

DEVELOPMENT APPLICATION: ACOUSTICS

120 Marine Parade, Cottesloe

Reference: 20115939-01c DA Acoustic

Prepared for:

Gary Dempsey Developments

Report: 20115939-01c DA Acoustic

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Date:	Rev	Description	Prepared By	Verified
23-Nov-20	0	Issued to Client	Terry George	Olivier Mallié
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1 INTRODUCTION

It is proposed to construct a mixed use development at 120 Marine Parade, Cottesloe – refer *Figure 1-1*. The development includes 2 basements of car park (accessed via 122 Marine Parade), ground floor commercial space and 11 apartments over the first to sixth floors - refer *Appendix A* plans.



Figure 1-1 Project Locality (Town of Cottesloe Intramaps)

With regards to acoustics, there will be several criteria that the project will need to satisfy. The apartments will need to comply with the *National Construction Code*, which provides minimum performance requirements for noise transfer between apartments, between apartments and other uses, and considers noise from their own services such as hydraulics, lifts and the like.

Also applicable for the entire project will be the control of noise to neighbouring properties, predominantly from mechanical services and also the ground floor commercial space and car parking, which will need to comply with the *Environmental Protection (Noise) Regulations 1997*.

The final acoustic aspect relates to ambient noise. The site is outside of areas that would fall under assessment of *State Planning Policy 5.1: Land Use Planning in the Vicinity of Perth Airport* (July 2015) and *State Planning Policy No. 5.4 Road and Rail Noise* (Sept 2019). However, whilst Marine Parade is not identified on the PlanWA maps as a significant road, it does carry reasonable traffic volumes such that this along with general ambient noise from nearby commercial will also be considered during detailed design.

Given this report is for Development Application (DA) purposes only, these items are discussed broadly but will be considered further in detailed design.

Appendix B contains a description of some of the terminology used throughout this report.

2 CRITERIA

Each of the relevant criteria are provided in the following sections. Compliance with these will be worked through during detailed design.

2.1 Environmental Protection (Noise) Regulations 1997

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (EPNR). The regulations that will be applicable to this project are as follows:

- Mechanical plant and noise from commercial tenancies are to comply with regulations 7 & 8 at neighbouring properties and noise sensitive parts of this development; and
- Noise during construction is to comply with regulation 13.

Each of these regulations as well as other relevant parts are explained in detail in *Section 2.1.1* to *Section 2.1.4*.

2.1.1 Regulations 7 & 8

Regulation 7 defines the prescribed standard for noise emissions as follows:

“7. (1) Noise emitted from any premises or public place when received at other premises –

- (a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and
- (b) Must be free of –
 - i. Tonality;
 - ii. Impulsiveness; and
 - iii. Modulation”.

A “...noise emission is taken to *significantly contribute to* a level of noise if the noise emission exceeds a value which is 5 dB below the assigned level...”

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

- (a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and
- (b) The noise emission complies with the standard prescribed under regulation 7 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 EPNR Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in Table 2-2.

Table 2-2 EPNR Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor

1. **highly sensitive area** means that area (if any) of noise sensitive premises comprising —
- (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - (b) any other part of the premises within 15 metres of that building or that part of the building.

The area is predominantly residential, with some mixed use, including the site itself, that could be considered commercial in terms of influencing factor calculations and considered to result in a 1 dB influencing factor. The latest traffic count (2018/19) for Marine Parade is 7,967 vehicles per day (vpd), south of Eric Street (MRWA Site No. 0307). Being below 15,000 vpd but above 6,000 vpd, this is classed as a secondary road under the Noise Regulations and therefore obtains a + 2 dB transport factor.

The assigned noise levels applicable at the nearest residences (refer Figure 2-1) are provided in Table 2-3.

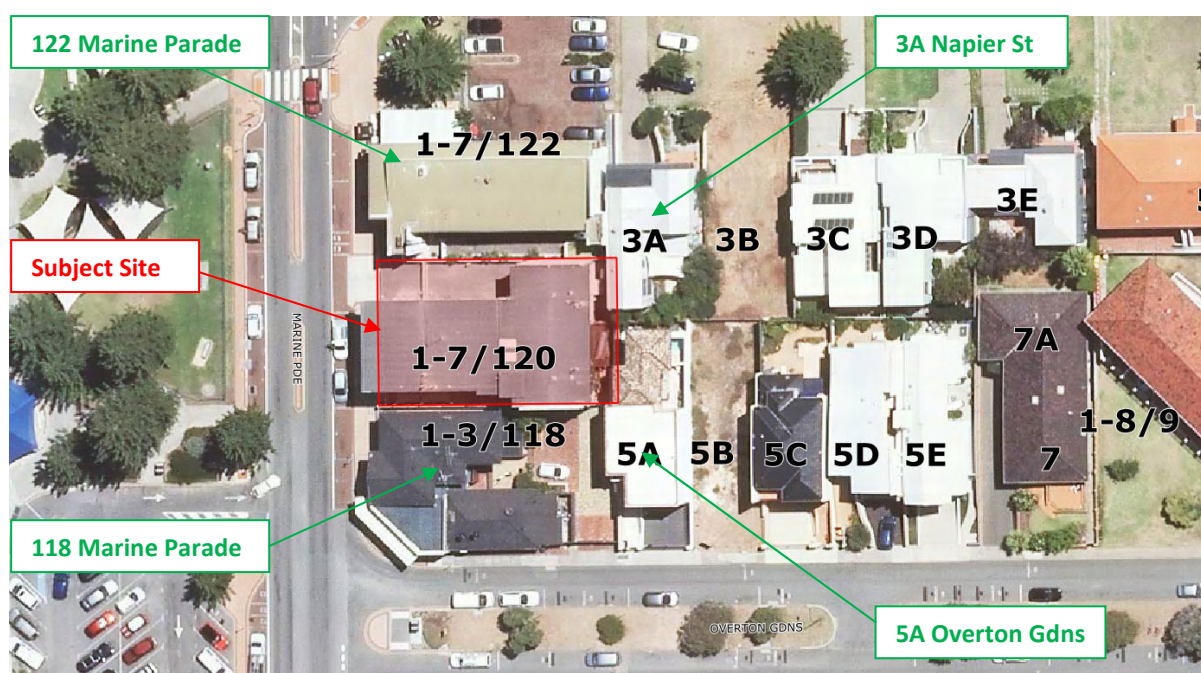


Figure 2-1 Receiver Locations (Source: Town of Cottesloe Intramaps)

Table 2-3 EPNR Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area ¹	0700 to 1900 hours Monday to Saturday (Day)	48	58	68
	0900 to 1900 hours Sunday and public holidays (Sunday)	43	53	68
	1900 to 2200 hours all days (Evening)	43	53	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	38	48	58

1. *highly sensitive area* means that area (if any) of noise sensitive premises comprising —
- a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - any other part of the premises within 15 metres of that building or that part of the building.

With regards to the nearest residences, the following is noted:

- 122 Marine Parade – to be redeveloped similar to this proposal;
- 118 Marine Parade – 2 levels (first floor possible residence);
- 5A Overton Gardens – 3 level dwelling;
- 3A Napier Street – 3 level dwelling.

2.1.2 Regulation 14A

Regulation 14A provides requirements for such activities as the collection of waste, landscaped area maintenance and car park cleaning. Such activities can also be exempt from having to comply with regulation 7, provided they are undertaken in accordance with regulation 14A(2) as follows:

- during daytime hours, defined as:
 - 07:00 to 19:00 Monday to Saturday (excluding public holiday), or
 - 09:00 to 19:00 on a Sunday or public holiday
- in the quietest reasonable and practicable manner and using the quietest equipment reasonably available.

In the case where specified works are to be undertaken outside daytime hours and their noise emissions are likely not to comply with regulation 7, the works also need to be carried out according to a Noise Management Plan which has been approved by the local government authority CEO.

2.1.3 Regulation 13

Construction noise must comply with regulation 13, which states the following:

Regulation 7 does not apply to ... construction work carried out between 0700 hours and 1900 hours on any day which is not a Sunday or public holiday if the occupier of the premises ... shows that –

- a) *The construction work was carried out in accordance with control of environmental noise practices set out in section 6 of AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites;*
- b) *The equipment used on the premises was the quietest reasonably available; and*
- c) *If the occupier was required to prepare a noise management plan ... in respect of the construction site –*
 - i. *The noise management plan was prepared and given in accordance with the requirement, and approved by the Chief Executive Officer; and*
 - ii. *The construction work was carried out in accordance with the management plan.*

Regulation 7 does not apply to ... construction work carried out other than between the [above] hours if the occupier of the premises ... shows that –

- a) *The construction work was carried out in accordance with control of environmental noise practices set out in section 6 of AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites;*
- b) *The equipment used on the premises was the quietest reasonably available;*
- c) *The construction work was carried out in accordance with a noise management plan in respect of the construction site –*
 - i. *Prepared and given to the Chief Executive Officer not later than 7 days before the construction work commenced; and*
 - ii. *Approved by the Chief Executive Officer;*

- d) *At least 24 hours before the construction work commenced, the occupier of the construction site gave written notice of the proposed construction work to the occupiers of all premises at which noise emissions received were likely to fail to comply with the standard prescribed under regulation 7; and*
- e) *It was reasonably necessary for the construction work to be carried out at that time.*

2.2 AS2107:2016

Australian Standard 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* provides design sound levels as shown in Table 2-4. These would be used with regard to road traffic noise and other ambient noise.

