	X	X	X
November	X	X	X
December	X	X	

A directional plot of the annual and 5% exceedance winds for the Perth region, and the frequency of the winds are shown in Figure 2. Again, this plot has been produced based on an analysis of recorded wind speed data obtained from Perth Airport, from 1944 to 2006.

As shown in Figure 2, the easterly winds are the most frequent for the Perth region, and are also the strongest. The south-westerly winds occur most frequently during the warmer months of the year for the Perth region, and hence are usually welcomed within outdoor areas. South-westerly winds are also similar strength to the westerly winds, but not as strong as the easterly events. The south-westerly and westerly winds typically occur during the afternoon periods.

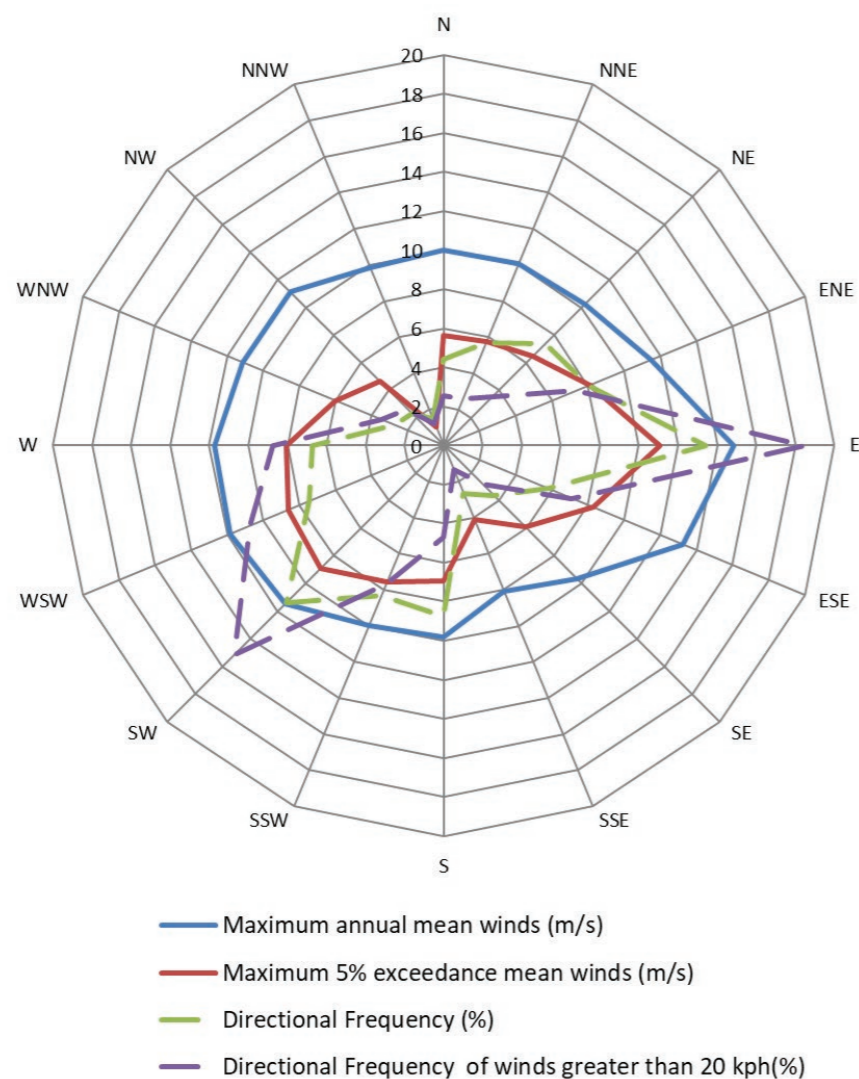


Figure 2: Annual and 5% Exceedance Hourly Mean Wind Speeds, and Frequencies of Occurrence, for the Perth Region (referenced to 10m above ground in standard open terrain)

4 WIND EFFECTS ON PEOPLE

The acceptability of wind in any area is dependent upon its use. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 2 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

Table 2: Summary of Wind Effects on People (A.D. Penwarden, 1973)

Type of Winds	Beaufort Number	Mean Wind Speed (m/s)	Effects
Calm	0	Less than 0.3	Negligible.
Calm, light air	1	0.3 – 1.6	No noticeable wind.
Light breeze	2	1.6 – 3.4	Wind felt on face.
Gentle breeze	3	3.4 – 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read.
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged.
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant.
Near gale	7	13.9 – 17.2	Inconvenience felt when walking.
Gale	8	17.2 – 20.8	Generally impedes progress, difficulty balancing in gusts.
Strong gale	9	Greater than 20.8	People blown over.

It should be noted that wind speeds can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use (rather than referencing specific wind speeds). Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

5 RESULTS AND DISCUSSION

The expected wind conditions are discussed in the following sub-sections of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report.

Located in Applecross, the development site is surrounded by low-rise residential and retail buildings with some medium-rise buildings located a further distance away. As a result, the site receives minimal shielding and the prevailing winds will be relatively unobstructed upstream of the development, with the potential to cause adverse wind conditions.

5.1 Ground Level Areas

The wind conditions for the various pedestrian footpaths in close proximity to the tower are expected to be stronger than the existing conditions due to the increased height of the development in relation to the surrounding buildings. The existing building around the site to the north and the east have the potential to provide some shielding effects for the low level direct winds, however, due to their shorter height, their benefit will be minimal. The tower is expected to capture the prevailing winds and direct them downwards around the south-west corners along Kishorn and Forbes Road.

The tower setback along the northern and eastern aspects is expected to reduce the impact of the downwash winds from the tower onto the neighbouring areas by breaking up the flow pattern. The lack of a setback in the other areas is expected to allow the tower to capture the prevailing westerly and south-westerly winds and cause a potentially adverse downwash effect. It is recommended to include an impermeable awning above the seating area to prevent adverse downwash effects affecting the comfort of pedestrian and residents using the outdoor space.

The east-west alignment of Kishorn Road combined with minimal shielding will allow the predominant easterly, westerly and south-westerly winds to directly impact the pedestrian footpath areas along Kishorn and Forbes Road. There is the potential for these winds to interact with the building morphology and accelerate around the corner at the south-western aspect. It is recommended to include densely foliating evergreen trees along the pedestrian footpath areas and shrubs within the planter areas along the southern and western aspects, as shown in the drawings, to provide shielding against the prevailing winds.

The main lobby entrance receives shielding from direct winds and downwash, as the entrance is located centrally under Level 1. However, the adjacent through site link located south of the main lobby entrance has the potential to propagate the predominant westerly winds and funnel

through the space, resulting in adverse wind conditions. It is recommended to consider a baffle screen design within the through site link to mitigate any funnelling effects.

5.2 Podium and Balcony Areas

The majority of the balcony floor area on Level 1 is shielded from downwash effects, however the southern and western balconies do consist of areas exposed to potential downwash winds from the tower. It is recommended to consider an awning over these spaces to mitigate any adverse downwash wind effects. It is recommended to retain the impermeable balustrades around the balcony perimeters.

The Level 2 podium areas along the northern and eastern aspects are potentially exposed to downwash wind effects captured by the building tower above. It is recommended to consider an awning over these areas to mitigate any downwash wind effects.

The centrally located private balcony areas on Levels 3-14 are expected to be suitable for their intended use as the areas incorporate a recessed design with balustrades in place, as well as exposure limited to only a single aspect. This design will ensure the winds are not able to accelerate across the balcony areas. The corner balconies are also recessed within the floor plan, however they have the potential to be exposed to wrap around winds due to minimal shielding and the impact of the predominant winds interacting with the building form.

The large corner private balconies located on Level 16-19 will be exposed to the prevailing winds due to their elevation, and the lack of upstream shielding. They will be particular prone to direct winds streaming across the open space of the balcony areas, interacting with the building form and accelerating around the corners. To ensure comfortable wind conditions it is recommended to include screening (2.0m to full-height) along two aspects of these balcony areas, with an impermeable balustrade along the perimeters.

The Sky Garden areas located on Levels 3, 6, 9, 12, 15, 16, and 19 are expected to be suitable for their intended use as the areas incorporate a recessed design with balustrades in place. The inclusion of densely foliating evergreen vegetation within these spaces is expected to provide further mitigation.

5.3 Outdoor Communal Areas

The outdoor communal area on Level 15 is partially shielded from the predominant easterly and south-westerly winds due to the floorplan design. The proposed seating features on the north-western aspect are expected to be suitable for their intended use due to their enclosed design. However, the communal area is exposed to the direct westerly winds with the potential for the south-westerly and easterly winds to wrap around into the area. To mitigate these effects it is recommended to consider perimeter balustrades of 1.5-2.0m high. This can be glazed to preserve the view of the surroundings.

The outdoor areas on the Roof include a Playground, Garden, and seating features. The area is exposed to the three prevailing wind directions due to limited shielding, which will result in

adverse wind conditions. The Playground is expected to be suitable for its intended use as it is enclosed with a canopy above. This design will stagnate flow in the area. The Roof Garden also consist of a canopy constructed on pillars in an elliptical shape. It is recommended that perimeter screening with a minimum height of 2.0m be considered around the perimeter of the Roof Level. It is also recommended to include densely foliating evergreen shrubs within the planter regions capable of growing to a height of 1.5-2.0m high above the floor slab.

Wind tunnel testing is recommended to be undertaken to assess the wind conditions within and around the subject development. This will provide a quantitative analysis of the wind conditions and determine the extent of the abovementioned wind mitigation treatments to ensure suitable wind conditions are achieved.

6 REFERENCES

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Assets | Engineering | Environment | Noise | Spatial | Waste

Waste Management Plan

10-14 Forbes Road and 40A, B & C Kishorn Road, Applecross

Prepared for Apex View Pty Ltd

January 2019

Project Number: TW18037

Appendix

WASTE MANAGEMENT

DOCUMENT CONTROL

Version	Description	Date	Author	Reviewer
0a	Internal Review	28/08/18	JW	RH
1a	DRAFT Released to Client	31/08/18	JW	Client
1b	Released to Client	07/11/18	JW	Client
1c	Released to Client	16/11/18	RH	Client
1d	Released to Client	25/01/19	RH	Client
1e	Released to Client	29/01/19	RH	Client

Approval for Release

Name	Position	File Reference
Ronan Cullen	Director	TW18037- Waste Management Plan.1e

Signature



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Executive Summary

Apex View Pty Ltd is seeking development approval for the proposed mixed use development located at 10-14 Forbes Road and 40A, B & C Kishorn Road, Applecross (the Proposal) within the Kintail Quarter of the Canning Bridge Activity Centre.

To satisfy the conditions of the development application the City of Melville (the City) requires the submission of a Waste Management Plan (WMP) that will identify how waste is to be stored and collected from the Proposal. Mustera Property Group on behalf of Apex View Pty Ltd has engaged Talis Consultants Pty Ltd (Talis) to prepare this WMP to satisfy those conditions.

The anticipated quantities of refuse and recyclables for the Proposal were based upon the City's *Waste and Recyclable's Collection for Multiple Dwellings, Mixed Use Developments and Non Residential Developments* (2016). In addition, discussions with the City were also undertaken to ensure that the selected generation rates were suitable for the Proposal.

A summary of the receptacle size, numbers, collection frequency and collection method for the Proposal is provided in the below table.

Proposed Waste Collection Summary

Waste Type	Generation (L/week)	Bin Size (L)	Number of Bins	Collection Frequency/Week	Collection
Residential Apartments					
Refuse	8,193	660	5	3	City of Melville
Recyclables	4,313	660	3	3	City of Melville
Commercial Spaces					
Refuse	6,798	660	4	3	City of Melville
Recyclables	1,989	660	2	3	City of Melville

The City will utilise its rear lift waste collection vehicle to service the Proposal from Loading Bay within the development. The City's waste collection staff will ferry the receptacles to and from the City's rear lift waste collection vehicle for servicing. The City will provide a 'spotter' who will accompany the driver to assist when the waste collection vehicle is reversing on-site.

Building management will oversee the relevant aspects of waste management at the Proposal.



Table of Contents

Introduction	5
1.1 Objectives and Scope	5
2 Waste Generation	6
2.1 Proposed Tenancies	6
2.2 Waste Generation Rates	6
2.3 Waste Generation Volumes	6
2.3.1 Residential Waste	6
2.3.2 Commercial Waste	7
2.4 Potential Waste Streams.....	7
3 Waste Storage	9
3.1 Residential Internal Receptacles	9
3.2 Commercial Internal Receptacles	9
3.3 Bin Storage Area.....	9
3.3.1 Receptacle Sizes	9
3.3.2 Residential Bin Store Size	9
3.3.3 Commercial Bin Store Size	10
3.3.4 Design.....	10
4 Waste Systems	12
4.1.1 Waste Chute.....	12
4.1.2 Automated Bin Tracks.....	12
4.1.3 Compactors.....	12
5 Waste Collection	13
5.1 Residential Waste	13
5.2 Commercial Waste	13
5.3 Bulk Wastes and Other Waste Services	14
5.4 Specialty/Hazardous Waste	14



5.5 Future Waste Recovery	15
6 Waste Management Activities	16
7 Conclusion	17

Tables

Table 2-1: Estimated Waste Generation - Residential

Table 2-2: Estimated Waste Generation - Commercial

Table 3-1: Typical Receptacle Dimensions

Table 3-2: Receptacle Requirements – Residential Bin Store

Table 3-3: Receptacle Requirements – Commercial Bin Store

Figures

Figure 1: Locality Plan

Figure 2: Bin Storage Area



Introduction

Apex View Pty Ltd is seeking development approval for the proposed mixed use development located at 10-14 Forbes Road and 40A, B & C Kishorn Road, Applecross (the Proposal), within the Kintail Quarter of the Canning Bridge Activity Centre.

To satisfy the conditions of the development application the City of Melville (the City) requires the submission of a Waste Management Plan (WMP) that will identify how waste is to be stored and collected from the Proposal. Apex View Pty Ltd has engaged Talis Consultants Pty Ltd (Talis) to prepare this WMP to satisfy those conditions.

The Proposal is bordered by residential premises to the north, Forbes Road to the west, Kishorn Road to the south and a mix of commercial premises to the east, as shown in Figure 1.

1.1 Objectives and Scope

The objective of this WMP is to outline the equipment and procedures that will be adopted to manage all waste (refuse and recyclables) at the Proposal. Specifically, the WMP demonstrates that the Proposal should be designed to:

- Adequately cater for the anticipated quantities of waste and recyclables to be generated;
- Provide suitable Bin Storage Areas including appropriate receptacles; and
- Allow for efficient collection of receptacles by appropriate waste collection vehicles.

To achieve the objective, the scope of the WMP comprises:

- Section 2: Waste Generation;
- Section 3: Waste Storage;
- Section 4: Waste Systems;
- Section 5: Waste Collection;
- Section 6: Waste Management Activities; and
- Section 7: Conclusion.



2 Waste Generation

This section outlines the waste generation rates used and the estimated waste volumes to be generated at the Proposal.

2.1 Proposed Tenancies

The anticipated quantities of refuse and recyclables to be generated were based on the number of residential and commercial tenancies at the Proposal. The Proposal consists of the following residential and commercial spaces:

- Residential:
 - Apartments – 97; and
 - Amenities including, pool deck, gym, treatment, bbq, dining/lounge and clubhouse – 618m²;
- Commercial Tenancies:
 - Short Stay Apartments – 15;
 - Restaurant/Cafe – 110m²;
 - Co-working space – 520m²; and
 - Retail (non-food) – 73m².

