Government of **Western Australia**
Development Assessment Panels

Metro Outer Joint Development Assessment Panel Agenda

Meeting Date and Time: Friday, 7 January 2022; 9:30am
Meeting Number: MOJDAP/146
Meeting Venue: Electronic Means

To connect to the meeting via your computer - https://zoom.us/j/95092895569

To connect to the meeting via teleconference dial the following phone number - 08 7150 1149
Insert Meeting ID followed by the hash (#) key when prompted - 950 9289 5569

This DAP meeting will be conducted by electronic means (Zoom) open to the public rather than requiring attendance in person.

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Attendance

DAP Members

Mr Paul Kotsoglo (Presiding Member)
Ms Lindsay Baxter (A/Deputy Presiding Member)
Mr Jason Hick (Third Specialist Member)

Item 8.1
Cr Frank Cvitan (Local Government Member, City of Wanneroo)
Cr Vinh Nguyen (Local Government Member, City of Wanneroo)

Item 8.2
Cr Chontelle Stone (Local Government Member, City of Cockburn)
Cr Chamonix Terblanche (Local Government Member, City of Cockburn)

Officers in attendance

Item 8.1
Ms Nicole Alexander (Western Australian Planning Commission)
Mr Johan Gildenhuys (Western Australian Planning Commission)

Item 8.2
Mr David King (City of Cockburn)
Mr Lorenzo Santoriello (City of Cockburn)

Minute Secretary

Ms Adele McMahon (DAP Secretariat)

Applicants and Submitters

Item 8.1
Mr Marc Karol (T&Z Architects)

Item 8.2
Mr Tony Watson (MW Urban)
Ms Tanya Trevisan (Frasers Property for Port Catherine Developments)

Members of the Public / Media

Nil.

1. Opening of Meeting, Welcome and Acknowledgement

The Presiding Member declares the meeting open and acknowledges the traditional owners and pay respects to Elders past and present of the land on which the meeting is being held.

In accordance with regulation 27(3A) of the *Planning and Development (Development Assessment Panel) Regulations 2011*, Mr Paul Kotsoglo has been appointed as Presiding Member for this meeting.

This meeting is being conducted by electronic means (Zoom) open to the public. Members are reminded to announce their name and title prior to speaking.

2. Apologies

Mr Ian Birch (Presiding Member)
Ms Sheryl Chaffer (Deputy Presiding Member)

3. Members on Leave of Absence

DAP Member, Mr Ian Birch has been granted leave of absence by the Director General for the period of 27 December 2021 to 10 January 2022 inclusive.

DAP Member, Ms Sheryl Chaffer has been granted leave of absence by the Director General for the period of 18 December 2021 to 2 February 2022 inclusive.

4. Noting of Minutes

Signed minutes of previous meetings are available on the DAP website.

5. Declarations of Due Consideration

The Presiding Member notes an addendum to the agenda was published to include details of a DAP request for further information and responsible authority response in relation to Item 8.2, received on 5 January 2022.

Any member who is not familiar with the substance of any report or other information provided for consideration at the DAP meeting must declare that fact before the meeting considers the matter.

6. Disclosure of Interests

Member	Item	Nature of Interest
Mr Paul Kotsoglo	8.2	Impartiality Interest – Planning Solutions employs Nic Watson, son of Tony Watson of MW Urban, the applicant for item 8.2. In the recent past Mr Kotsoglo understands Tony Watson has referred clients to Planning Solutions given capacity issues.

7. Deputations and Presentations

7.1 Ms Tanya Trevisan (Frasers Property for Port Catherine Developments) presenting in support of the recommendation for the application at Item 8.2. The presentation will address some of the proposed conditions and content of the RAR.

The Western Australian Planning Commission and the City of Cockburn may be provided with the opportunity to respond to questions of the panel, as invited by the Presiding Member.