Table 2-4 AS2107 Criteria

Type of Occupancy	Description	Room	Design Sound Level
Residential Building	Houses and apartments in inner city areas or entertainment districts or near major roads	Living areas	35 to 45 dB(A)
		Sleeping areas (night-time)	35 to 40 dB(A)

2.3 Building Code of Australia (BCA)

It is a requirement under the *National Construction Code* (NCC) for sound transmission and insulation to be considered. In this case, the relevant volume of the NCC is Volume One of the *Building Code of Australia, Class 2 to Class 9 Buildings* (BCA) and specifically Part F5.

The Objective of Part F5 as stated in *Guide to NCC Volume One* is to:

“...safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted –

- a) Between adjoining sole-occupancy units; and*
- b) From common spaces to sole-occupancy units; and*
- c) From parts of different classifications to sole-occupancy units.”*

The BCA separates the performance requirements into floors and walls for Class 2 and 3 buildings as follows:

FP5.1

Floors separating –

- a) sole-occupancy units: or*
 - b) a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby, or the like, or a part of a different classification,*
- must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.*

FP5.2

Walls separating sole-occupancy units or a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby, or the like, or parts of a different classification, must provide insulation against the transmission of –

- a) airborne sound; and*
- b) impact generated sound, if the wall is separating a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit,*

sufficient to prevent illness or loss of amenity to the occupants.

FP5.3

The required sound insulation of a floor or a wall must not be compromised by -

- a) The incorporation or penetration of a pipe or other service element; or*
- b) A door assembly.*

In order to satisfy FP5.1 to FP5.3, building elements are to satisfy the minimum acoustic performances nominated in *Table 2-5*, being a summary of the Deemed-to-Satisfy Provisions provided in F5.1 to F5.7.

Table 2-5 BCA Deemed-to-Satisfy Provisions

Partition	Deemed-to-Satisfy Provisions	
	Laboratory	On-Site
Floors (F5.4a) Separating SOU's or SOU from plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.	$R_w + C_{tr} \geq 50$ $L_{n,w} \leq 62$	$D_{nT,w} + C_{tr} \geq 45$ $L_{nT,w} \leq 62$
Walls (F5.5a) Separating SOU's (Habitable to Habitable) Separating SOU's (Habitable to bathroom, sanitary compartment, laundry or kitchen) Separating SOU to Plant room or lift shaft Separating SOU to Stairway, public corridor, public lobby, or parts of a different classification	$R_w + C_{tr} \geq 50$ $R_w + C_{tr} \geq 50$ & D.C. $R_w \geq 50$ & D.C. $R_w \geq 50$	$D_{nT,w} + C_{tr} \geq 45$ $D_{nT,w} + C_{tr} \geq 45$ $D_{nT,w} \geq 45$ $D_{nT,w} \geq 45$
Doors (F5.5b) Separating SOU to Stairway, public corridor, public lobby or the like.	$R_w \geq 30$	$D_{nT,w} \geq 25$
Services (F5.6) SOU (Habitable) to duct, soil, waste, water supply or storm water (not associated with the SOU) SOU (Non-Habitable) to duct, soil, waste, water supply or storm water (not associated with the SOU)	$R_w + C_{tr} \geq 40$ $R_w + C_{tr} \geq 25$	N/A N/A

Notes:
 SOU – Sole Occupancy Unit
 D.C. Discontinuous Construction

3 METHODOLOGY AND FUTURE REPORTING

During Detailed Design following Development Approval (DA), the following methodology and reporting will occur, which can be submitted to Town of Cottesloe if required.

3.1 Environmental Noise

A 3-dimensional noise model will be established using dedicated software *SoundPLAN*, in order to predict the noise emissions to neighbouring residences. These will include noise from:

- Mechanical services – sound level data will be provided from the project mechanical consultant obtained from manufacturers.
- Commercial Space – file data will be used in relation to patron noise (if relevant).

Noise levels will be predicted to the nearest residences in *Figure 2-1* and compared to the assigned noise levels of *Table 2-3*. Where exceedances are calculated, noise mitigation recommendations will be provided.

3.2 Ambient Noise

The site will be attended during a weekday to quantify normal road traffic noise and then also on a Friday/Saturday night to quantify road traffic and other ambient noise. The results from the monitoring will be used to determine the acoustic requirements of the facade, in order to achieve the design sound levels of *Table 2-4*.

This report will address the R-Code Volume 2 requirement O4.7.1 to consider the siting and layout of the development to minimise the impact of external noise sources and provide appropriate acoustic privacy to dwellings and on-site open space.

3.3 BCA Part F5

The BCA Part F5 report addresses all acoustic issues associated with the Building Code of Australia (BCA) and will address construction requirements for walls, floors, ceilings and the like as well as providing specific guidance for hydraulic, mechanical, electrical and lift services. The development of this report will be in close consultation with the architect and will form part of their specification.

Given the location of the development, the construction will be at a higher than minimum acoustic standard. For information, the minimum wall acoustic ratings are marked on the typical fifth floor plan in *Figure 3-1*. All upper floor hard floors will be installed on impact isolation mats with suspended, insulated ceilings to the floors below.

Note with the lift doors opposing each other on the typical floor and opening into each apartment will require careful consideration in order to maintain $R_w + C_{tr} \geq 50$ between apartments.

In addition to the above, subsequent reports of acoustic advice, site inspections, results of testing and the like will occur throughout the construction and commissioning of the project.