2.2 Waste Generation Rates

The anticipated quantities of refuse and recyclables for the Proposal were based upon the City's *Waste and Recyclable's Collection for Multiple Dwellings, Mixed Use Developments and Non Residential Developments* (2016). In addition the discussions with the City were also undertaken to ensure that the selected generation rates were suitable for the Proposal.

Consideration was also given to Western Australian Local Government Association's *Multiple Dwelling Waste Management Guidelines* (2014) and *Commercial and Industrial Waste Management Plan Guidelines* (2014).

2.3 Waste Generation Volumes

Waste generation is estimated by volume in litres (L) as this is generally the influencing factor when considering receptacle size, numbers and storage space required.

2.3.1 Residential Waste

Residential waste volumes in litres per week (L/week) of refuse and recyclables adopted for this waste assessment are shown Table 2-1. It is anticipated that the residential apartments and associated amenities will generate 8,193L of refuse and 4,313L of recyclables each week.

Table 2-1: Estimated Waste Generation - Residential

Residential Tenancies	Number of Apartments / floor area (m ²)	Waste Generation Rate (L/week)	Waste Generation (L/Week)
Refuse			
Apartments	97	80	7,760
Amenities: pool deck, gym, treatment, bbq, dining/lounge and clubhouse	618	10	433
Total			8,193
Recyclables			
Apartments	97	40	3,880
Amenities: pool deck, gym, treatment, bbq, dining/lounge and clubhouse	618	10	433
Total			4,313

2.3.2 Commercial Waste

Commercial waste generation volumes in litres per week (L/week) of refuse and recyclables adopted for this waste assessment are shown in Table 2-2. It is anticipated that the commercial tenancies at the Proposal will generate 6,798L of refuse and 1,989L of recyclables each week.

Table 2-2: Estimated Waste Generation - Commercial

Commercial Tenancies	Number of serviced apartments / floor area (m ²)	Waste Generation Rate (L/week)	Waste Generation (L/Week)
Refuse			
Short Stay Apartments	15	80	1,200
Restaurant/Café	110	660	5,082
Co-working spaces	520	10	260
Retail (non-food)	73	50	256
Total			6,798
Recyclables			
Short Stay Apartments	15	40	600
Restaurant/Café	110	130	1,001
Co-working spaces	520	10	260
Retail (non-food)	73	25	128
Total			1,989

2.4 Potential Waste Streams

Identification of the following waste materials is relevant to the potential opportunities to avoid and reduce their impact on the waste stream at the Proposal. Waste materials relevant to all apartments and commercial tenancies at the Proposal are predominantly:

- General Waste (refuse);
- Organics;
- Corrugated Cardboard and Paper;

- White office Paper;
- Mixed Plastics (PET and HDPE);
- Beverage containers included in the proposed Container Deposit Scheme;
- Glass;
- E-waste; and
- Hazardous wastes including batteries and fluorescent/LED light globes.

3 Waste Storage

To ensure that waste is managed appropriately at the Proposal, it is important to allow for sufficient space to accommodate the required number of receptacles within the Bin Storage Area. The procedure and receptacles to be used in this area is described in the following sections.

3.1 Residential Internal Receptacles

To promote positive recycling behaviour and maximise diversion from landfill, the Proposal will have a minimum two receptacles within each apartment for the separate disposal of refuse and recyclables. These receptacles will be transferred by the resident, or their authorised representative, to the waste chute system for disposal to the Residential Bin Store. Large cardboard items or bulky materials will be taken by the resident to the Bin Storage Area to reduce the likely hood of blockage in chutes.

A minimum of two receptacles will be located in common use areas across the Proposal's residential amenities for the separate disposal of refuse and recyclables. These receptacles will be taken by the building manager, or their authorised representative, to the Residential Bin Store for disposal into the appropriate receptacles.

3.2 Commercial Internal Receptacles

Each serviced apartment and commercial tenancy will have a minimum of two receptacles for the separate disposal of refuse and recyclables. Refuse and recyclable materials generated by the serviced apartments and commercial tenancies will be taken by staff/cleaners, or their authorised representative, and placed in the appropriate receptacles in the Commercial Bin Store. Refuse and recyclable receptacles will be clearly labelled at all times.

In the future the Proposal may provide additional receptacles for the source separation of waste streams identified in Section 2.4 to further assist with diversion of wastes from landfill.

3.3 Bin Storage Area

Refuse and recyclable materials generated within the Proposal will be collected in receptacles located in the Bin Storage Area shown in Figure 2.

3.3.1 Receptacle Sizes

The information in Table 3-1 below presents the typical dimensions of receptacle sizes 660L and 1,100L. It should be noted that these receptacle dimensions are approximate and can vary slightly between suppliers.

Table 3-1: Typical Receptacle Dimensions

Bin Size (L)	Depth (mm)	Width (mm)	Height (mm)	Area (mm ²)
660	770	1,306	1,200	1,500
1,100	1,100	1,400	1,400	2,000

Reference: City of Melville guidelines

3.3.2 Residential Bin Store Size

To ensure sufficient area is available for storage of the residential waste receptacles, the quantity of receptacles required for Residential Bin Store was using the dimensions in Table 3-1 and assuming three

collections each week of residential refuse and recyclables from the Proposal. Based on modelling results in Table 3-2 the Residential Bin Store is designed to accommodate the following receptacles:

- Five 660L refuse receptacles; and
- Three 660L recyclable receptacles.

Table 3-2: Receptacle Requirements – Residential Bin Store

Waste Stream	Waste Generation (L/week)	Number of Receptacles Required	
		660L	1,100L
Refuse	8,193	5	3
Recyclables	4,313	3	2

The configuration of the receptacles within the Residential Bin Store is shown in Figure 2. It is worth noting that the number of receptacles and corresponding placement of receptacles shown in Figure 2 represents the maximum requirements, assuming three collections each week of refuse and recyclables. Increased collection frequencies or use of a compactor would reduce the required number of receptacles.

3.3.3 Commercial Bin Store Size

To ensure sufficient area is available for storage of the residential waste receptacles, the quantity of receptacles required for Residential Bin Store was using the dimensions in Table 3-1 and assuming three collections each week of residential refuse and recyclables from the Proposal. Based on modelling results in Table 3-3 the Commercial Bin Store is designed to accommodate the following receptacles:

- Four 660L refuse receptacles; and
- Two 660L recyclable receptacles.

Table 3-3: Receptacle Requirements – Commercial Bin Store

Waste Stream	Waste Generation (L/week)	Number of Receptacles Required	
		660L	1,100L
Refuse	6,798	4	3
Recyclables	1,989	2	1

The configuration of these receptacles within the Bin Storage Area is shown in Figure 2. It is worth noting that the number of receptacles and corresponding placement of receptacles shown in Figure 2 represents the maximum requirements assuming three collections each week of refuse and recyclables. Increased collection frequencies would reduce the required number of receptacles.

3.3.4 Design

The design of the Bin Storage Area will consider the following:

- Impervious floors draining to the sewer, not less than 75mm in thickness, and provided with an adequate liquid refuse disposal system;
- A tap for washing of receptacles and Bin Storage Area as required;
- Adequate aisle width for easy manoeuvring of receptacles;
- No double stacking of receptacles;
- Self-closing doors and are proposed to be vermin proof;
- Doors wide enough to fit bins through;



- Ventilated to a suitable standard, in accordance with the Australian Standard 1668.2: The Use of Ventilation and Air Conditioning in Buildings;
- Signs installed at drop-off points and within the Bin Storage Area to encourage correct recycling and reduce contamination;
- Clear signage instructing how to correctly use the waste management system;
- Located behind the building setback line;
- Receptacles are not visible from the property boundary or areas trafficable by the public; and
- Receptacles are reasonably secured from theft and vandalism.

Receptacle numbers and storage space within the Bin Storage Area will be monitored by the building manager during operation of the Proposal to ensure that the number of receptacles and collection frequency is sufficient.



4 Waste Systems

4.1.1 Waste Chute

In order to ensure the efficient disposal of waste to the Residential Bin Store a waste chute will be utilised at the Proposal. The Proposal may utilise a single waste chute with diverter system, which uses a common chute with a diverter mechanism at the terminus of the chute for separation of the refuse and recyclables.

The waste chute system will be located in close proximity to the elevators and be accessible on each residential unit level. Chute doors would be self-closing with a bottom hinge and two hour fire rated to AS1530.4-2005. Chutes are required to be vented to reduce odour and insulated for noise reduction. The chute system should be routinely cleaned via chute flushing operations.

The building manager will be required to swap full receptacles with empty receptacles at the terminus of the waste chute system.

4.1.2 Automated Bin Tracks

The Proposal may utilise automated track system within the Residential Bin Store at the terminus of the waste chute. This system is designed to automate the rotation of a number of receptacles through the use of sensors under the waste chute which is activated when the receptacle is full.

The automated track system can be designed to send the building manager a digital alert of the receptacles capacity to ensure the swapping of empty and full bins is done in a timely manner. The automated track system will reduce the amount of work for building management swapping full and empty waste receptacles.

The building manager will be required to manually swap full receptacles with empty receptacles at the terminus of the waste chute.

4.1.3 Compactors

Compactors may be introduced to the Proposal and may be combined with the automated track system under the terminus of the chute system or as standalone equipment. Compactors will typically only be used on the general waste stream, and have a compaction ratio set at around 2:1 to reduce OHS problems and mechanical damage caused by heavier receptacles resultant from higher compaction rates.



5 Waste Collection

5.1 Residential Waste

The City will service the Proposal by providing five 660L receptacles for refuse and three 660L receptacles for recyclables, which will be collected by City's rear lift waste collection vehicle, three times each week for refuse and three times each week for recyclables.

The City's rear lift waste collection vehicle will enter the Proposal in forward motion far enough to then be able reverse into the Loading Bay adjacent to the Residential Bin Store. The City's waste collection staff will ferry the receptacles to and from the City's rear lift waste collection vehicle for servicing. The path for wheeling bins between the loading bay and the Residential Bin Store is of flat surface, with no steps and will be kept free of obstacles. The Loading Bay allows for a 2.5m loading area behind the rear lift waste collection vehicle. Once servicing is complete the City's rear lift waste collection vehicle will exit the Proposal in forward motion.

In the future, it may be that the City introduces more compact rear lift waste collection vehicles that could be able to service basements with a floor to ceiling clearance (including pipes and services) of less than 4 metres. Clearance for the proposed carpark entry provides sufficient space for vehicles up to 3.35 metres high in order to accommodate any future compact rear lift waste collection vehicles within the Proposal.

The City will provide a 'spotter' who will accompany the driver to assist when the waste collection vehicle is reversing on-site. The City will be provided with key/PIN code access to the security access gate and the Bin Storage Area.

The ability for the waste collection vehicle to access the Proposal has been assessed by Transcore and will be included within their Traffic Impact Assessment.

5.2 Commercial Waste

The City will service the Proposal by providing four 660L receptacles for refuse and two 660L receptacles for recyclables, which will be collected by City's rear lift waste collection vehicle, three times each week for refuse and three times each week for recyclables.

The City's rear lift waste collection vehicle will enter the Proposal in forward motion far enough to then be able reverse into the Loading Bay adjacent to the Commercial Bin Store. The City's waste collection staff will ferry the receptacles to and from the City's rear lift waste collection vehicle for servicing. The path for wheeling bins between the loading bay and the Commercial Bin Store is of flat surface, with no steps and will be kept free of obstacles. The Loading Bay allows for a 2.5m loading area behind the rear lift waste collection vehicle. Once servicing is complete the City's rear lift waste collection vehicle will exit the Proposal in forward motion.

In the future, it may be that the City introduces more compact rear lift waste collection vehicles that could be able to service basements with a floor to ceiling clearance (including pipes and services) of less than 4 metres. Clearance for the proposed carpark entry provides sufficient space for vehicles up to 3.35 metres high in order to accommodate any future compact rear lift waste collection vehicles within the Proposal.

The City will provide a 'spotter' who will accompany the driver to assist when the waste collection vehicle is reversing on-site. The City will be provided with key/PIN code access to the security access gate and the Bin Storage Area.



The ability for the waste collection vehicle to access the Proposal has been assessed by Transcore and will be included within their Traffic Impact Assessment.

5.3 Bulk Wastes and Other Waste Services

Residential tenants are entitled to one kerbside bulky goods collection and three kerbside green waste collections each year. Due to the surrounding streetscape placement of bulky or green wastes on the verge would not be appropriate for this development.

The City encourages bulky waste to accumulate within a storage area and for the building manager to arrange for onsite collection with the City, as it is required. Removal of bulky wastes will be the responsibility of the resident and is to be removed as it is generated so that large amounts of bulk wastes are not accumulated. The building manager will monitor bulky waste and assist residents with its removal, as required.

Each residential apartment has a dedicated store where bulky wastes can be stored for disposal. In addition, a Bulk Waste Store has been allocated for the temporary holding of bulky goods, as shown in Figure 2. This space may also be used for the temporary storage of specialty wastes and bulky commercial wastes and will assist with the reduction of illegal dumping of bulky waste at the Proposal.

It is expected green waste collection will not often be required. Generation of green waste is to be removed as it is generated and will be managed by the building manager.

The City offers a number of additional recycling programs throughout the year and a range of educational opportunities to residents in sustainability and waste minimisation. Information regarding these services can be available on the City's website.

5.4 Specialty/Hazardous Waste

Adequate space will be allocated throughout the Proposal for suitable cabinets/containers for the collection and storage of specialty/hazardous wastes that cannot be disposed within the refuse or recyclable receptacles. Specialty/hazardous waste may include items such as:

- Clothing;
- Batteries;
- E-wastes;
- Used cooking oil;
- White goods;
- Cleaning chemicals; and
- Fluorescent/LED light bulbs.

Bulky specialty/hazardous wastes can be accumulated within the Bulky Waste Store, while smaller waste items can be collected in cabinets/containers in centralised locations across the Proposal.

Specialty/hazardous wastes will be removed from the Proposal once sufficient volumes have been accumulated to warrant disposal. Specialty/hazardous waste collection will be managed by the building manager, who will organise for its disposal at the appropriate facility.



5.5 Future Waste Recovery

In the future the Proposal may look to reduce waste volumes in order to minimise waste collection costs. The Bin Storage Area has allowed space for future resource recovery from the waste streams. This may include the addition of receptacles for source separation of waste streams identified in Section 2.4.

In addition the Proposal could look to reduce the number of waste receptacles or collections by utilising technology such as balers, compactors, or a containerised composting unit to reduce the volume of food waste through treatment.

The incorporation of source separation or treatment technologies into the waste management system will be dependent on the nature of the tenants, available technologies, market conditions and building management considerations in the future. The building manager should engage with residents, staff and cleaners on what opportunities exist for additional resource recovery.