8. Form 1 – Responsible Authority Reports – DAP Applications

8.1 Lot 101 (2018) Santorini Promenade, Alkimos

Development Description:	Education Establishment, Alkimos College Stage 2
Applicant:	T&Z Architects
Owner:	Department of Education
Responsible Authority:	Western Australian Planning Commission
DAP File No:	DAP/21/02127

8.2 Lot 9153 Orsino Boulevard, North Coogee

Development Description:	Mixed Use (Shop and Multiple Dwellings)
Applicant:	MW Urban
Owner:	Port Catherine Developments Pty Ltd
Responsible Authority:	City of Cockburn
DAP File No:	DAP/21/02123

9. Form 2 – Responsible Authority Reports – DAP Amendment or Cancellation of Approval

Nil.

10. State Administrative Tribunal Applications and Supreme Court Appeals

Current SAT Applications				
File No. & SAT DR No.	**LG Name**	**Property Location**	**Application Description**	**Date Lodged**
DAP/21/02000 DR203/2021	City of Joondalup	Lot 642 (104) Mullaloo Drive & Lot 643 (20) Stanford Road, Kallaroo	Proposed Child Care Centre	28/09/2021
DAP/21/02016 DR207/2021	City of Joondalup	centre Lot 667 (73) Kingsley Drive & Lot 666 (22) Woodford Wells Way, Kingsley	Child Care Centre	28/09/2021
DAP/21/02047 DR	City of Swan	Lots 136 (26) & 3235 (34) Asturian Drive and Lots 137 (238) & 138 (230) Henley Street, Henley Brook	Proposed education facility	03/12/2021

11. General Business

In accordance with Section 7.3 of the DAP Standing Orders 2020 only the Presiding Member may publicly comment on the operations or determinations of a DAP and other DAP members should not be approached to make comment.

12. Meeting Closure

Direction for Further Services from the Responsible Authority

Regulation 13(1) and DAP Standing Orders 2020 cl. 3.3

Guidelines

A DAP Member who wishes to request further services (e.g. technical information or alternate recommendations) from the Responsible Authority must complete this form and submit to daps@dplh.wa.gov.au.

The request will be considered by the Presiding Member and if approved, the Responsible Authority will be directed to provide a response to DAP Secretariat within the form.

It is important to note that **the completed form containing the query and response will published on the DAP website** as an addendum to the meeting agenda.

DAP Application Details

DAP Name	Metro Outer Joint Development Assessment Panel
DAP Application Number	MOJDAP/146
Responsible Authority	City of Cockburn
Property Location	Lot 9153 Orsino Blvd, North Coogee

Presiding Member Authorisation

Presiding Member Name	Mr Paul Kotsoglo
Signature	
Date	4 January 2022
Response Due	**6 January 2022; 2.00pm**

#	DAP Query	City response
1	The City of Cockburn respond in writing to the Panel to the tracked changes made by Ms Trevisan attached to the Presentation Request Form, including, but not limited to, matters dealing with; a. the period of approval sought; b. the timing of the calculation and the payment of the development contribution; c. the number of residential dwellings; d. the building height; e. setbacks; f. car parking – in particular, separation of residential and retail and, the total number of bays required; g. bicycle parking; h. how the builder can comment on matters which are not their contractual responsibility according to the presenter; i. comment on statutory compliance; j. compliance with design considerations.	a. The applicant requests the proposal be approved for a period of five (5) years in lieu of the recommended four (4) years under Condition 2 of the RAR. Four years is recommended and consistent with Clause 16A (2) of the *Development Assessment Panel (Local Planning Schemes) Regulations 2011*; b. Development Contribution Area 13 applies to the proposal. Clause 5.3.13.2 of the City of Cockburn Town Planning Scheme No. 3 requires that an owners liability to pay the cost contribution arises at the earlier of …*the commencement of any development on the owner's land within the development contribution area*. The City recommends the DCA contribution be paid prior to the issue of a building permit application as this is the most logical time for the City to obtain the contribution prior to the commencement of development upon the site. c. The proposal contains 21 multiple dwellings. The City's RAR incorrectly identified one (1) of the nine (9) two bedroom/two bathroom dwellings as a three bedroom dwelling. The inconsistency does not have any parking implications. d. The maximum building height from Natural Ground Level is 17.56m. The City's RAR incorrectly identified the height as 16.9m – the height remains compliant. e. The City's RAR incorrectly identified the required street setback to Orsino Boulevard as 1m. The Port Coogee Marina Village Built Form Codes (BFC) requires a setback of 2.5m minimum to 3.5m maximum. It is noted that balconies and architectural elements are permitted to be on the street boundary. This is an additional variation, however the City maintains support of the setbacks and notes the following comments from the Design Review Panel – "*The treatment of stepped/varied setbacks reflecting different uses and orientation together with the varied material treatments provide a positive design response to the location".* f. There are 37 car parking bays provided on site (total) and 34.74 car parking bays are required for the development. There are several bays which are not allocated to a residential or retail use (ACROD and Electric Vehicles). With regard to the amendment the applicant made to the car parking table, there is no retail visitor requirement under the planning framework. The City maintains the assessment of the car parking calculations is correct and does not impact upon the support of the application.