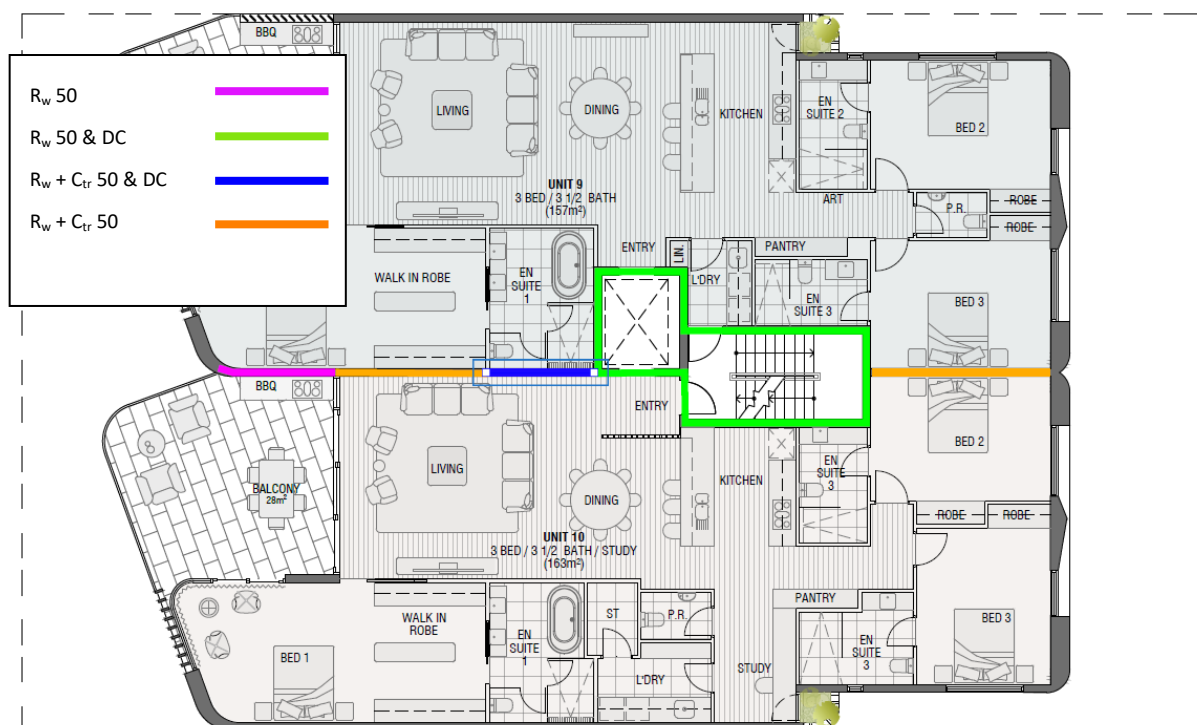


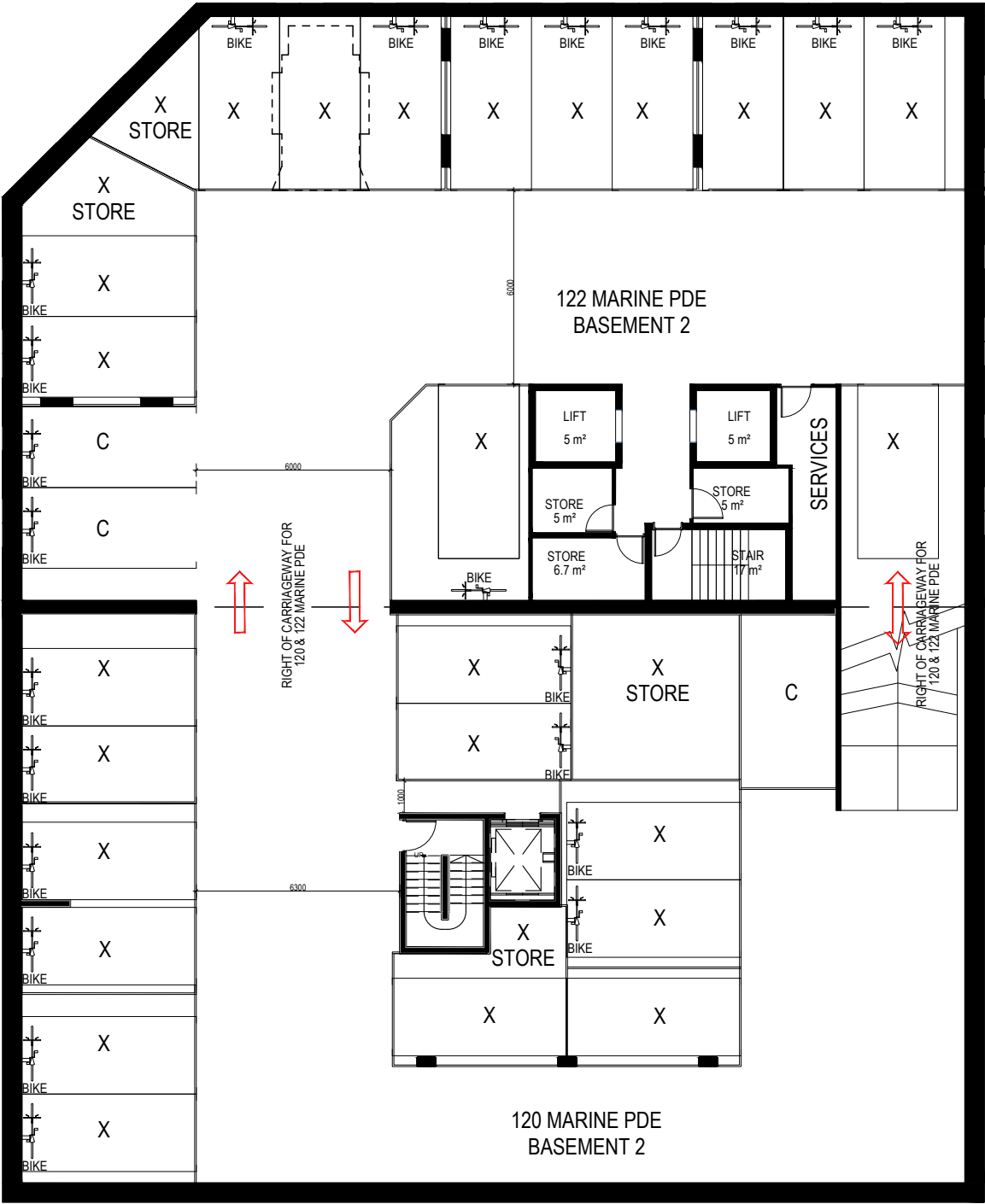
Figure 3-1 Minimum Wall Acoustic Ratings for BCA Part F5

This report will address the R-Code Volume 2 requirement O4.7.2 to provide acoustic treatment to reduce sound transfer within and between dwellings and to reduce noise transmission from external noise sources.

Appendix A

Development Plans

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ARCHITECT

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PROJECT

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Cottesloe, WA 6011

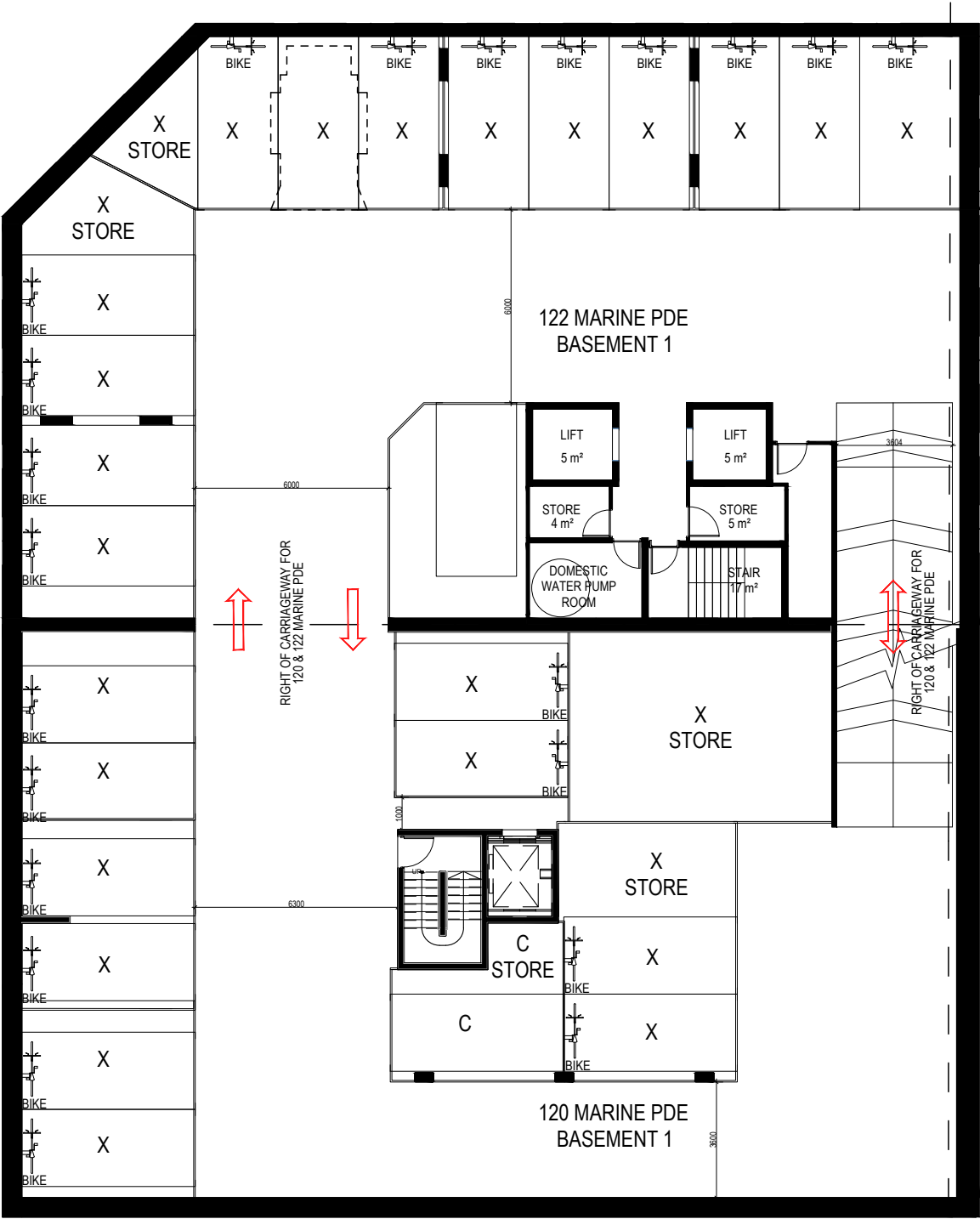
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RIGHT OF CARRIAGEWAY
BASEMENT TWO PLAN

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DA

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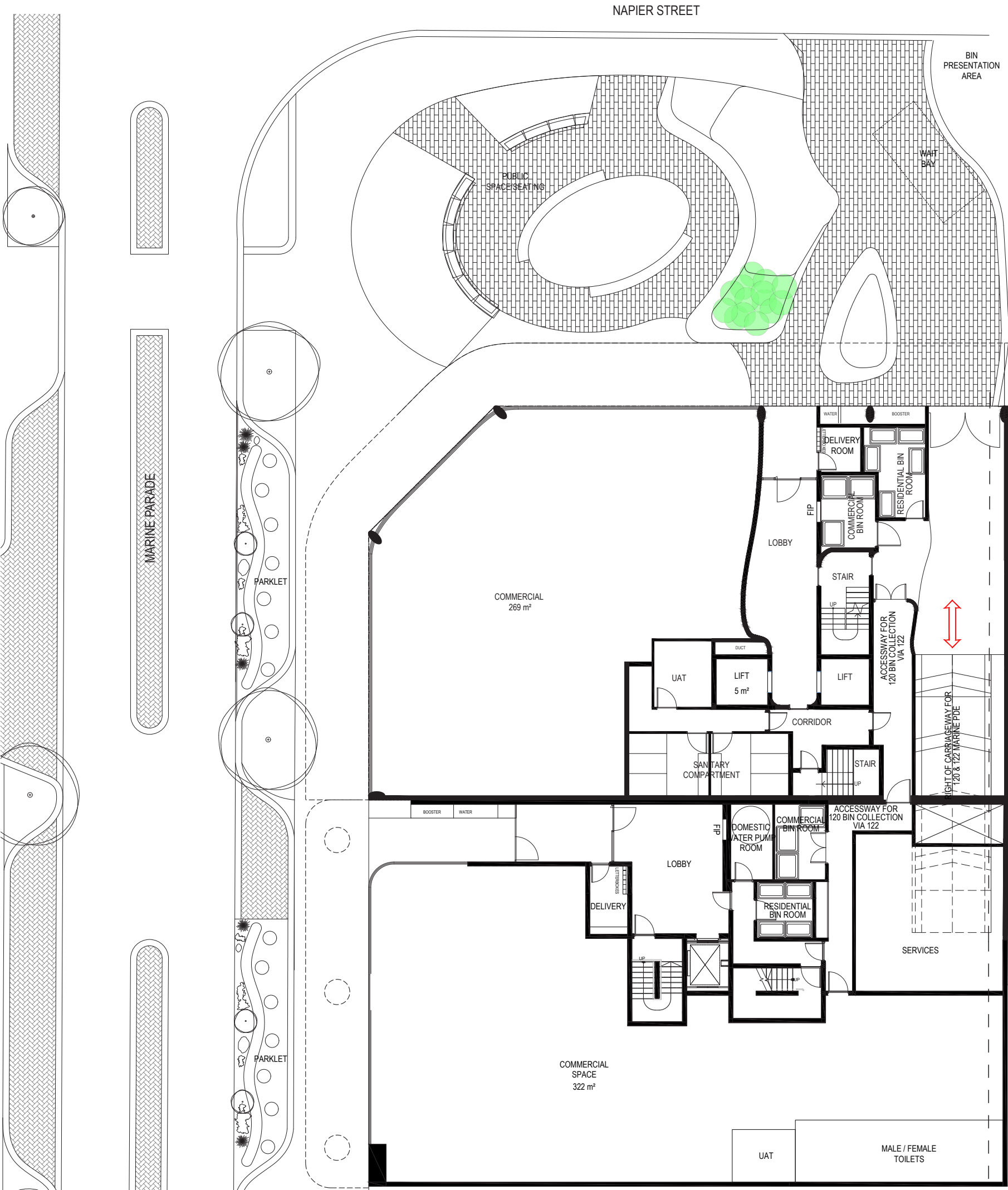
120 Marine Parade
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RIGHT OF CARRIAGEWAY
BASEMENT ONE PLAN