6 Waste Management Activities

Building management will be engaged to complete the following tasks:

- Monitoring and maintenance of receptacles and the Bin Storage Area;
- Cleaning of receptacles and Bin Storage Area when required;
- Monitoring and maintenance of waste systems and equipment;
- Swapping of full bins with empty bins at the terminus of the waste chute;
- Management of bulk, green and specialty wastes, as required;
- Display and maintain consistent signage on all receptacles and in Bin Storage Area;
- Regularly engage with residents, staff and cleaners to develop opportunities to reduce waste volumes and increase resource recovery;
- Monitor resident and cleaner behaviour and identify requirements for further education and/or signage;
- Ensure all residents, staff and cleaners are aware of the Waste Management Plan and their responsibilities thereunder; and
- Regularly engage with the City to ensure an efficient and effective waste service is maintained.



7 Conclusion

As demonstrated within this WMP, the Proposal provides a sufficiently large Bin Storage Area for collection and storage of refuse and recyclables based on the anticipated waste generation rates and a suitable configuration of receptacles. This indicates that a satisfactorily designed Bin Storage Area has been provided and collection of refuse and recyclable receptacles can be completed from the Proposal.

The above is achieved using:

- Residential Waste:
 - Five 660L refuse receptacles, collected by the City three times each week; and
 - Three 660L recyclables receptacles, collected by the City three times each week.
- Commercial Waste
 - Four 660L refuse receptacles, collected by the City three times each week; and
 - Two 660L recyclables receptacles, collected by the City three times each week.

The City will utilise its rear lift waste collection vehicle to service the Proposal from Loading Bay within the development. The City's waste collection staff will ferry the receptacles to and from the City's rear lift waste collection vehicle for servicing. The City will provide a 'spotter' who will accompany the driver to assist when the waste collection vehicle is reversing on-site.

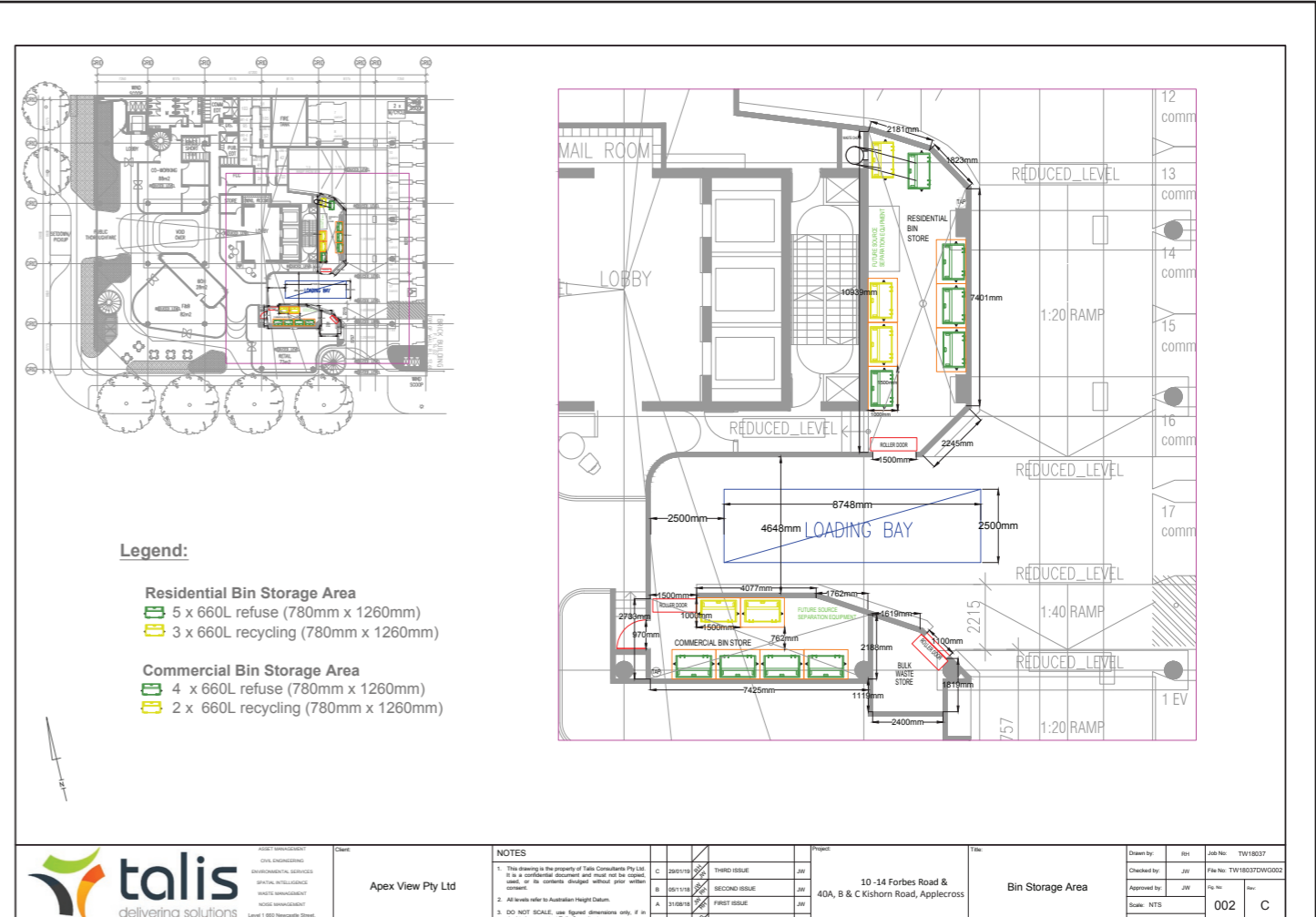
Building management will oversee the relevant aspects of waste management at the Proposal.



Figures

Figure 1: Locality Plan

Figure 2: Bin Storage Area

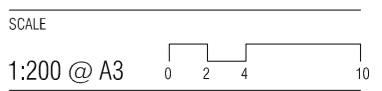


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 Licensed Surveyors
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 BURSWOOD, W.A., 6100.
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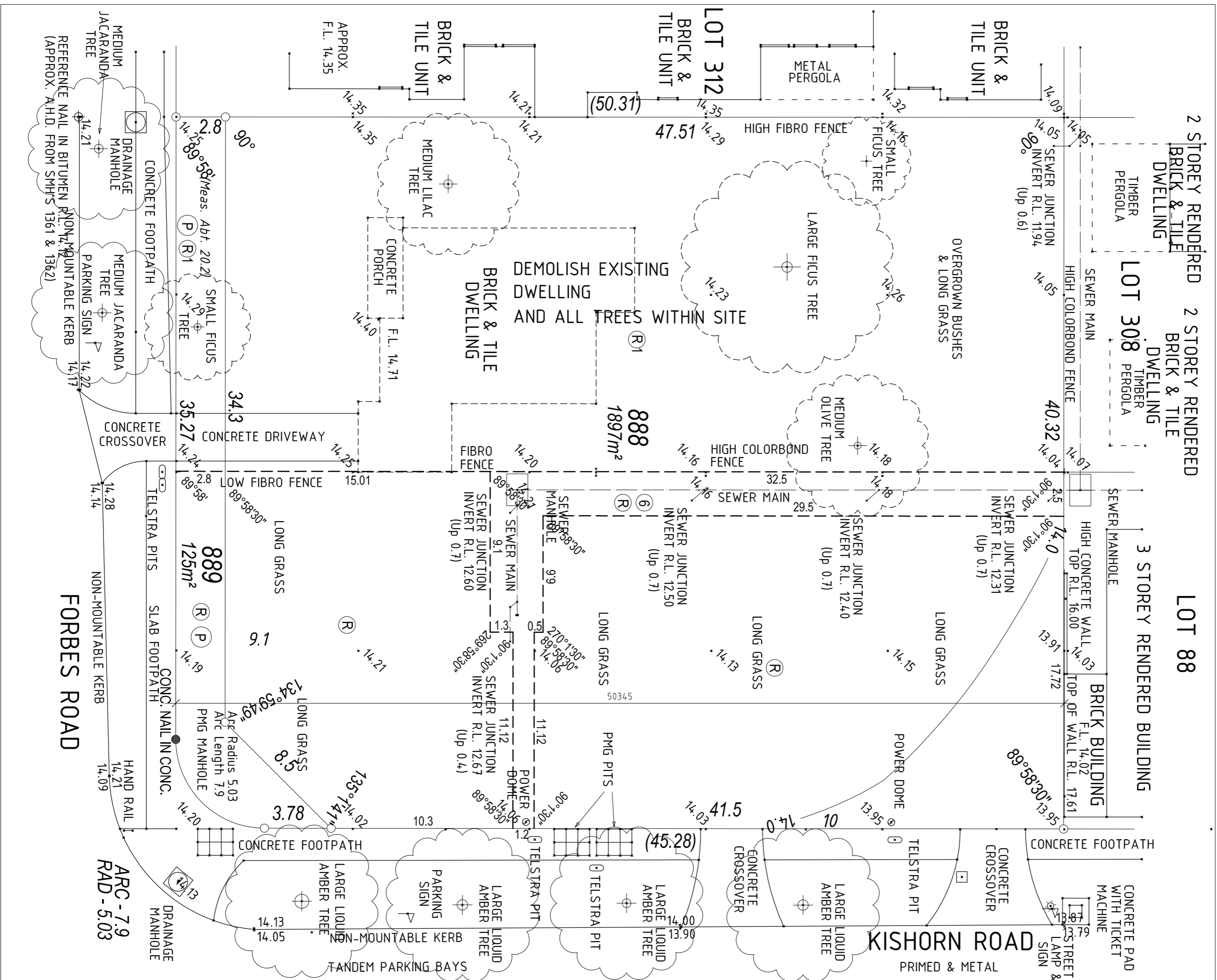
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 SURVEY OF LOTS 311 &
 800 - 804 INCLUSIVE
 #10-14 FORBES ROAD &
 #40A-40C KISHORN RD,
 APPLECROSS

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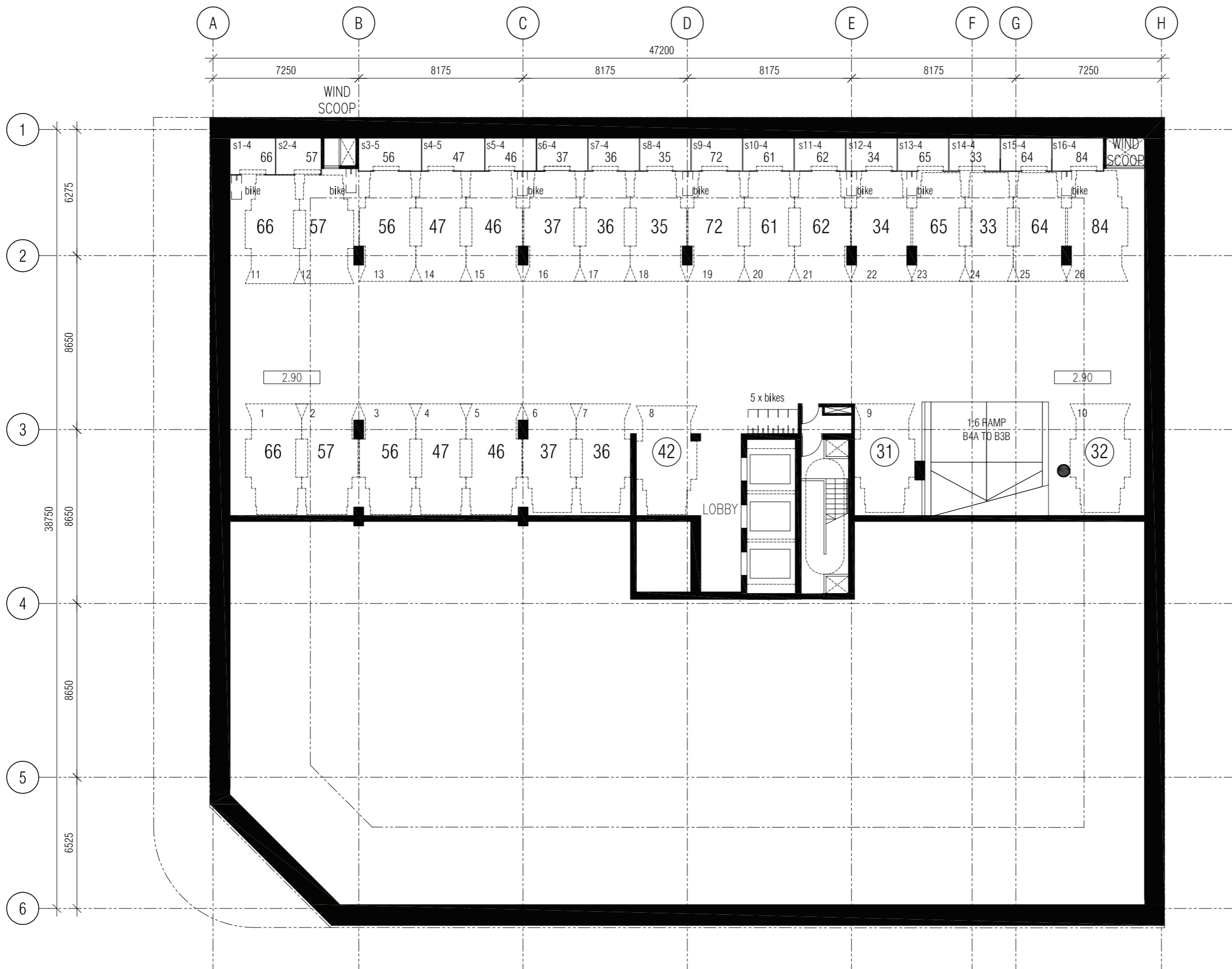