		g. The City agrees that the BFC does not consider bicycle parking and therefore the State Planning Policy 7.3 – Residential Design Codes (Volume 2) applies to this provision. There are 14 bicycle bays shown on the plan (10 within the bike store and 4 adjacent to the UAT), the condition reflects that the bicycle bays be provided as shown on the plans. The City does not object to the revision requested by the applicant to remove the text "in close proximity to the entrance of the building". h. Recommended Condition 17, which the applicant seeks to remove is a standard condition imposed by the City where an acoustic report is required. It essentially puts the onus upon the applicant/builder to demonstrate that the recommendations within the acoustic report have been carried out within the construction stage. Should the condition not be imposed, the City's Environmental Health services would be required to assess the developments compliance with the acoustic report which can take considerable time. The City would not object to the word 'builder' being replaced with 'acoustic consultant'. i. The only aspect which has identified an additional variation that was not identified in the RAR is the setback to Orsino Boulevard. All other variations are considered to be minor in nature and not impact upon the amenity of the surrounding area. j. The City does not object to advice note e) being deleted.
2	The City of Cockburn respond in writing to the Panel to the comments made in the presentation request by Ms Trevisan regarding typos and inaccuracies in the RAR, clearly correcting any typos or inaccuracies.	**Three bedroom dwelling** – The City agrees, Apartment 17 is a two bedroom apartment not a three bedroom apartment. This does not have any implications upon parking calculations or other. **Bicycle bays** – The City agrees that the BFC's do not consider bicycle parking, therefore the assessment reverts to State Planning Policy 7.3 – Residential Design Codes Volume 2 for the Multiple Dwellings. The City maintains its assessment is correct and 12 bicycle bays are required. The plans indicate 5 bicycle racks (equating to 10 bicycle bays) within the bike store on the ground floor and two bicycle racks (equating to 4 bicycle bays) are provided outside the UAT on the ground floor. The City does not object to the revision of Condition 8 as indicated on the applicants tracked changes. **Visitor car parking bays** – The plans did not differentiate the ACROD bay as to whether it is to be used for residents, retail or visitors. Notwithstanding, the retail parking is considered acceptable in this location given the close proximity to considerable on street parking and the areas Local Centre zoning. **Height –** The City agrees with the applicants comment that the height stated in the RAR of 16.9m is incorrect and the height is actually 17.56m. Notwithstanding the above, the height remains compliant with the permitted 21m in this location.

		Setbacks – The City agrees with the applicants comment that the setback to Orsino stated in the RAR (1m) is incorrect, and the minimum setback is 2.5m. The BFC notes that balconies and architectural elements may extend to the lot boundary, which the application proposes. The DRP made the following comment - *The treatment of stepped/varied setbacks reflecting different uses and orientation together with the varied material treatments provide a positive design response to the location*;
3	The City of Cockburn, in addition to the written response to the two queries contained in the R.13 above for the alternative conditions and advice notes in the Recommendation attached to the Presentation Request Form by Ms Trevisan, is invited to address the JDAP meeting.	The City will be attending the JDAP meeting via zoom and will be able to address any questions from the panel. Excluding the conditions which the applicant seeks to amend/delete, the inconsistencies noted by the applicant and addressed by the City (above) do not have any material impact on the proposal and the City maintains its support for the proposal.