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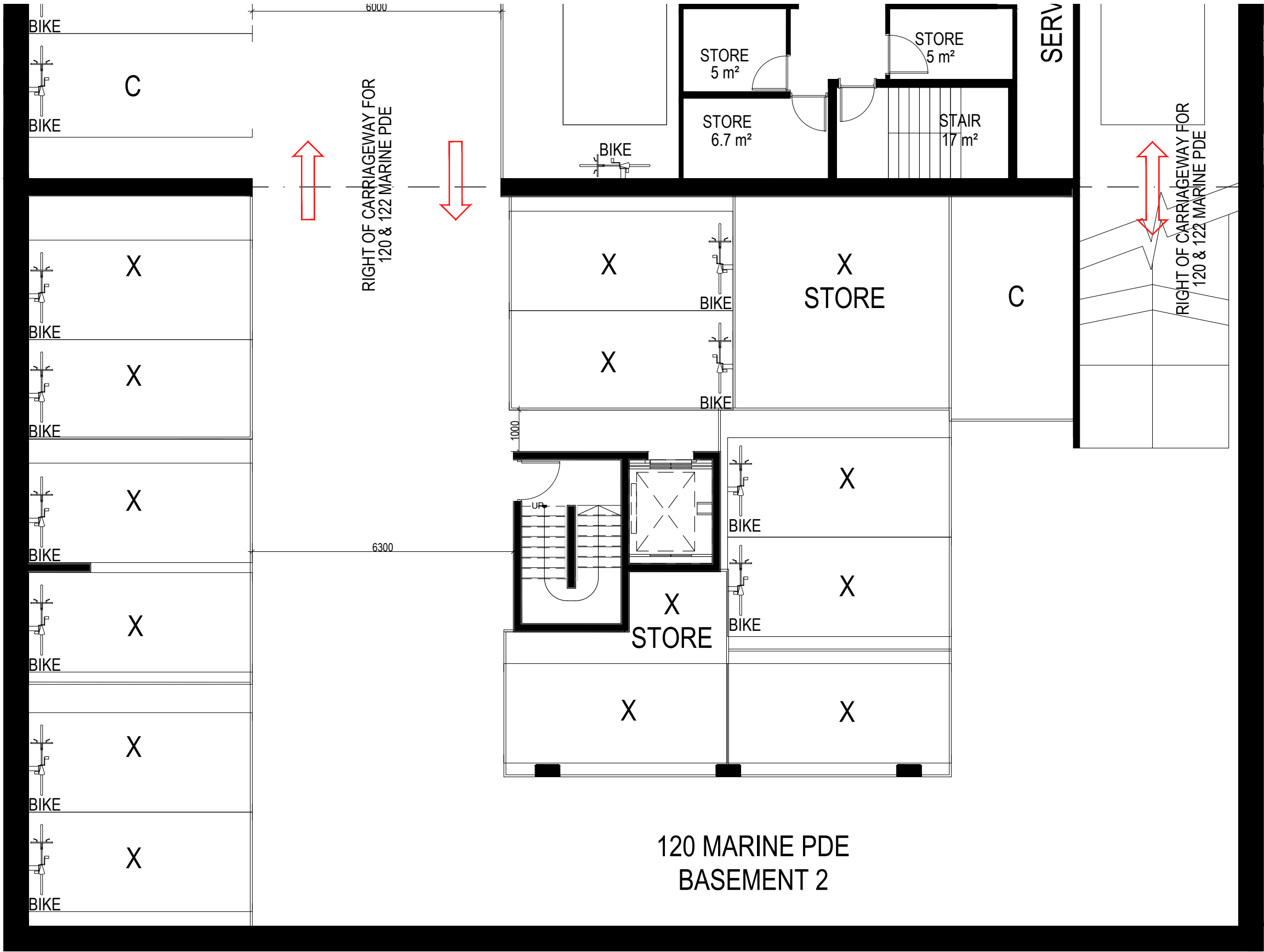
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RIGHT OF CARRIAGEWAY
GROUND FLOOR PLAN