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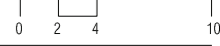
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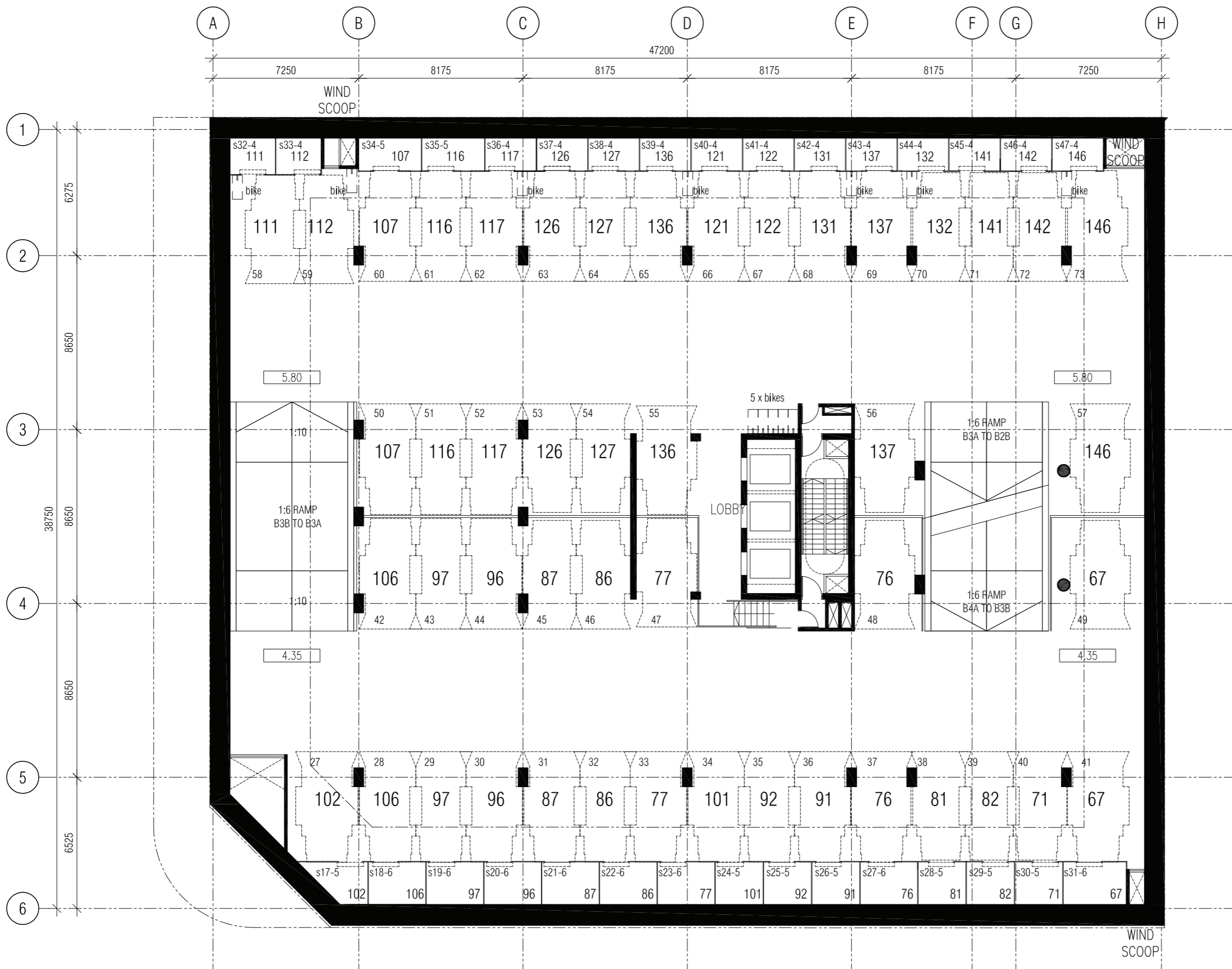
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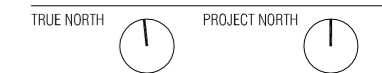


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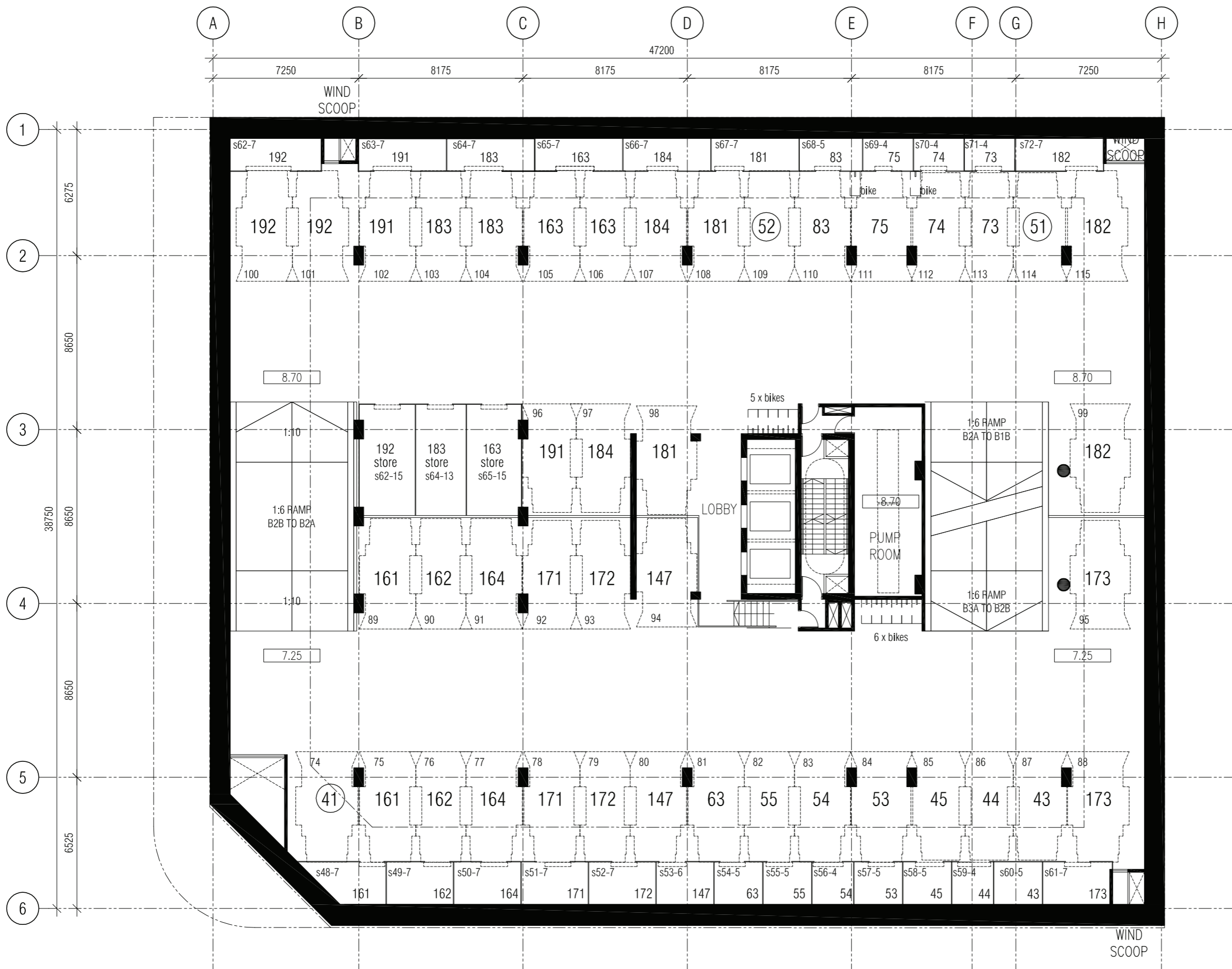
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NOTE:

TOTAL RESI. CAR BAYS	135
TOTAL SHORT STAY CAR BAYS	07
TOTAL CO-WORK CAR BAYS	15
TOTAL F & B BAYS	02
EV CHARGING BAY	01

TOTAL CAR BAYS 160

* CAR BAYS TO BE CAPABLE OF UTILISING INDIVIDUAL STACKER SYSTEM

94

APARTMENTS WITH REMOTE STORE ROOMS LOCATED ON GROUND FLOOR

CAR BAYS TO BE CAPABLE OF UTILISING INDIVIDUAL STACKER SYSTEM

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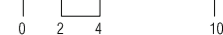


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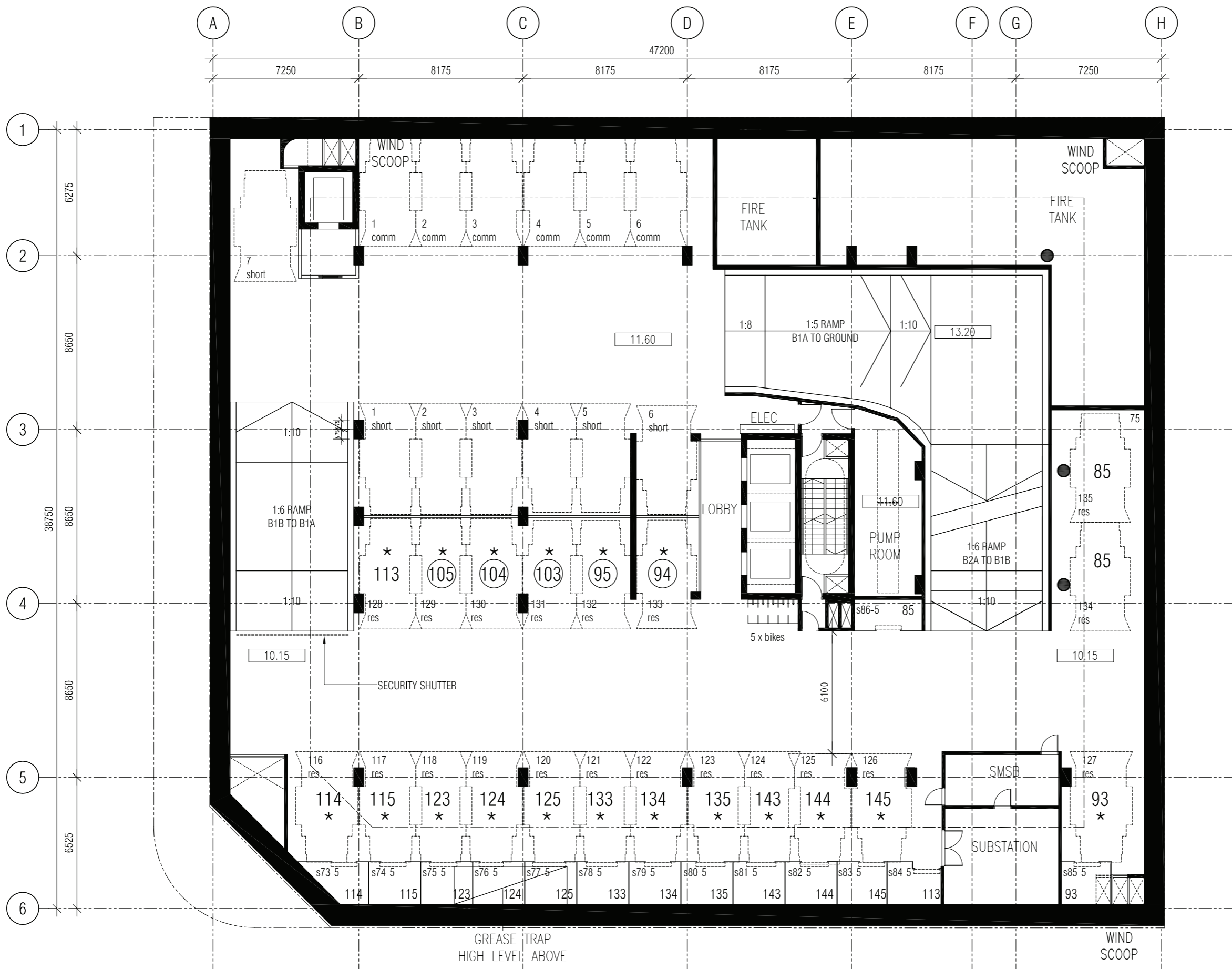
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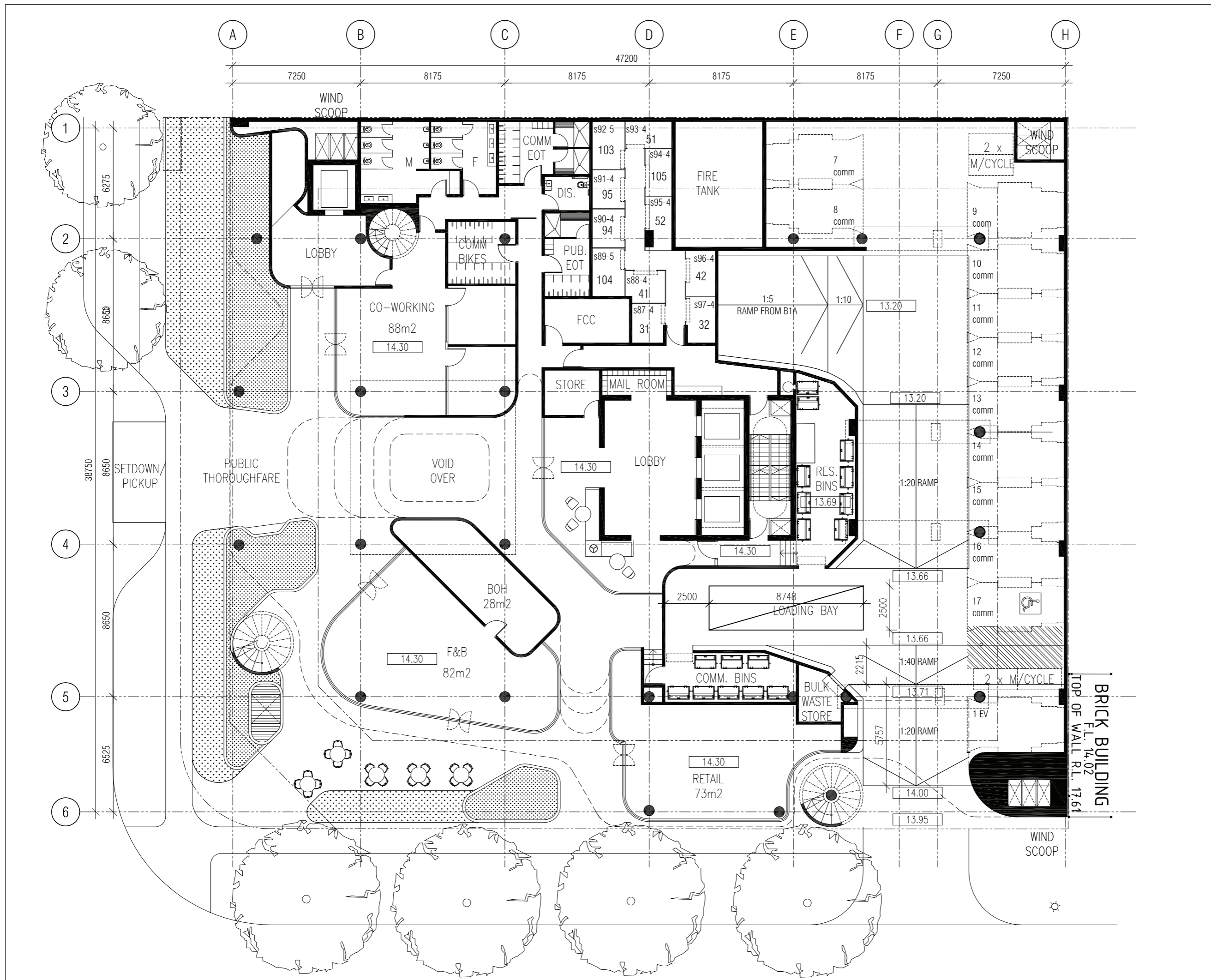
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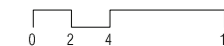


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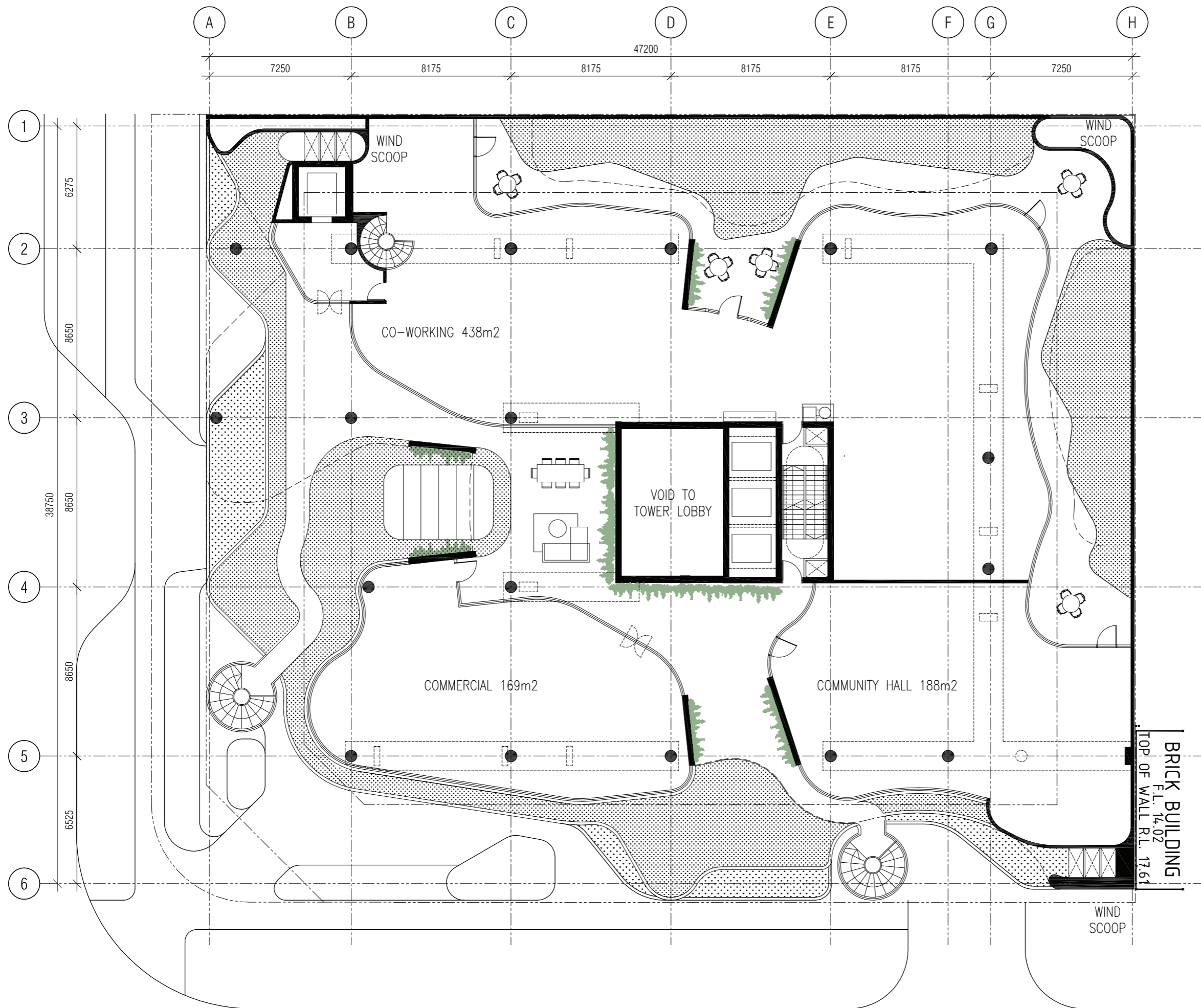
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FORBES RESIDENCES

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APPLECROSS

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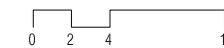


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APEX VIEW PTY LTD

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FORBES RESIDENCES

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APPLECROSS

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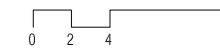


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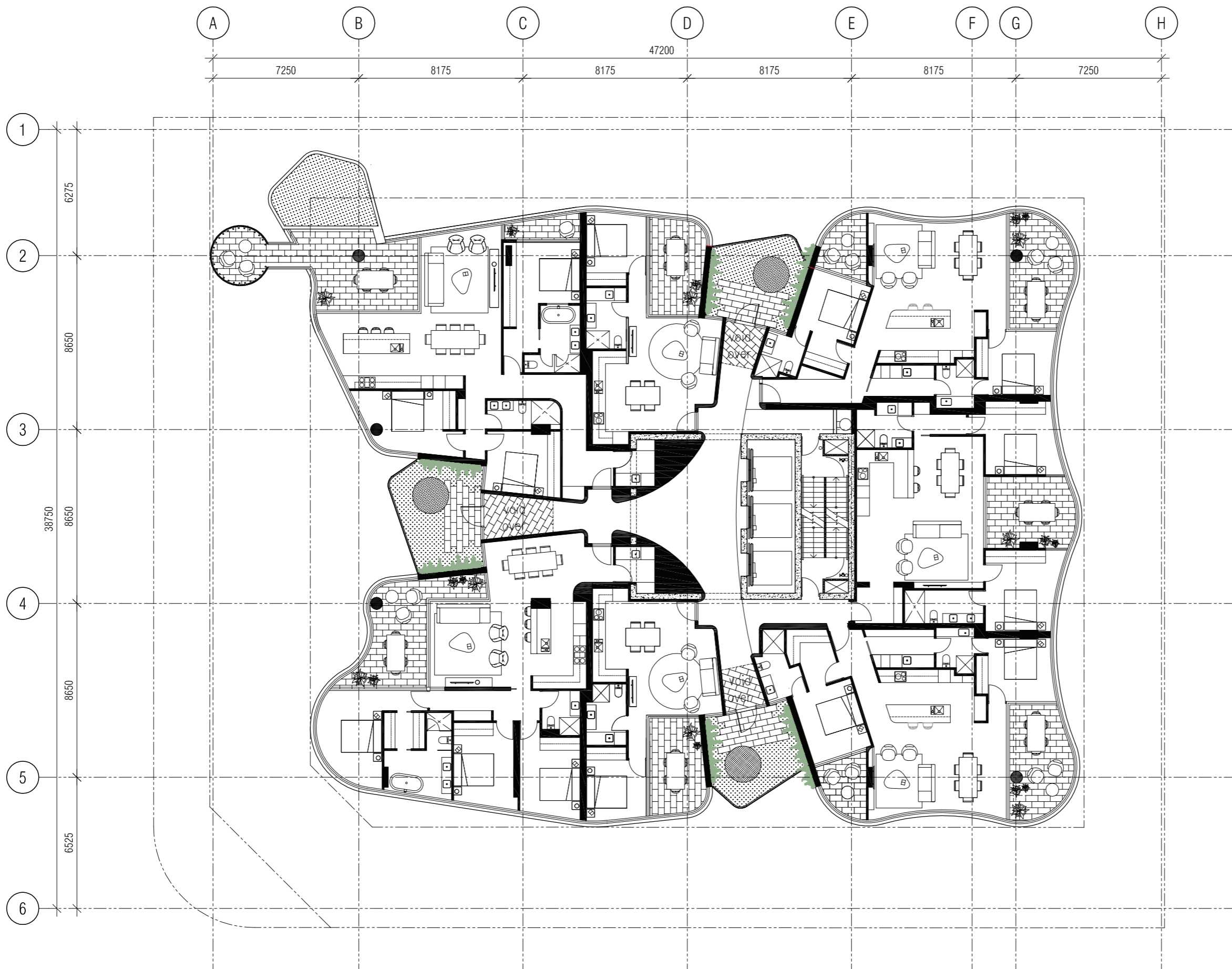
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FORBES RESIDENCES

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APPLECROSS

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18003

TRUE NORTH

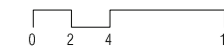


PROJECT NORTH



SCALE

1:200 @ A3



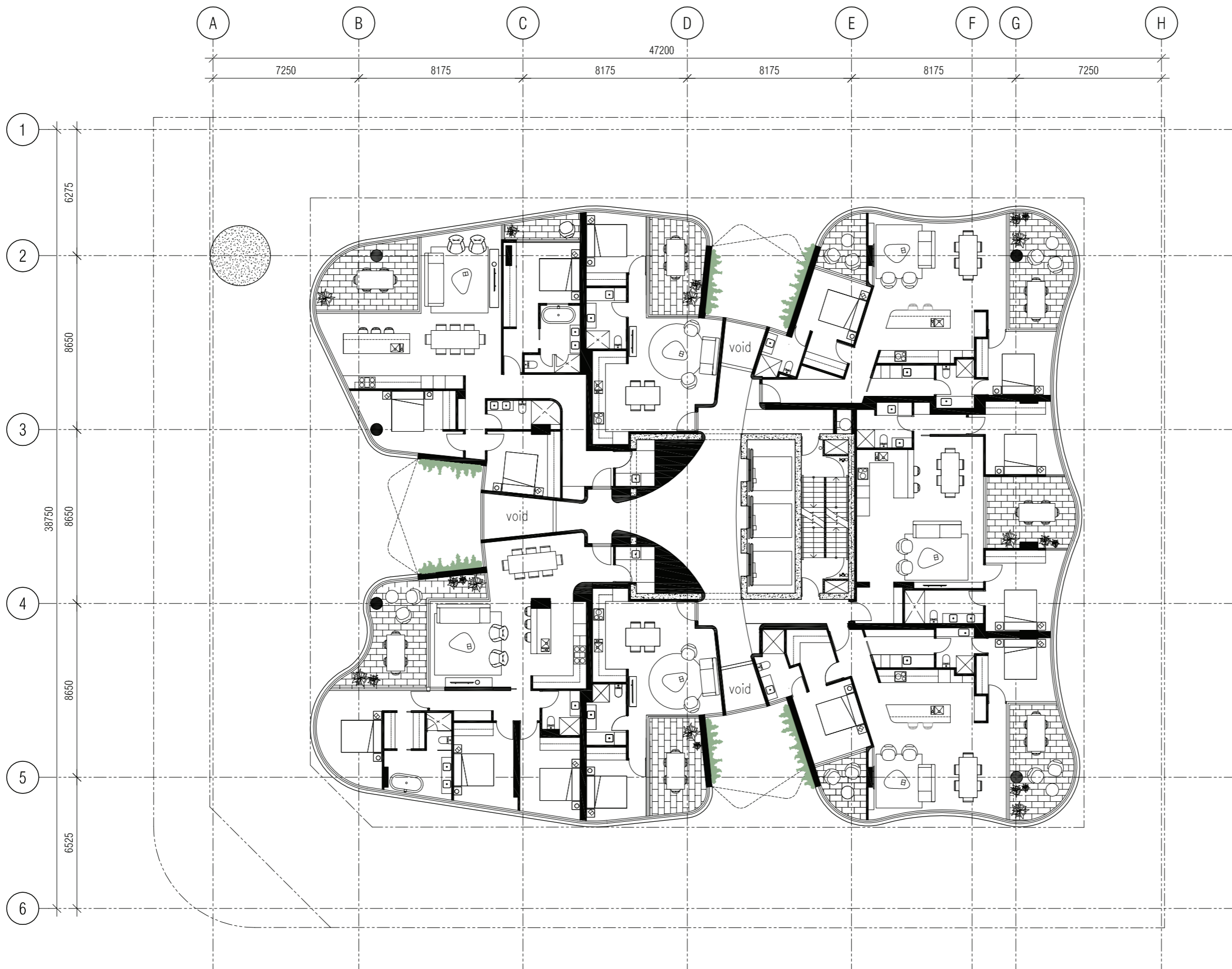
STATUS

ISSUED FOR DA

DRAWING

LEVELS 4,5,7,8,10,11,13,14

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.10	MEC	MEC	2



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X

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REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

CLIENT

APEX VIEW PTY LTD

PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD
APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

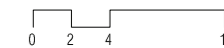


PROJECT NORTH



SCALE

1:200 @ A3



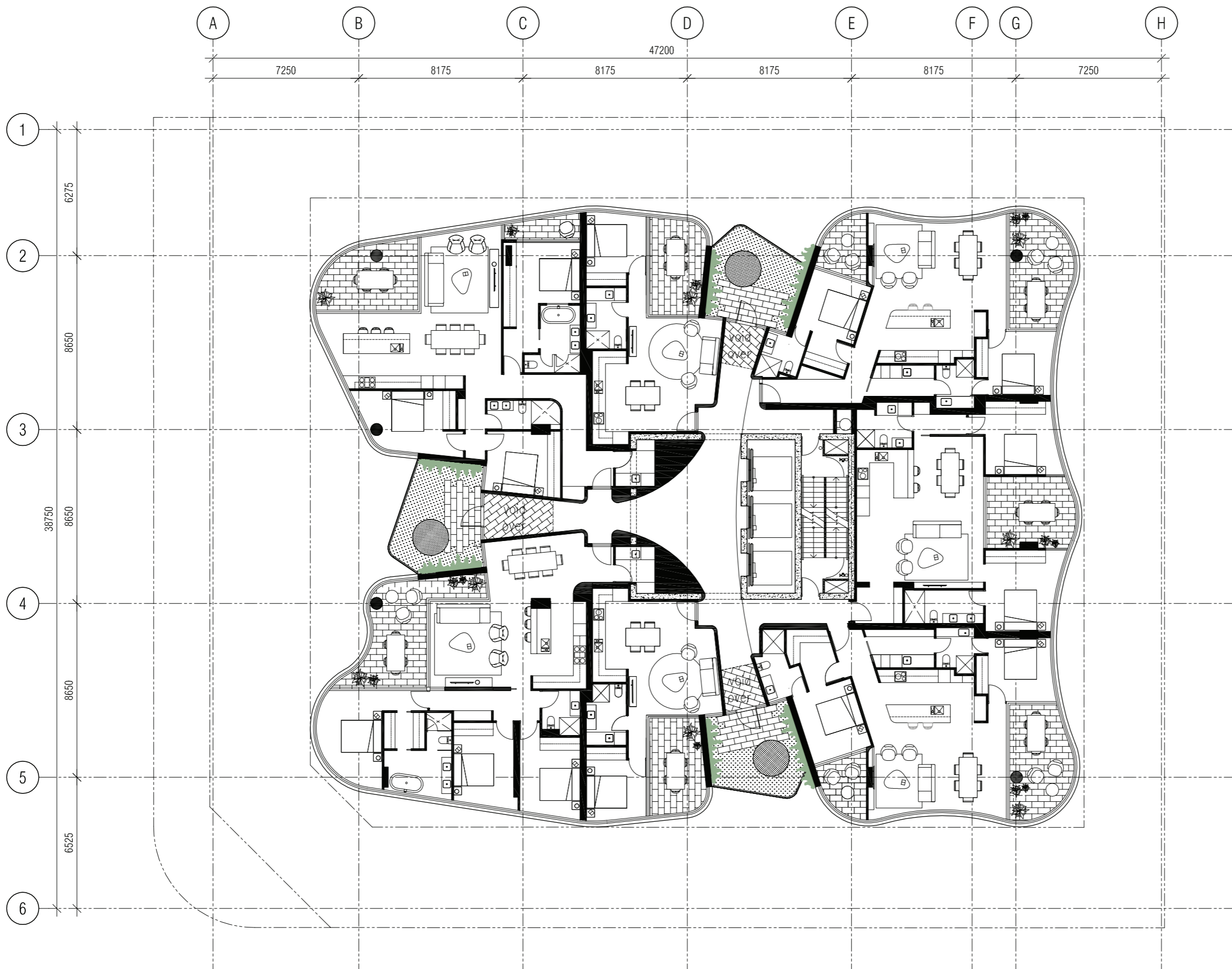
STATUS

ISSUED FOR DA

DRAWING

LEVELS 6 & 12

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.11	MEC	MEC	2



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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

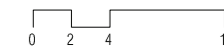


PROJECT NORTH



SCALE

1:200 @ A3



STATUS

ISSUED FOR DA

DRAWING

LEVEL 9

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.12	MEC	MEC	2



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1	18.11.18	DA ISSUE	MEC
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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD
APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