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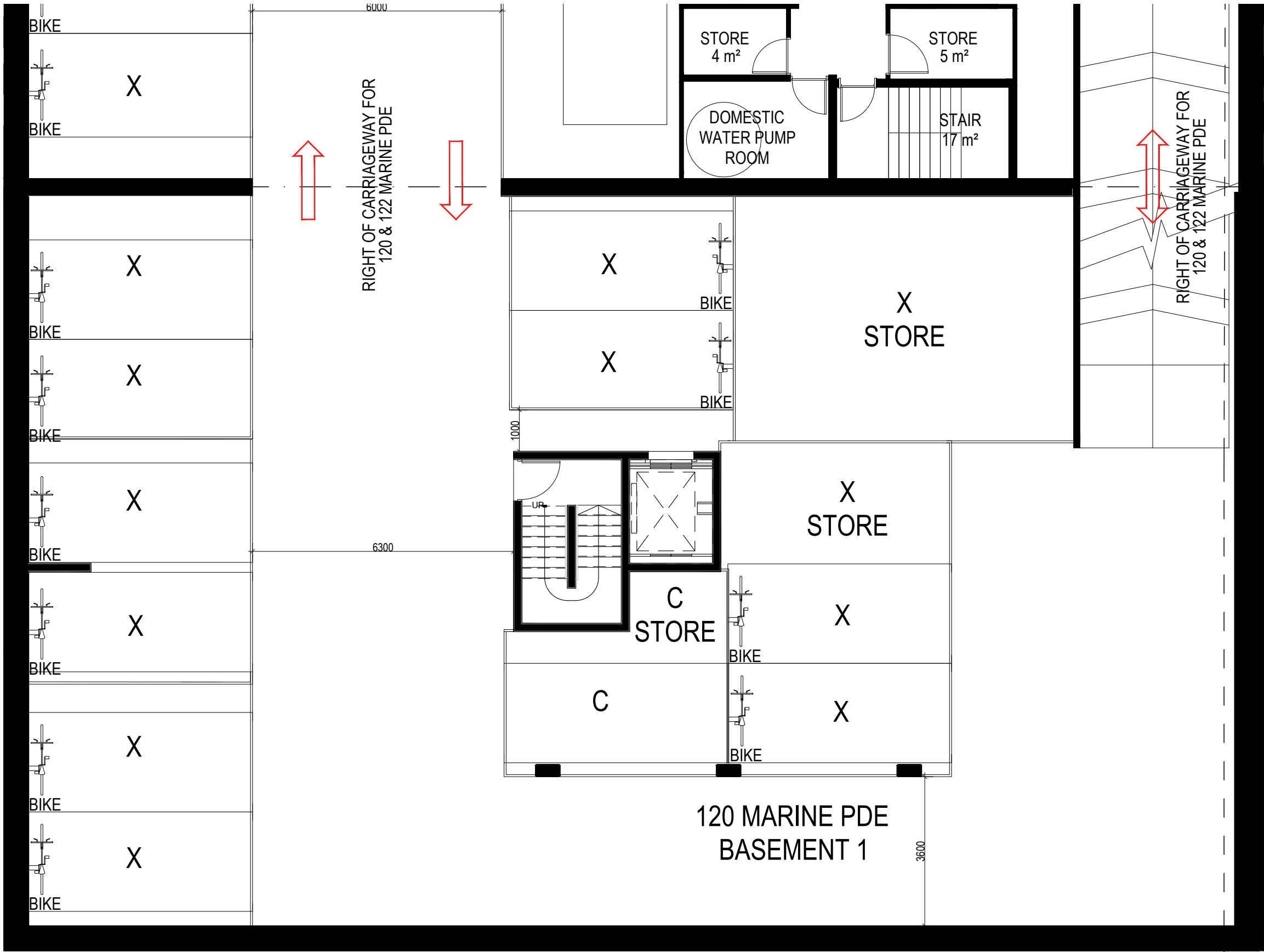
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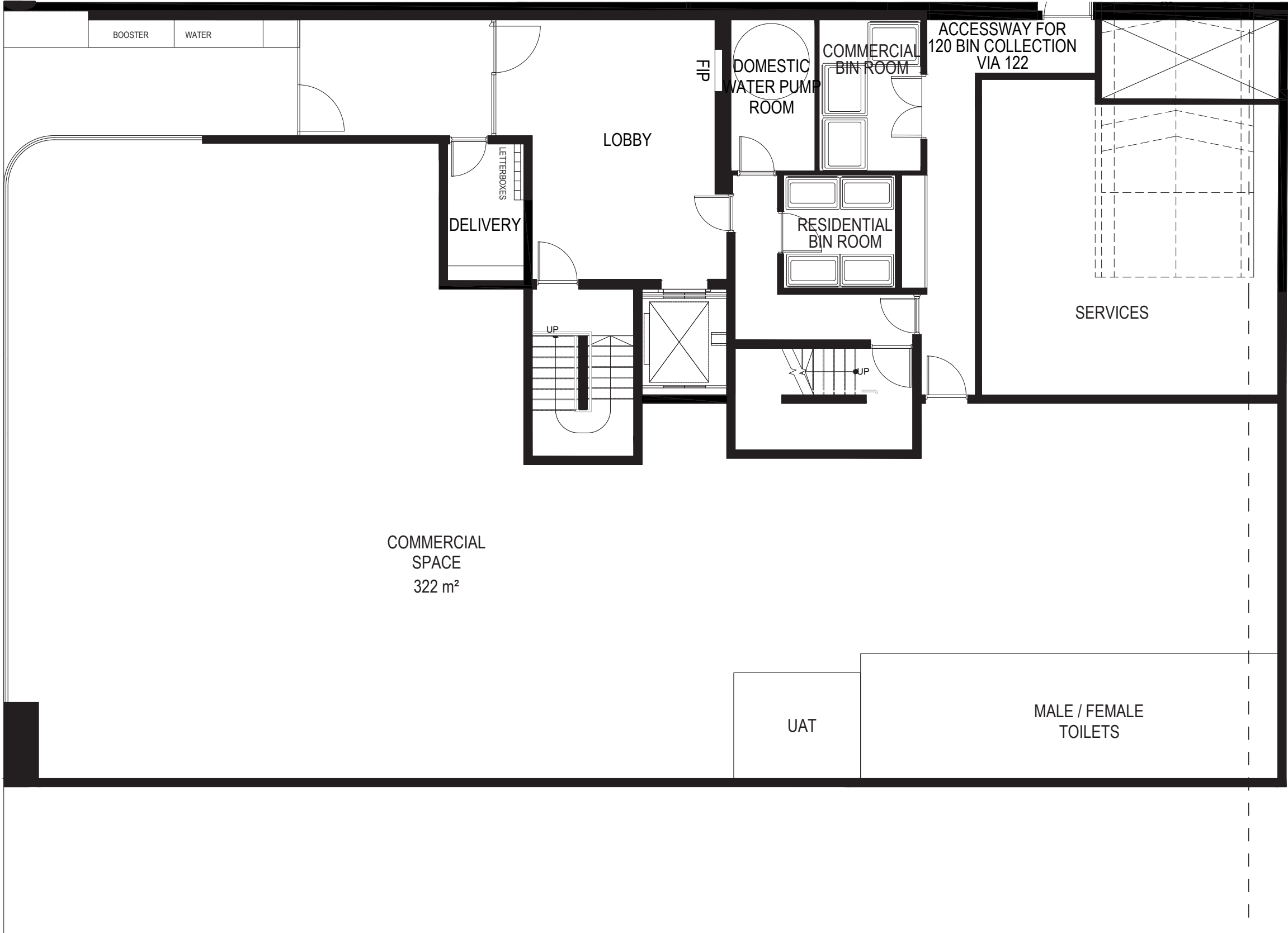
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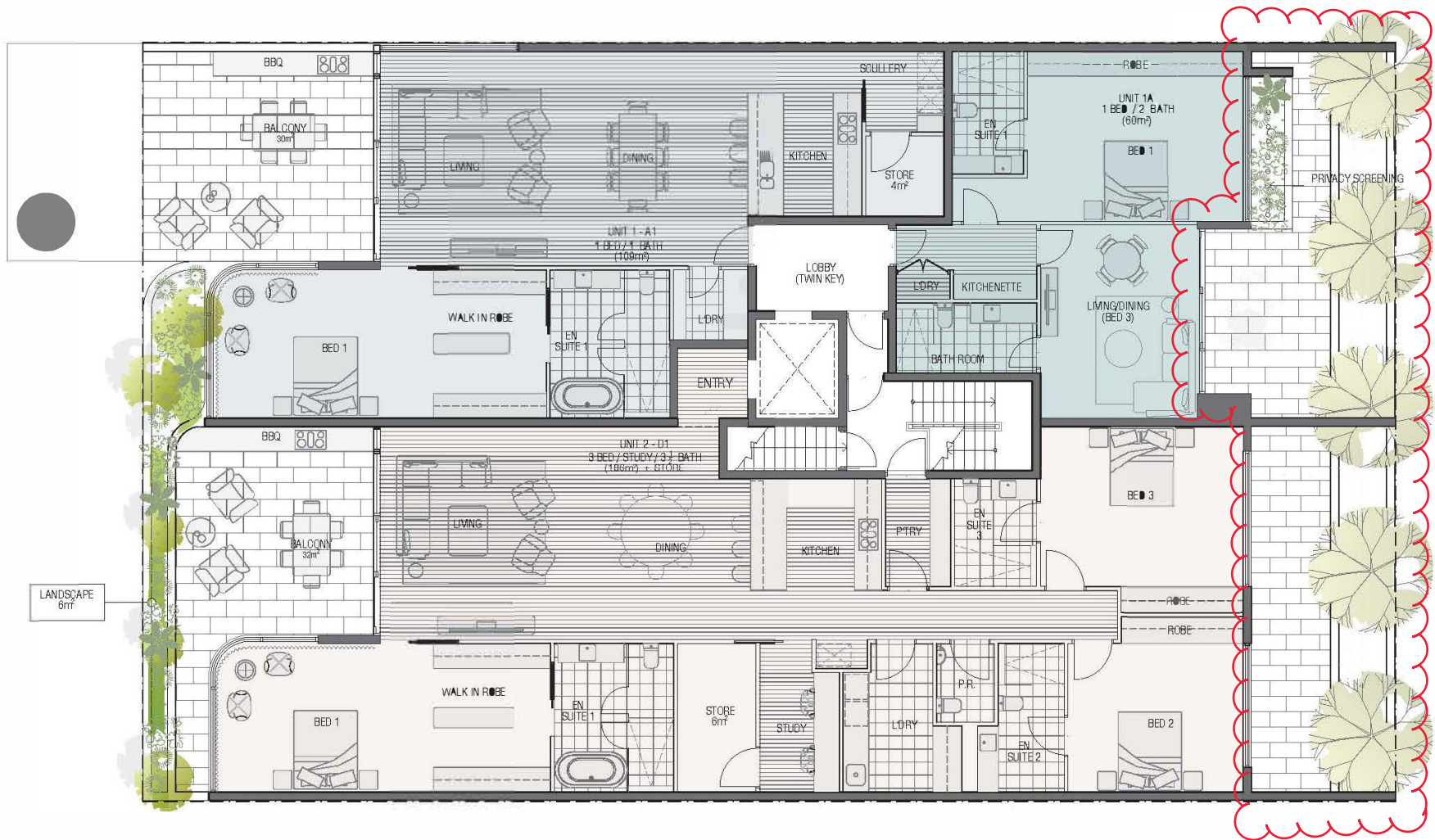
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TITLE

GROUND FLOOR PLAN

ISSUE FOR
DA

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SCALE 1: 200 (A3)			
PROJ N° A2003	STAGE ZONE	DISC/ DWGN° A105	REV B2



AT	14-06-21	ADDITIONAL INFORMATION SUB	AQ	20-05-21	G+1 STOREY PROPOSAL
AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
AR	25-05-21	WITHOUT PREJUDICE - 7 STOREYS	AQ	20-04-21	GROUND FLOOR ALTERNATIVE