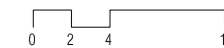


PROJECT NORTH



SCALE

1:200 @ A3



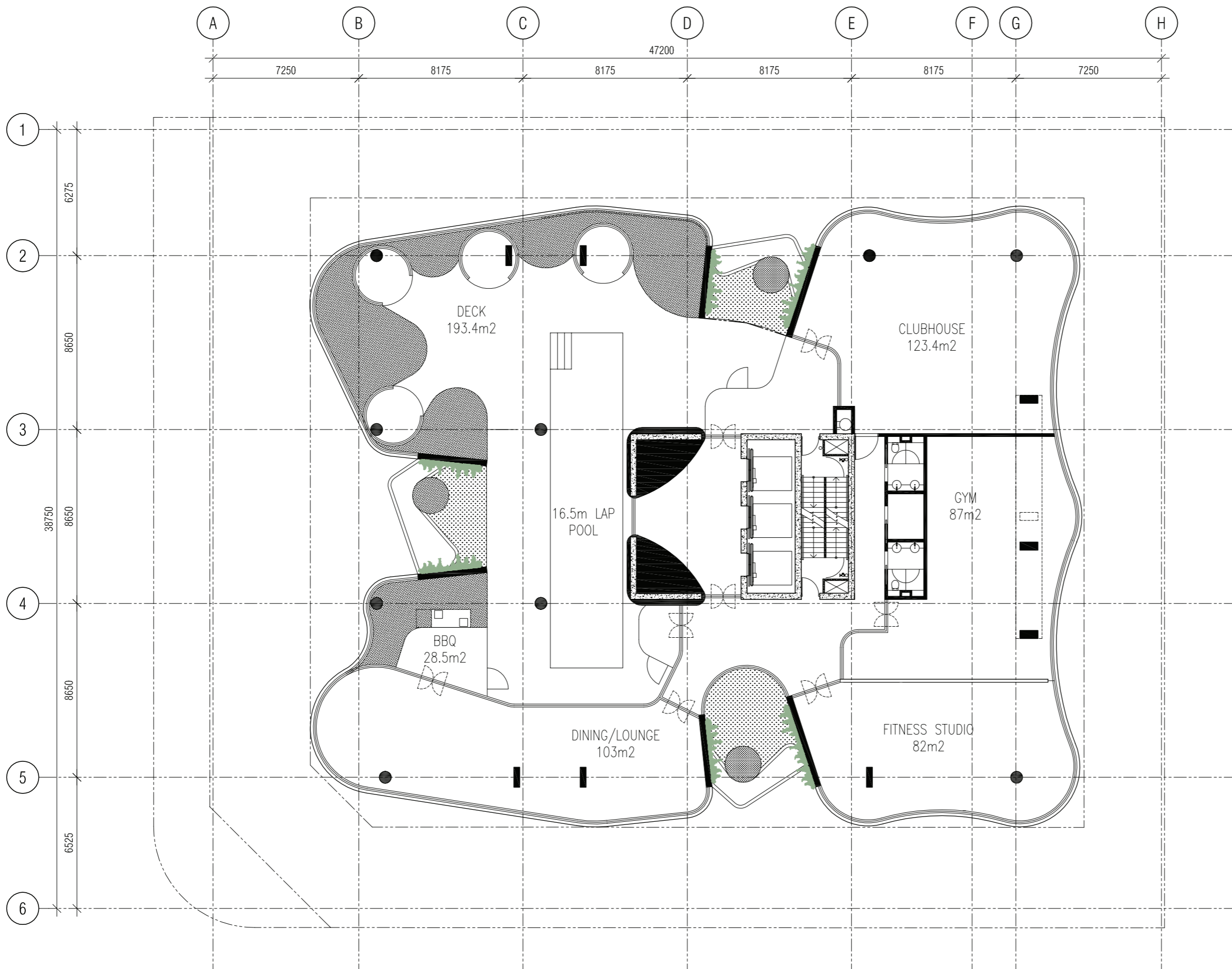
STATUS

ISSUED FOR DA

DRAWING

LEVEL 15

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.13	MEC	MEC	2



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1	16.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

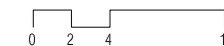


PROJECT NORTH



SCALE

1:200 @ A3



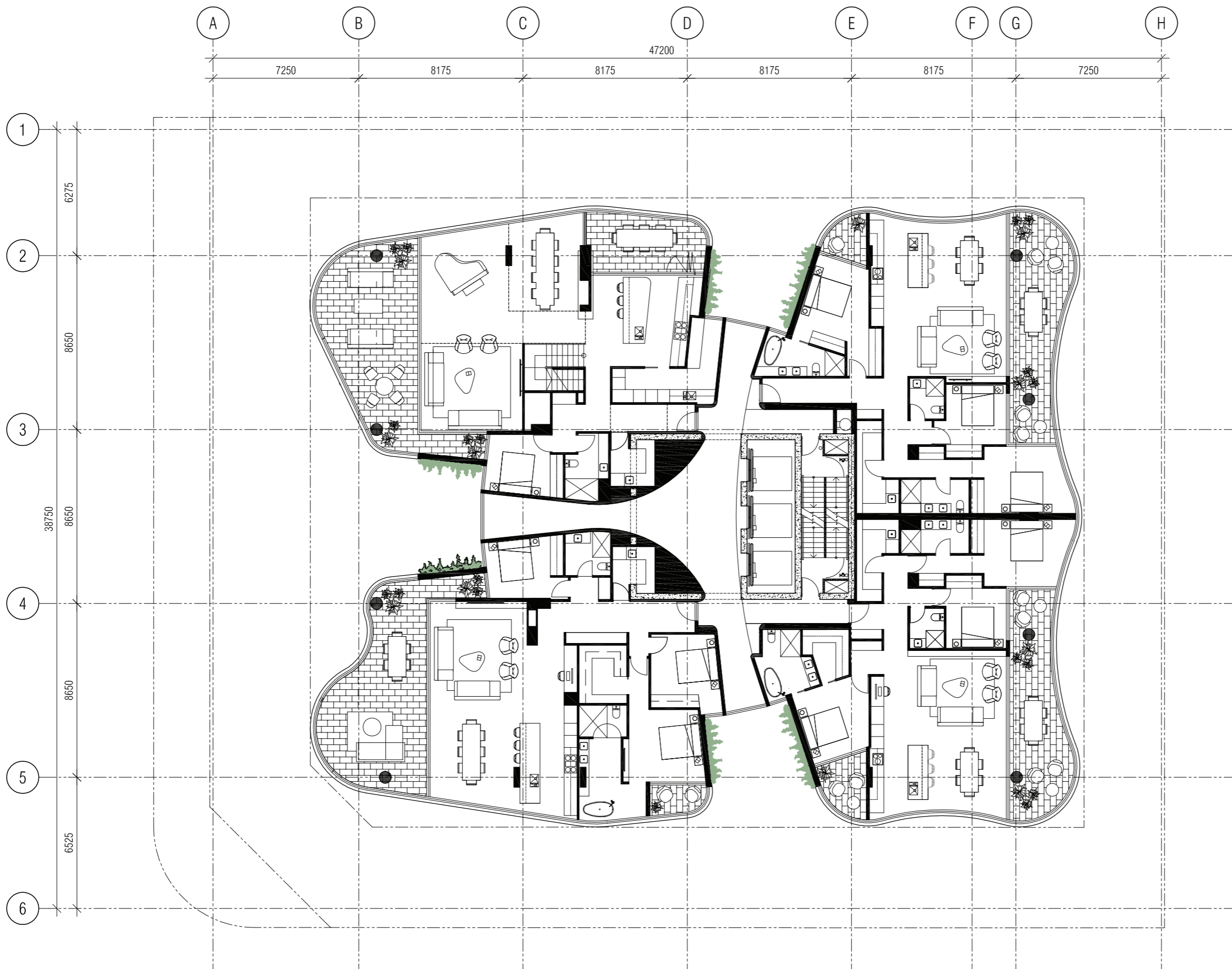
STATUS

ISSUED FOR DA

DRAWING

LEVEL 16

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.14	MEC	MEC	2



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REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

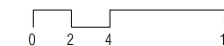


PROJECT NORTH



SCALE

1:200 @ A3



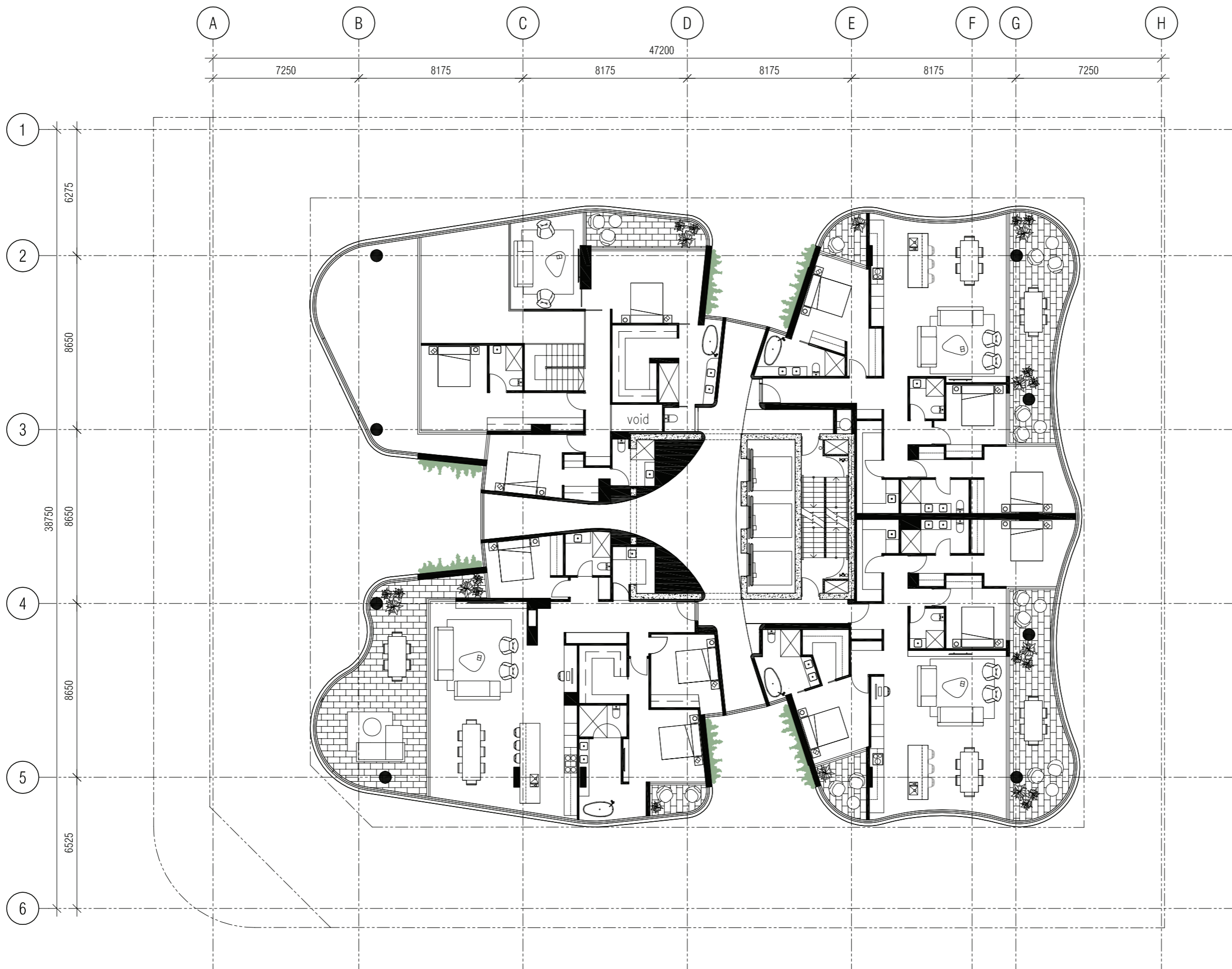
STATUS

ISSUED FOR DA

DRAWING

LEVEL 17

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.15	MEC	MEC	2



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1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

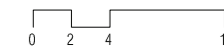


PROJECT NORTH



SCALE

1:200 @ A3



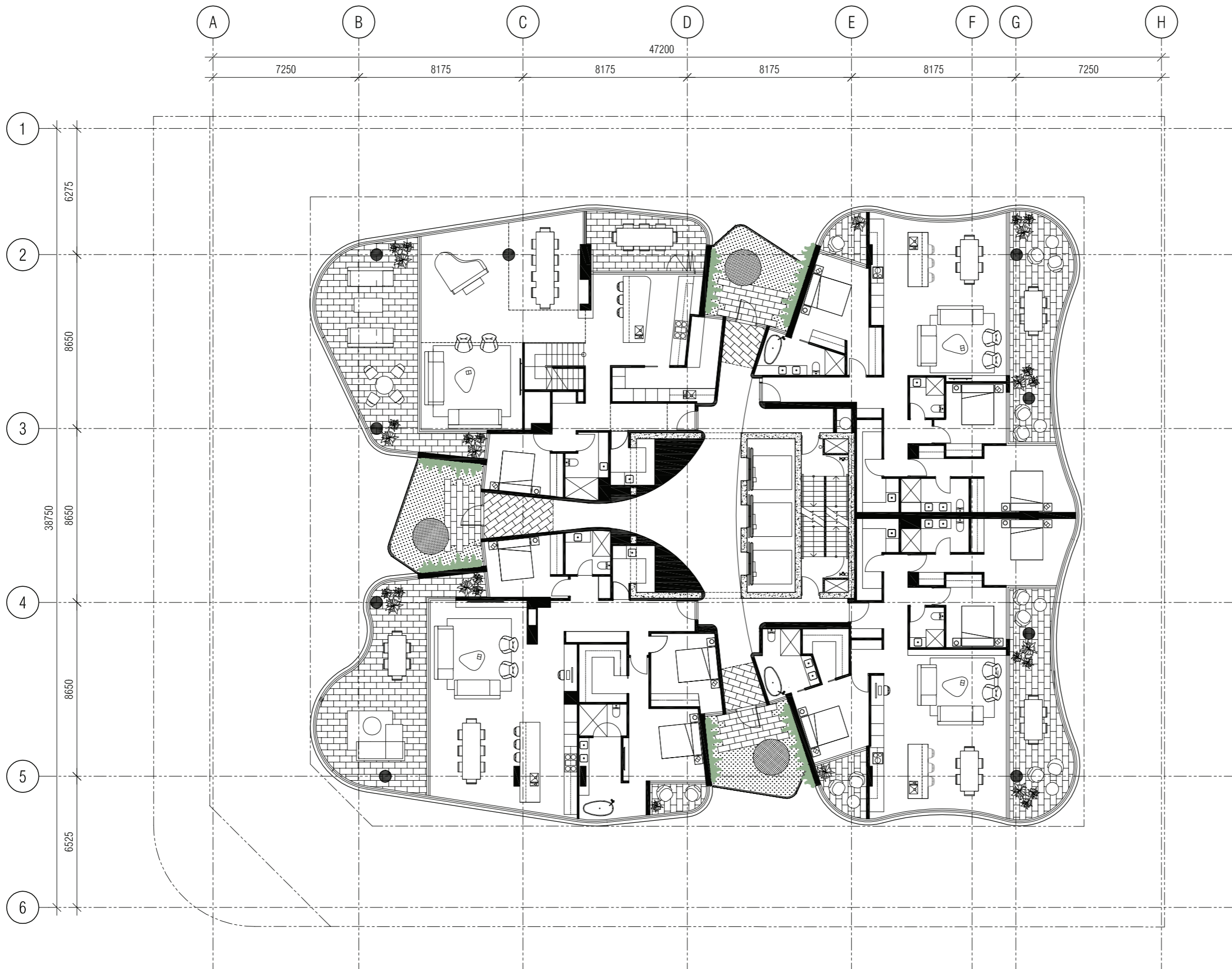
STATUS

ISSUED FOR DA

DRAWING

LEVEL 18

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.16	MEC	MEC	2



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REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD
APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