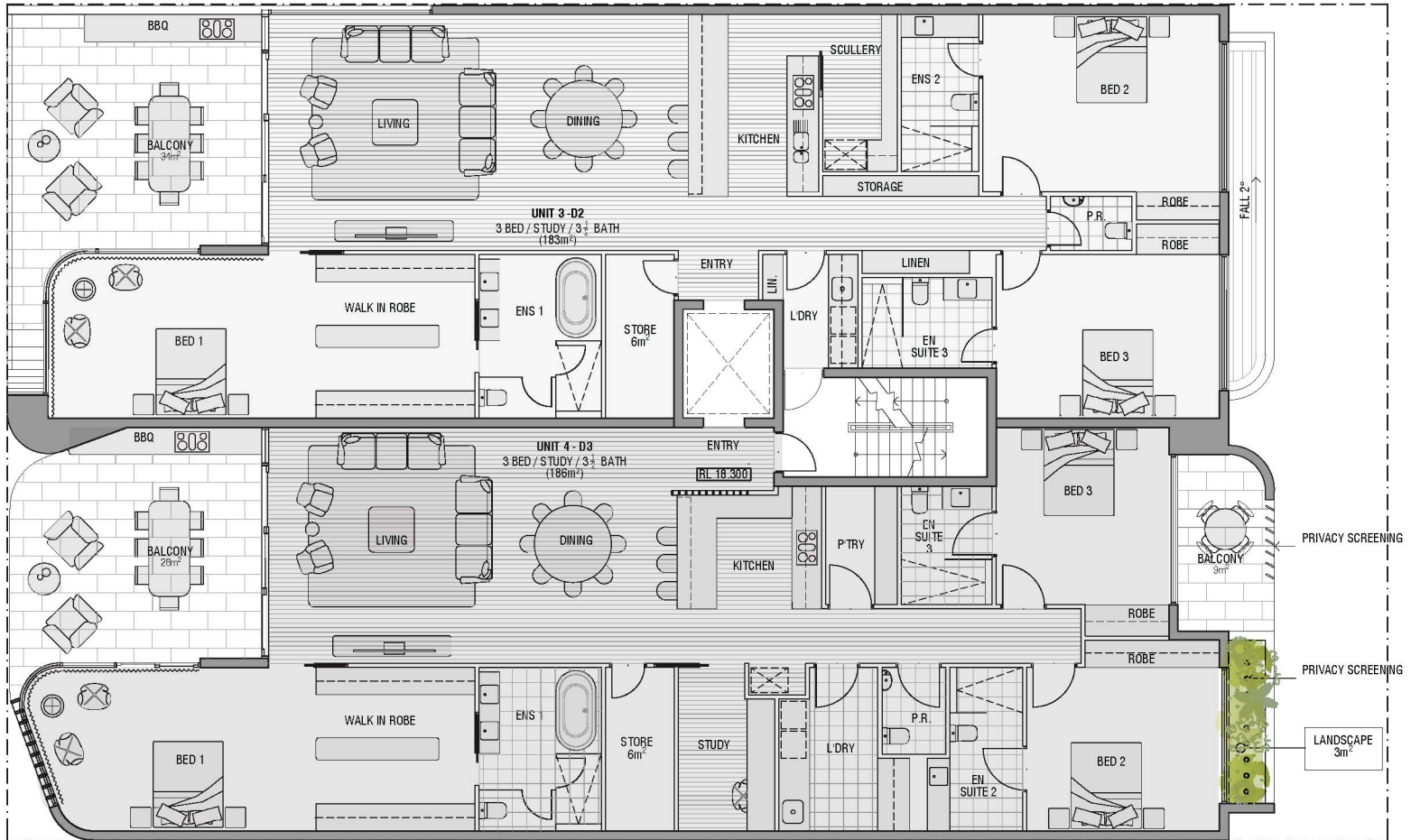
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DEVELOPMENT APPLICATION

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CLIENT: MARINE PARADE CLIENT GROUP
ADDRESS: 120 MAINE PARADISO TRESLOE

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JOB# 1902
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ISSUE AT



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ISSUE NUMBER	AT	14-06-21	ADDITIONAL INFORMATION SDAU	AQ	20-05-21	G + 6 STOREY PROPOSAL
	AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
	AR	25-05-21	WITHOUT PREJUDICE - 7 STOREYS	AO	20-04-21	GROUND FLOOR ALTERNATIVE

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 4. REFER TO INTERIOR DRAWINGS FOR PLUMBING SETOUTS.
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DWG:
 STAGE:
 DEVELOPMENT APPLICATION

SECOND FLOOR PLAN

PROJECT: MARINE PARADE RESIDENCES

CLIENT: MARINE PARADE CLIENT GROUP
 ADDRESS: 120 MARINE PARADE, COTTESLOE

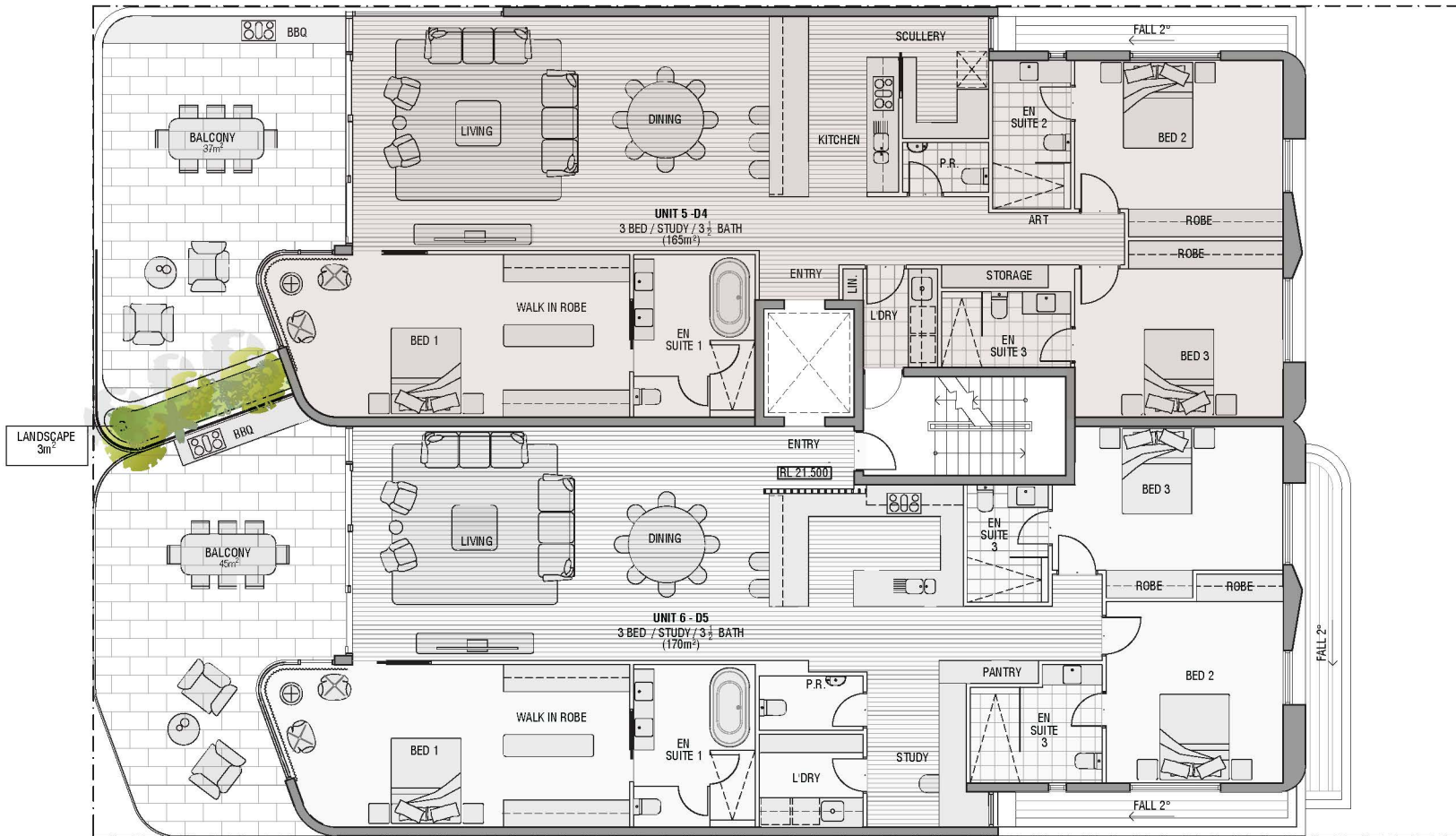
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JOB#:

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DEPARTMENT OF PLANNING, LANDS AND HERITAGE	
DATE	FILE
15-Jun-2021	SDAU-010-20

AT	14-06-21	ADDITIONAL INFORMATION SDAU	AQ	20-05-21	G + 6 STOREY PROPOSAL
AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
AR	25-05-21	WITHOUT PREJUDICE - 7 STOREYS	AO	20-04-21	GROUND FLOOR ALTERNATIVE

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STAGE:

THIRD FLOOR PLAN

DEVELOPMENT APPLICATION

PROJECT: MARINE PARADE RESIDENCES

CLIENT: MARINE PARADE CLIENT GROUP

ADDRESS: 120 MARINE PARADE, COTTESLOE

SCALE:

JOB#:

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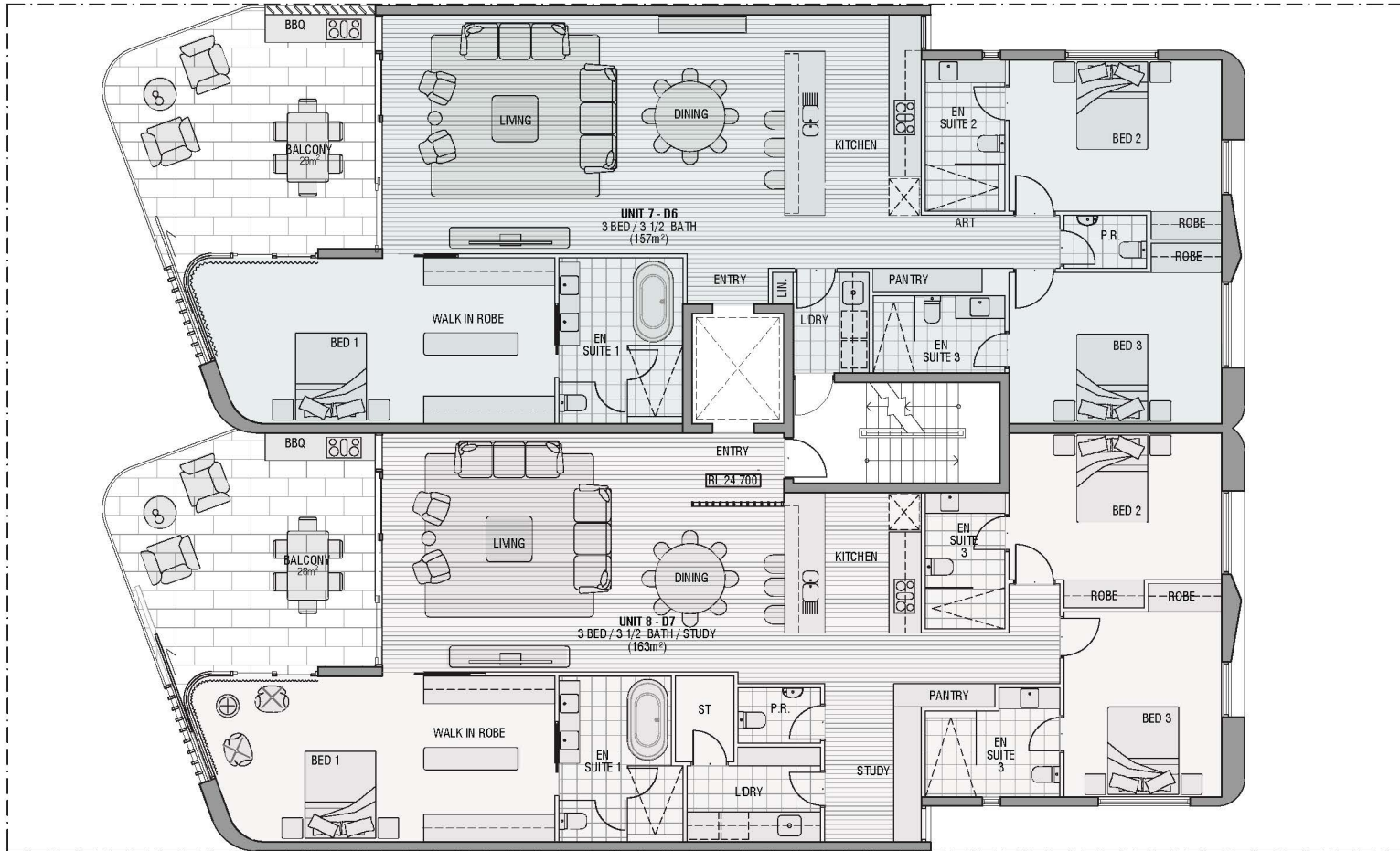
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ISSUE NUMBER	AT	14-06-21	ADDITIONAL INFORMATION SDAU	AQ	20-06-21	G + 6 STOREY PROPOSAL
	AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
	AR	25-05-21	WITHOUT PREJUDICE - 7 STOREYS	AO	20-04-21	GROUND FLOOR ALTERNATIVE

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 STAGE:
 DEVELOPMENT APPLICATION

FOURTH FLOOR PLAN

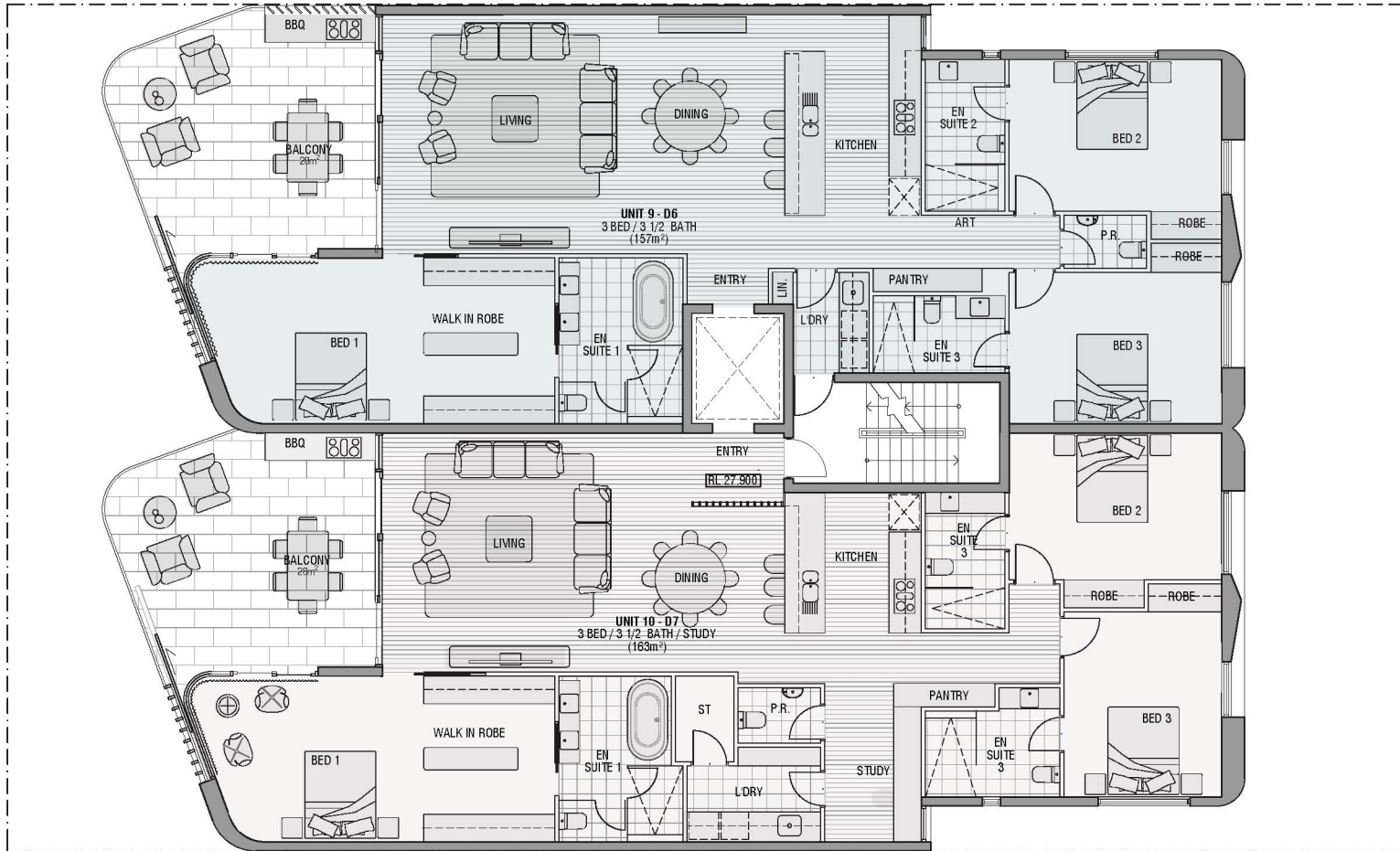
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CLIENT: MARINE PARADE CLIENT GROUP
 ADDRESS: 120 MARINE PARADE, COTTESLOE

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AT	14-06-21	ADDITIONAL INFORMATION SDAU	AQ	20-05-21	G + 6 STOREY PROPOSAL
AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
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DWG:
 STAGE: DEVELOPMENT APPLICATION

FIFTH FLOOR PLAN

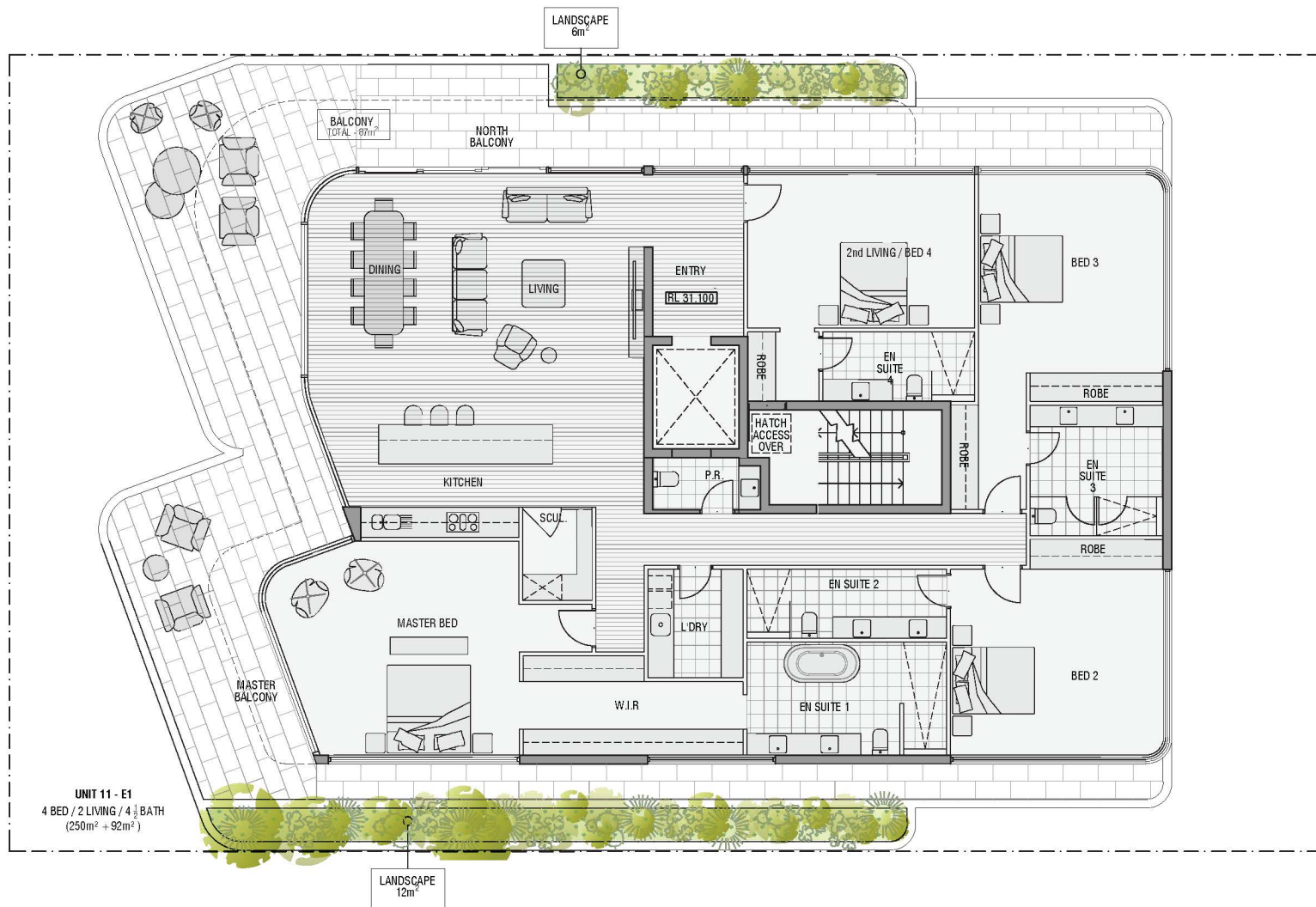
PROJECT: MARINE PARADE RESIDENCES

CLIENT: MARINE PARADE CLIENT GROUP
 ADDRESS: 120 MARINE PARADE, COTTESLOE

SCALE: 1:100
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 DWG: A110
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AT	14-06-21	ADDITIONAL INFORMATION SDAU	AQ	20-05-21	G + 6 STOREY PROPOSAL
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DWG:
STAGE:

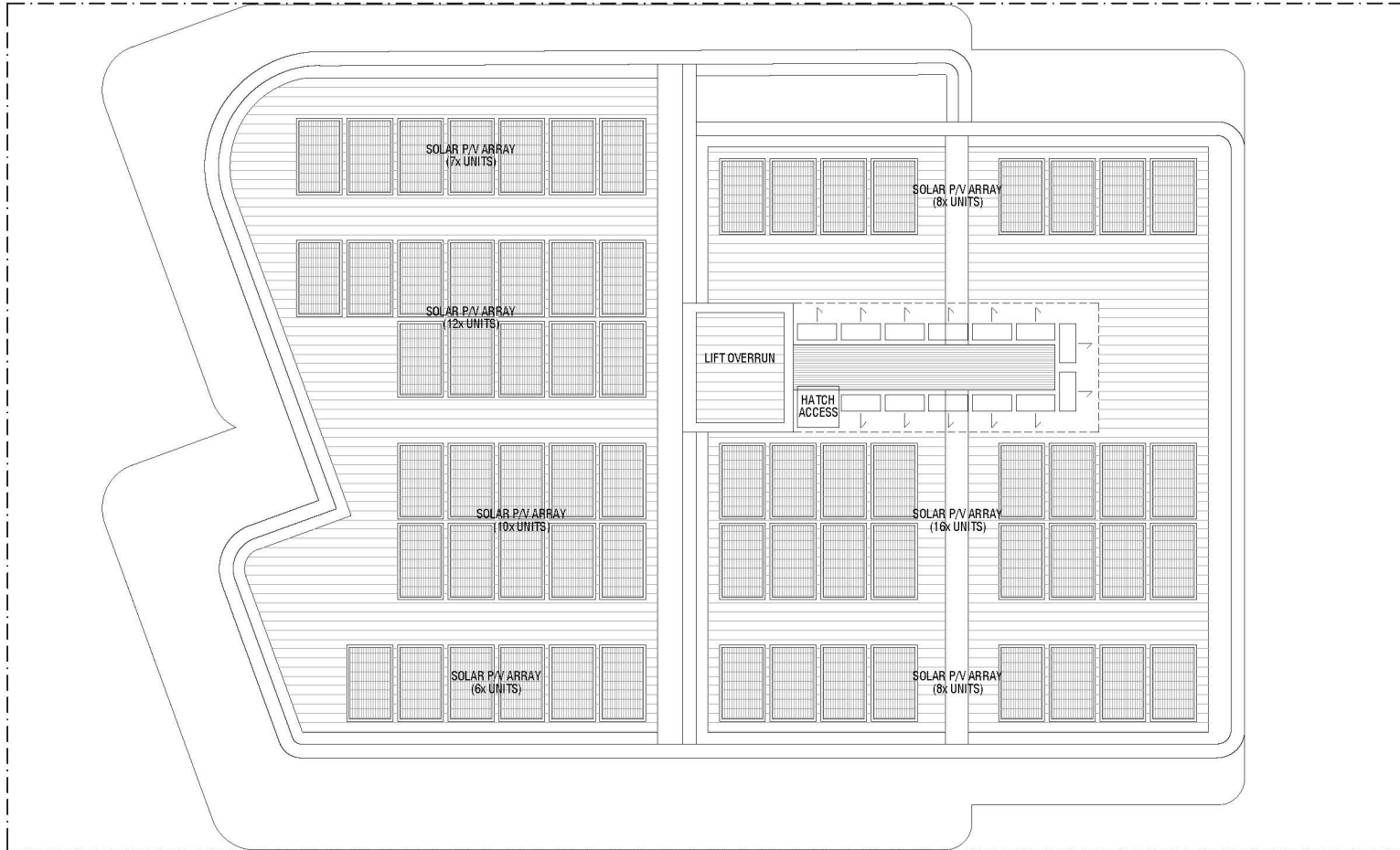
SIXTH FLOOR PLAN
DEVELOPMENT APPLICATION

PROJECT: MARINE PARADE RESIDENCES
CLIENT: MARINE PARADE CLIENT GROUP
ADDRESS: 120 MARINE PARADE, COTTESLOE

SCALE: 1:100
JOB#: 1902
DWG: A111
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AS	08-06-21	CONSULTANT ISSUE	AP	29-04-21	GROUND FLOOR ALTERNATIVE
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STAGE:

ROOF PLAN

PROJECT: MARINE PARADE RESIDENCES

CLIENT: MARINE PARADE CLIENT GROUP

ADDRESS: 120 MARINE PARADE, COTTESLOE

SCALE:

JOB#:

1:100



DWG: A112

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- AG: POWDER COAT FINISH ALUMINIUM FRAMED GLAZING.
 GB: FRAMELESS GLASS BALUSTRADE.
 GS: GLASS SLIDING SCREENING.
 T1: CERAMIC TILE - BLUE/GREEN.
 T2: TILE - SANDSTONE.
 J1: TIMBER LOUVER.
 AL: ALUMINIUM LOUVER.
 CO1: OFF FORM CONCRETE, ROLL ON TEXTURE COAT ON CONCRETE - WHITE.
 CO2: OFF FORM CONCRETE, ROLL ON TEXTURE COAT ON CONCRETE - CHARCOAL.
 FC: FINE CEMENT SHEET, PAINT FINISH.
 OF: PRESSED COLORBOND FLASHING/CAPPING.
 PS: PRIVACY SCREENING.

AT	14-06-21	ADDITIONAL INFORMATION SDAL	AQ	20-05-21	G + 6 STOREY PROPOSAL
AS	08-06-21	CONSULTANT ISSUE	AP	20-04-21	GROUND FLOOR ALTERNATIVE
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DWG:
 STAGE: DEVELOPMENT APPLICATION

WEST ELEVATION
 PROJECT: MARINE PARADE RESIDENCES
 CLIENT: MARINE PARADE CLIENT GROUP
 ADDRESS: 120 MARINE PARADE, C OTTESLOE

SCALE: 1:200
 JOB #: 1902
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Appendix B

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)

The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}

This is the noise level in decibels, obtained using the A frequency weighting and the S (Slow) time weighting as specified in IEC 61672-1:2002. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}

This is the noise level in decibels, obtained using the A frequency weighting and the F (Fast) time weighting as specified in IEC 61672-1:2002. This is used when assessing the presence of modulation only.

L_{APeak}

This is the greatest absolute instantaneous sound pressure in decibels using the A frequency weighting as specified in IEC 61672-1:2002.

L_{Amax}

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}

An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}

An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the “intrusive” noise level.

L_{Aeq}

The equivalent steady state A-weighted sound level (“equal energy”) in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the “average” noise level.

L_{A90}

An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

One-Third-Octave Band

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

- (a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
- (b) is present for at least 10% of the representative.

Impulsive Noise

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A \text{ peak}}$ and $L_{A \text{ Max slow}}$ is more than 15 dB when determined for a single representative event;

Major Road

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10} (\% \text{ Type A}_{100} + \% \text{ Type A}_{450}) + \frac{1}{20} (\% \text{ Type B}_{100} + \% \text{ Type B}_{450})$$

where :

% Type A₁₀₀ = the percentage of industrial land within
a 100m radius of the premises receiving the noise

%TypeA₄₅₀ = the percentage of industrial land within
a 450m radius of the premises receiving the noise

% Type B₁₀₀ = the percentage of commercial land within
a 100m radius of the premises receiving the noise

%TypeB₄₅₀ = the percentage of commercial land within
a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise

Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise

Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise

Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

Peak Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)

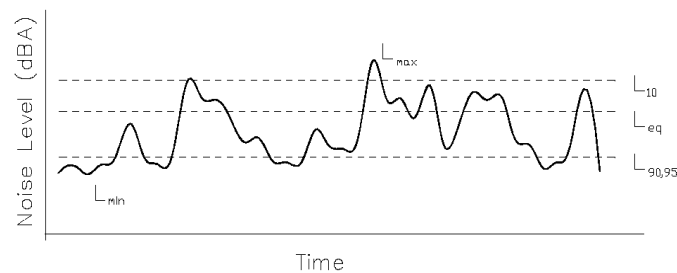
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

RMS Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors**Typical Noise Levels**