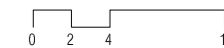


PROJECT NORTH



SCALE

1:200 @ A3



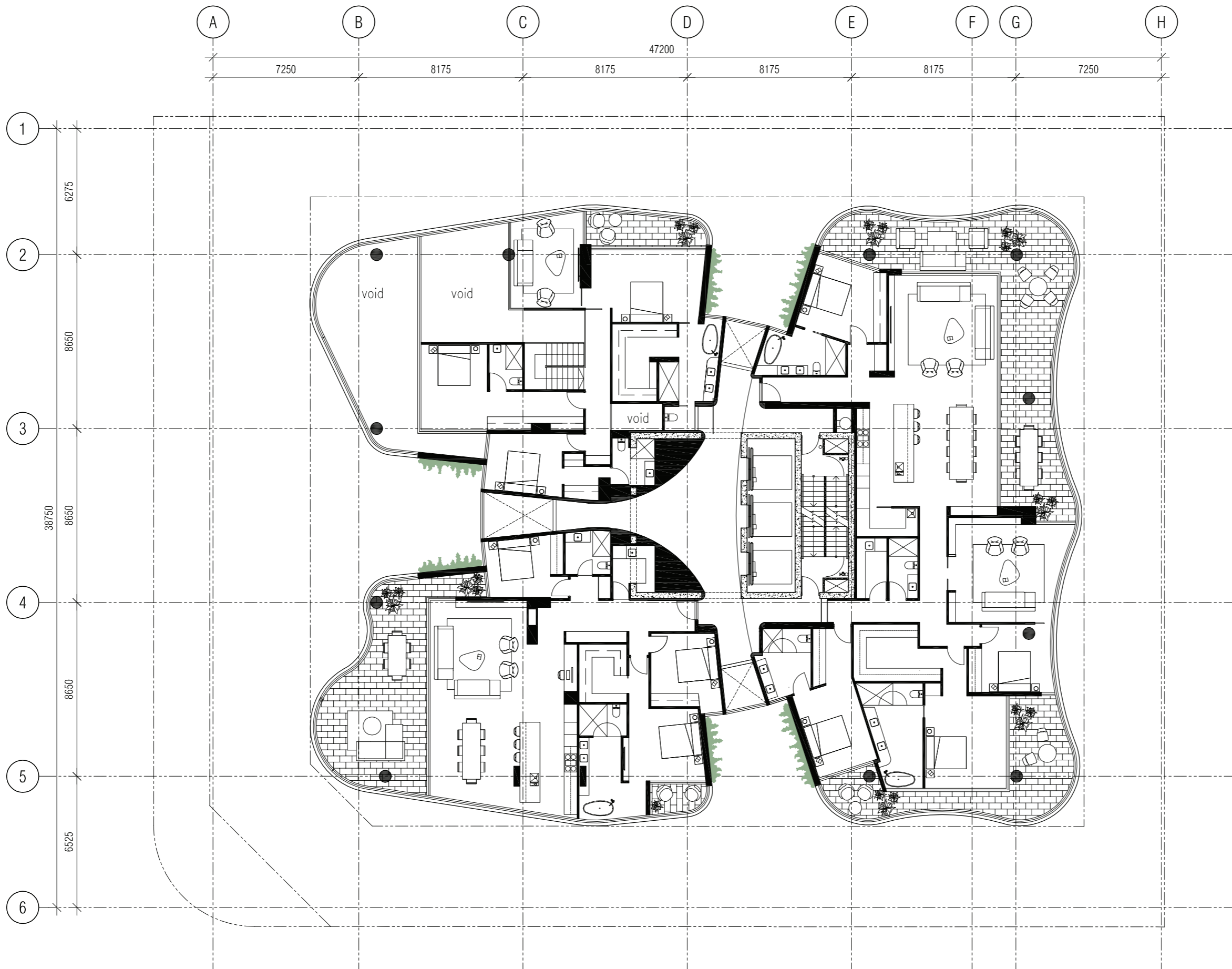
STATUS

ISSUED FOR DA

DRAWING

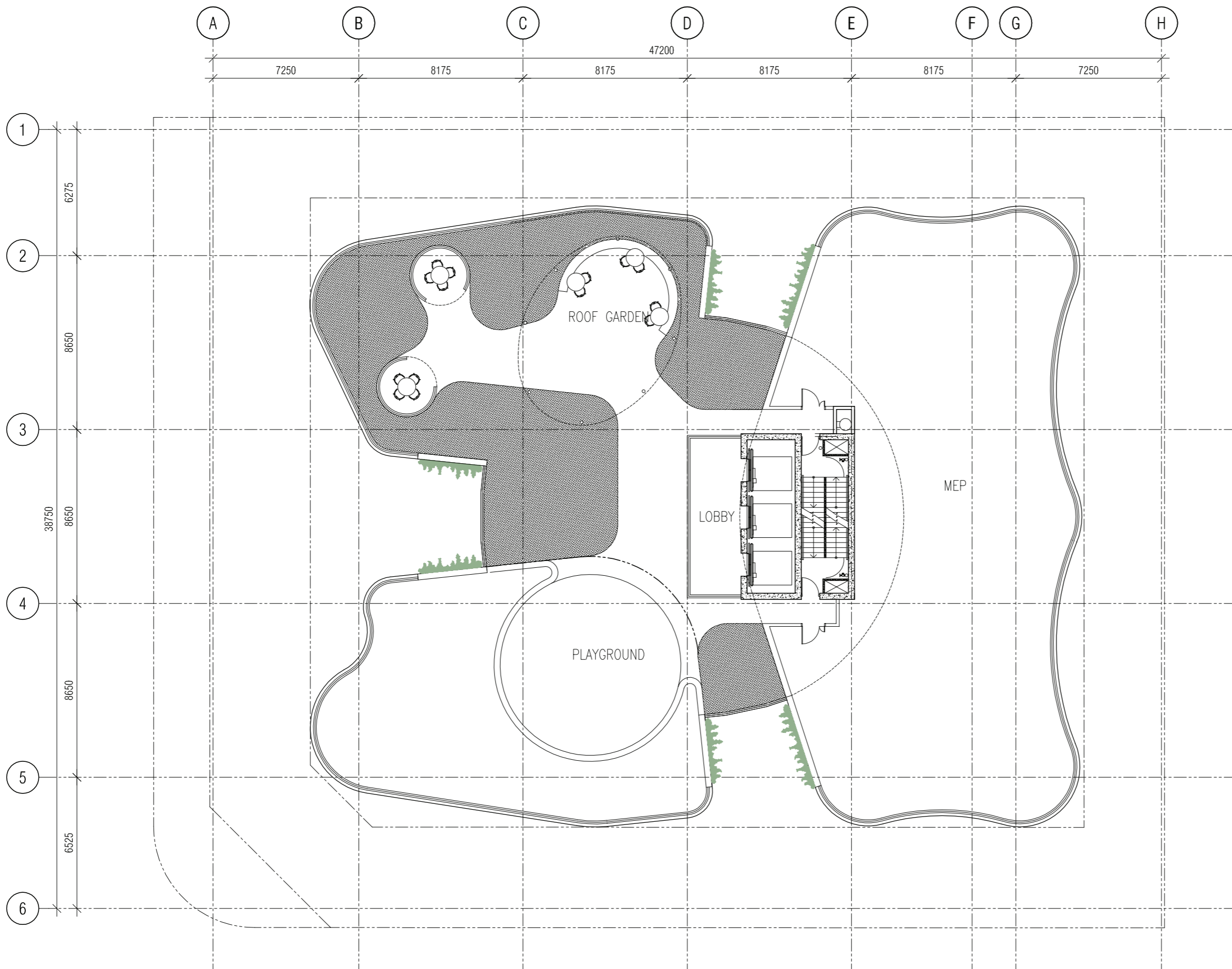
LEVEL 19

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.17	MEC	MEC	2



REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC

REV.	DATE	AMENDMENT	INIT.



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PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH

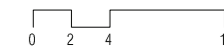


PROJECT NORTH



SCALE

1:200 @ A3



STATUS

ISSUED FOR DA

DRAWING

LEVEL ROOF TERRACE

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.18	MEC	MEC	2

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REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC



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APEX VIEW PTY LTD

PROJECT

FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES RD

APPLECROSS

MJA PROJECT NUMBER

18003

TRUE NORTH PROJECT NORTH



SCALE

1:400 @ A3

STATUS

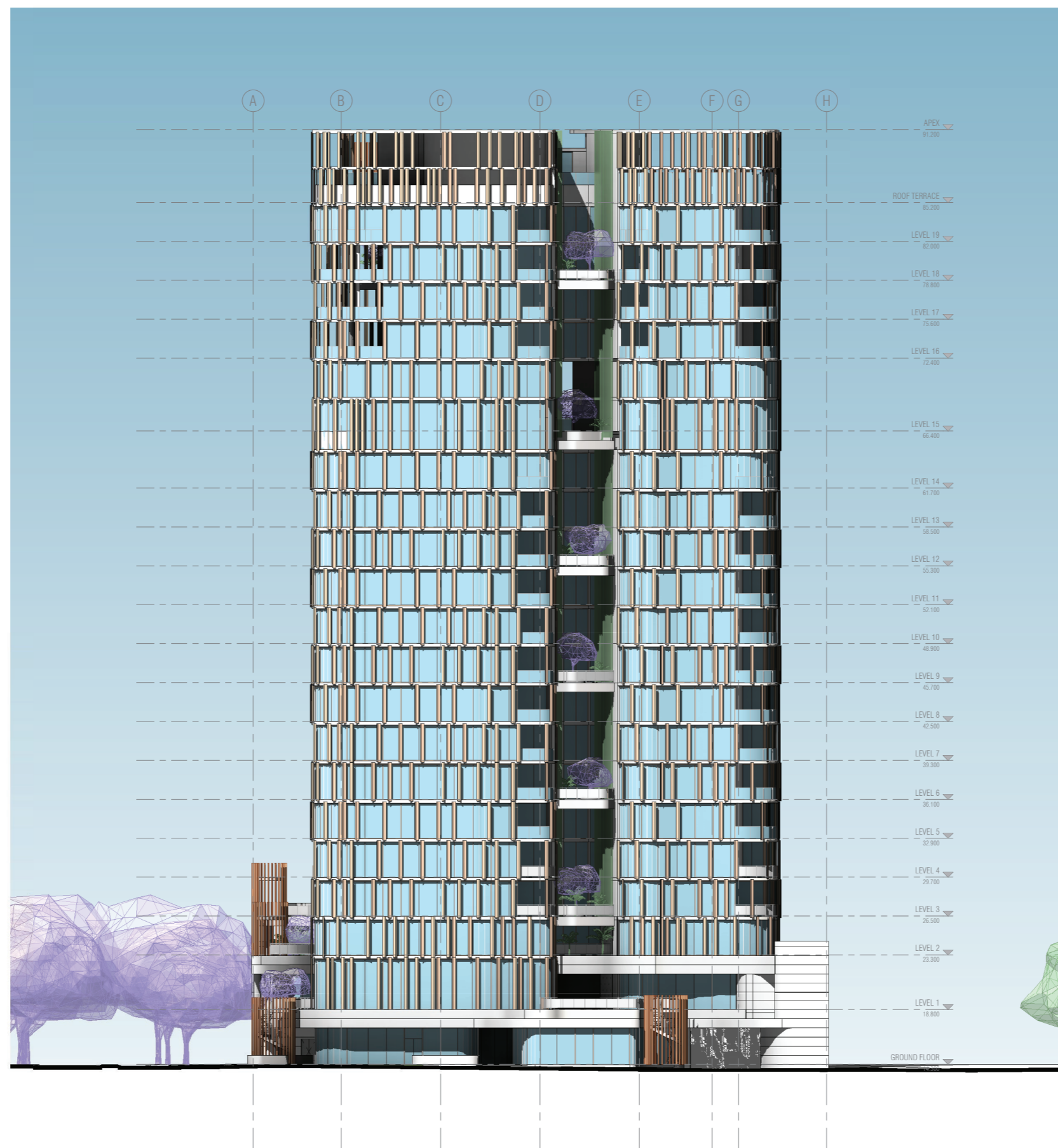
ISSUED FOR DA

DRAWING

WEST ELEVATION

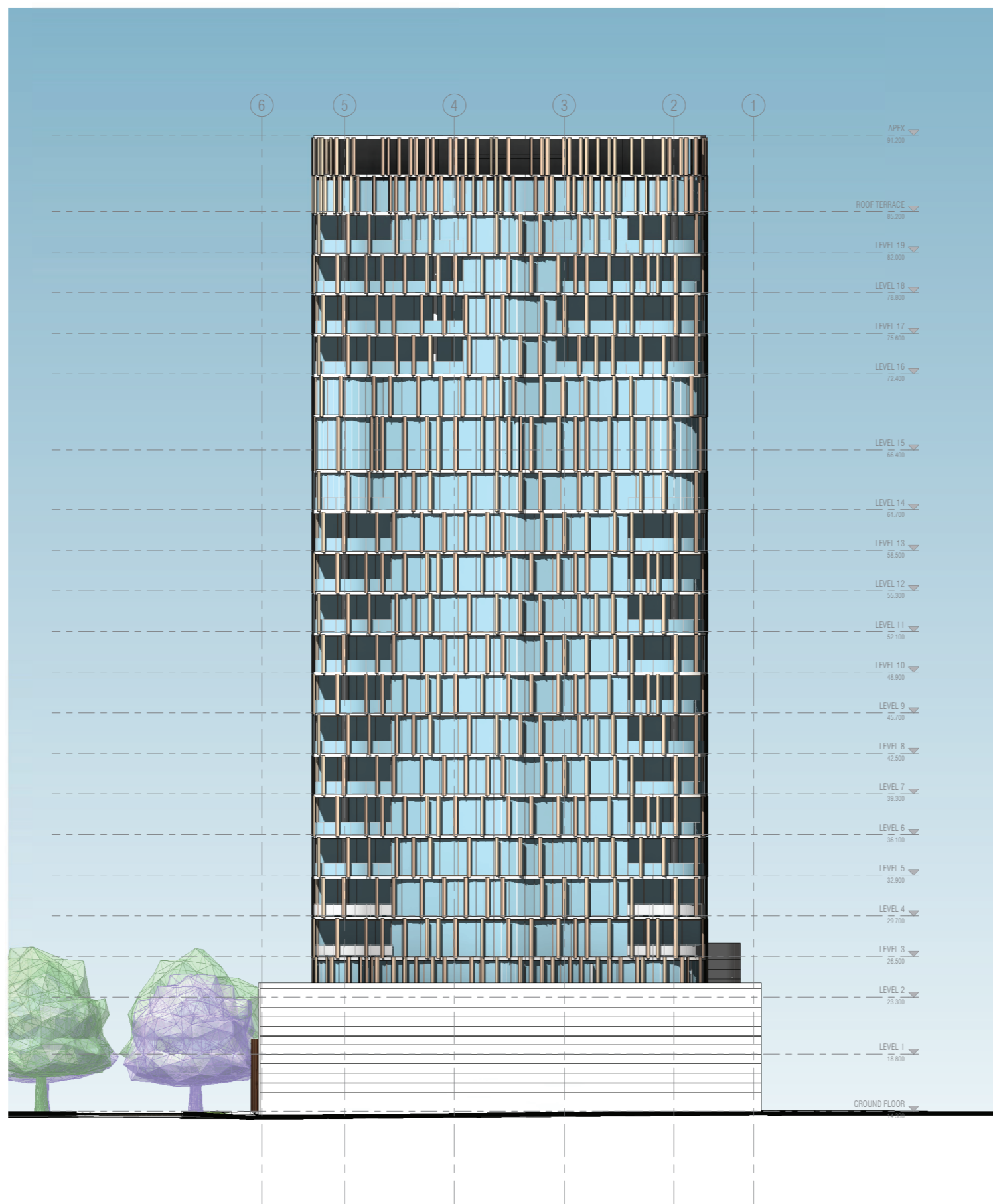
DRAWING NO.	DRAFTER	CHECKED	REV.
DA.19	MEC	MEC	2

REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC



CLIENT	APEX VIEW PTY LTD		
PROJECT	FORBES RESIDENCES		
PROJECT ADDRESS	10-14 FORBES RD APPLECROSS		
MJA PROJECT NUMBER	18003		
TRUE NORTH	PROJECT NORTH		
SCALE	1:400 @ A3		
STATUS	ISSUED FOR DA		
DRAWING	SOUTH ELEVATION		
DRAWING NO.	DRAFTER	CHECKED	REV.
DA.20	MEC	MEC	2

REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC





CLIENT
APEX VIEW PTY LTD

PROJECT
FORBES RESIDENCES

PROJECT ADDRESS
10-14 FORBES RD
APPLECROSS

MJA PROJECT NUMBER
18003

TRUE NORTH  PROJECT NORTH 

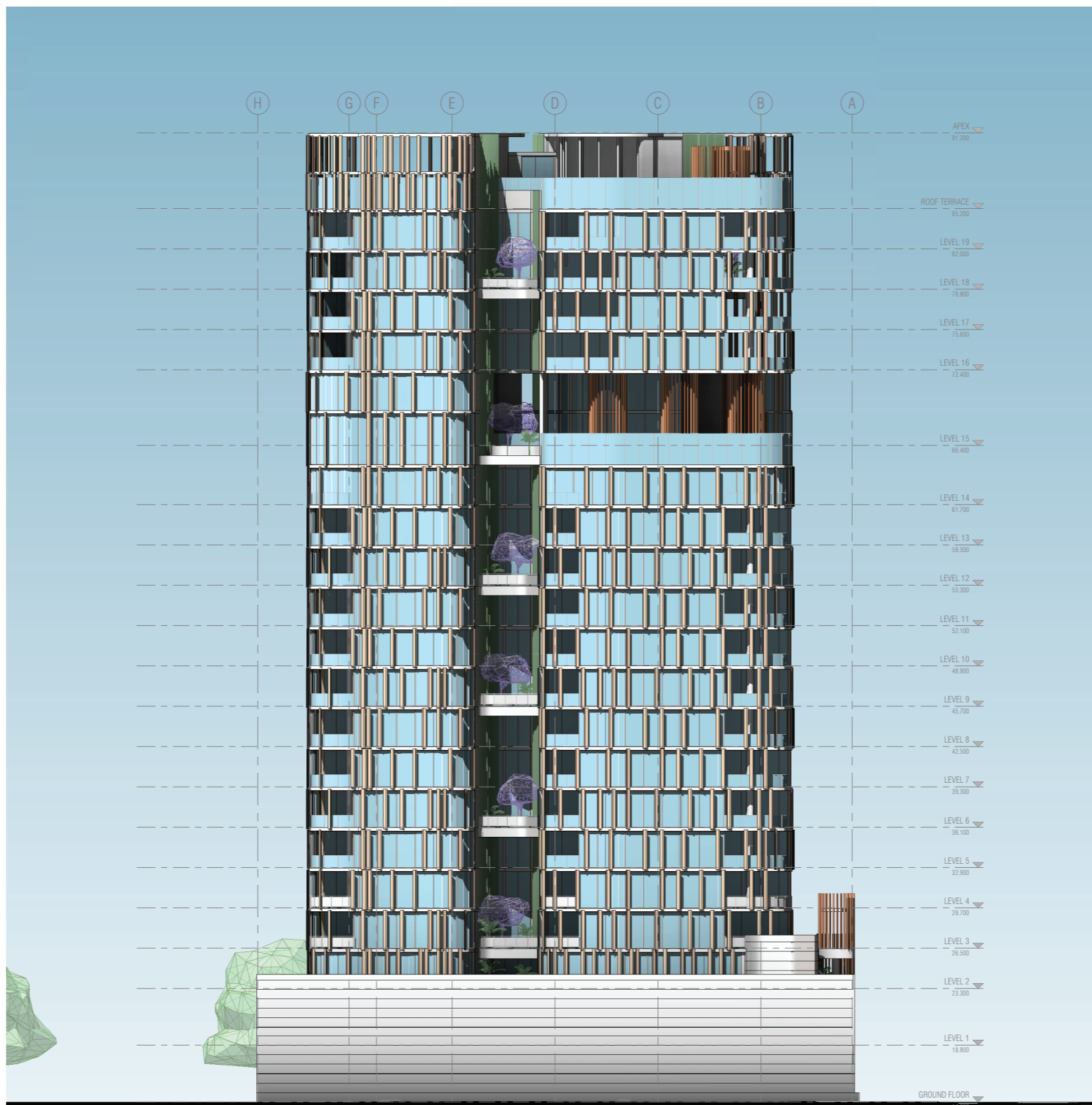
SCALE
1:400 @ A3

STATUS
ISSUED FOR DA

DRAWING
EAST ELEVATION

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.21	MEC	MEC	2

REV.	DATE	AMENDMENT	INIT.
1	18.11.18	DA ISSUE	MEC
2	29.01.19	REVISED DA ISSUE	MEC





CLIENT
APEX VIEW PTY LTD

PROJECT
FORBES RESIDENCES

PROJECT ADDRESS
**10-14 FORBES RD
 APPLECROSS**

MJA PROJECT NUMBER
18003

TRUE NORTH  PROJECT NORTH 

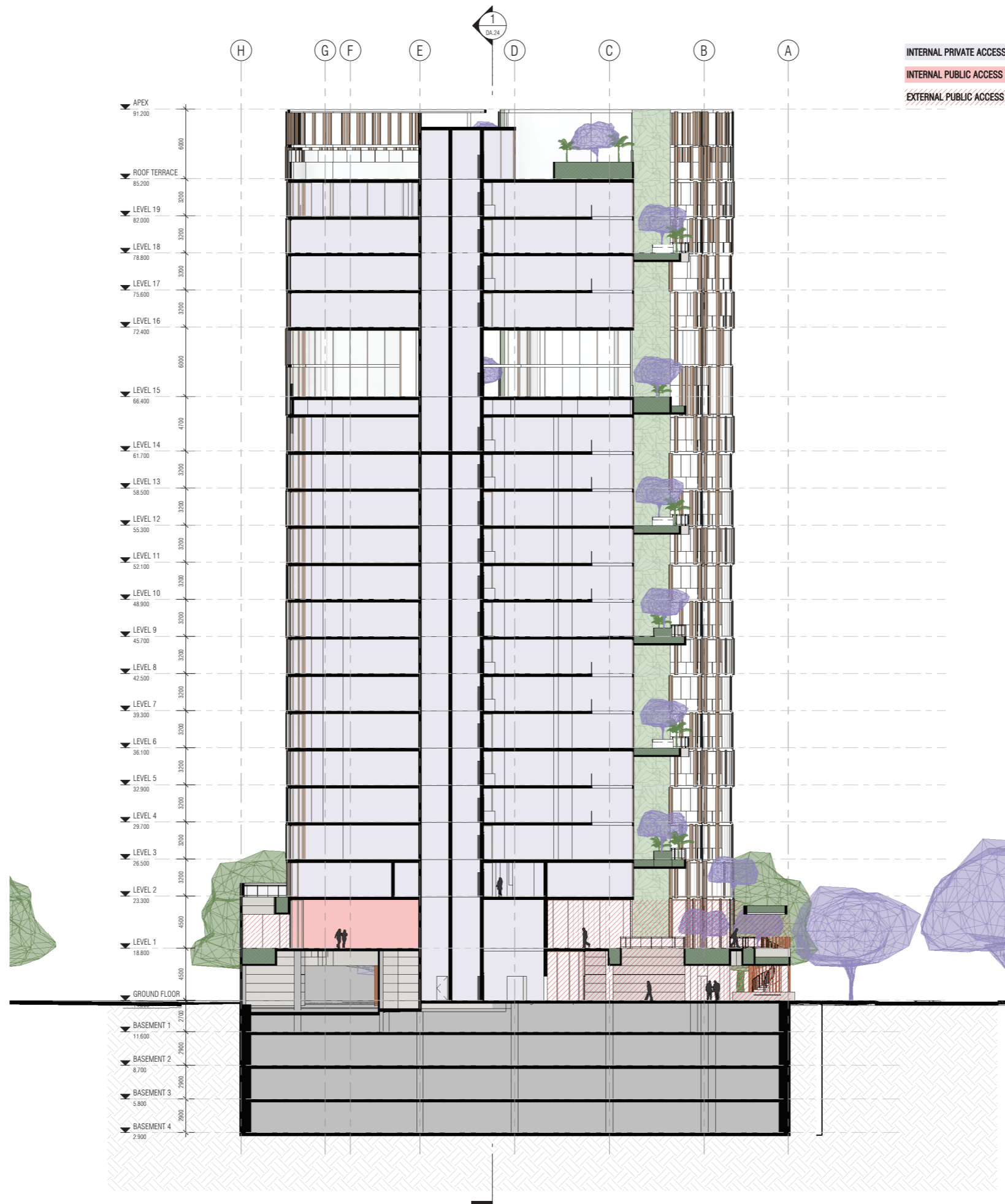
SCALE
1:400 @ A3

STATUS
ISSUED FOR DA

DRAWING
NORTH ELEVATION

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.22	MEC	MEC	2

REV.	DATE	AMENDMENT	INIT.
1	29.01.19	REVISED DA ISSUE	CPA



CLIENT
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PROJECT
 FORBES RESIDENCES

PROJECT ADDRESS

10-14 FORBES ROAD
 APPLECROSS, WA 6153

MJA PROJECT NUMBER
 18003

TRUE NORTH

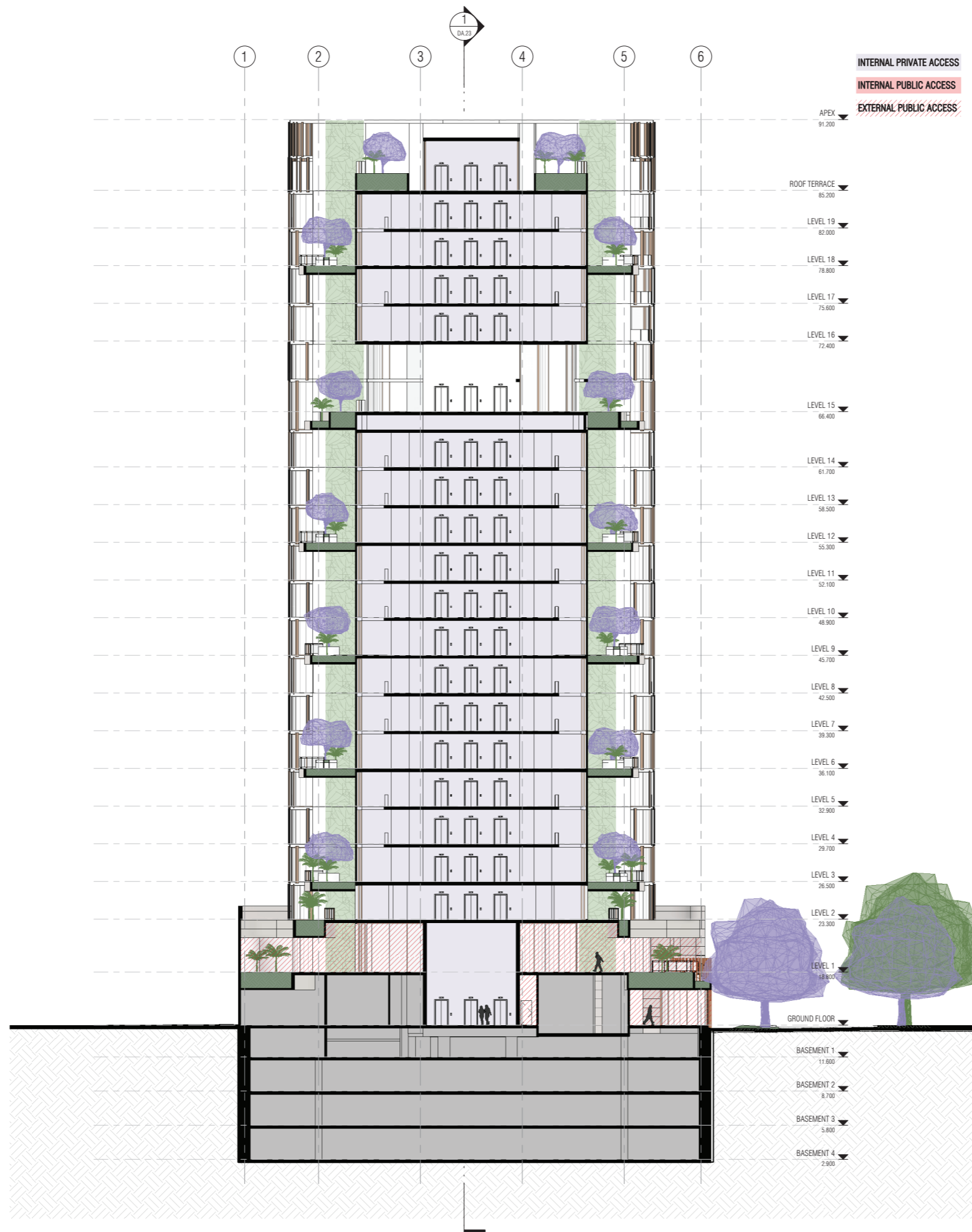
SCALE @ A1
 1 : 200

STATUS
 ISSUED FOR DA

DRAWING

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.23	MEC	MEC	1

REV.	DATE	AMENDMENT	INIT.
1	29.01.19	REVISED DA ISSUE	CPA



CLIENT
 APEX VIEW PTY LTD
 PROJECT
 FORBES RESIDENCES
 PROJECT ADDRESS

10-14 FORBES ROAD
 APPECROSS, WA 6153

MJA PROJECT NUMBER
 18003

TRUE NORTH

SCALE @ A1
 1 : 200

STATUS
 ISSUED FOR DA
 DRAWING

SECTION

DRAWING NO.	DRAFTER	CHECKED	REV.
DA.24	MEC	MEC	1



FORBES RESIDENCES