Government of **Western Australia**
Development Assessment Panels

Presentation Request Form

Regulation 40(3) and DAP Standing Orders 2020 cl. 3.5

Must be submitted at least 72 hours (3 ordinary days) before the meeting

Presentation Request Guidelines

Persons interested in presenting to a DAP must first consider whether their concern has been adequately addressed in the responsible authority report or other submissions. Your request will be determined by the Presiding Member based on individual merit and likely contribution to assist the DAP's consideration and determination of the application.

Presentations are not to exceed **5 minutes**. It is important to note that the presentation content will be **published on the DAP website** as part of the meeting agenda.

Please complete a separate form for each presenter and submit to daps@dplh.wa.gov.au

Presenter Details

Name	Tanya Trevisan
Company (if applicable)	Frasers Property for Port Catherine Developments
Please identify if you have any special requirements:	**YES** ☐ **NO** ☒ If yes, please state any accessibility or special requirements: Click or tap here to enter text.

Meeting Details

DAP Name	Metro Outer
Meeting Date	07 January 2022
DAP Application Number	DAP/21/02123
Property Location	Lot 9153 Calypso Parade cnr Orsino Boulevard, North Coogee
Agenda Item Number	8.2

Presentation Details

I have read the contents of the report contained in the Agenda and note that my presentation content will be published as part of the Agenda:	**YES** ☒
Is the presentation in support of or against the report recommendation)? *(contained within the Agenda)*	**SUPPORT** ☒ **AGAINST** ☐
Is the presentation in support of or against the proposed development?	**SUPPORT** ☒ **AGAINST** ☐
Will the presentation require power-point facilities?	**YES** ☐ **NO** ☒ **If yes, please attach**

Presentation Content*

These details may be circulated to the local government and applicant if deemed necessary by the Presiding Member. Handouts or power points will not be accepted on the day.

Brief sentence summary for inclusion on the Agenda	*The presentation will address:* Some of the proposed conditions and content of the RAR.

In accordance with Clause 3.5.2 of the *DAP Standing Orders*, your presentation request must also be accompanied with a written document detailing the content of your presentation.

Please attach detailed content of presentation or provide below:

Conditions

2. We wish to request 5 years not 4. Please refer to pages 15 and 16 of the RAR which also discusses this item.
3. We wish to request prior to release of Occupancy Certificate (BA9) as building is unoccupied for circa 18 - 20 months at Permit issue. Please also refer to Page 15.
8. We query the basis of the number ie 14 bike bays as 10 were shown within the submitted DA set, also there is EOT for the retail space which needs to be separate from the residents bikes, we request that the words 'in close proximity to the entrance of the building' be removed from the condition as this has no bearing on the function or amenity and the location of the bays is also not a requirement is not in SPP7.3. Bike parking itself, is not a requirement within the Port Coogee Marina Village Built Form Codes ('BFC') either so we have reverted to SPP7.3 for guidance on this. The bike room will struggle to accommodate 14 bays inside it and mixing retail with the residents will create security issues. By our calculation the number for compliance should be 13 in any case (rounding up from 12.5).
11. Refer to Advice Notes E. This pertains to landscaping outside of the site boundary and outside of the scope of the future building contract so we suspect that this cannot be related to this building or this DA. We are addressing this as part of the estate public realm civil and landscape design. Please also refer to Page 14 (Consideration of Wind);
17. It is not anticipated that this is a Design and Construct contract so we can't see how a builder can or would confirm that the recommendations of the acoustic report are within the documentation by the consultant team who are not employed by the builder – we believe that this is an odd condition and outside of the scope and responsibility of a builder. Conditions #16 and #18 should be suffice ie #16 in essence is for the acoustic engineer to confirm that the construction ie permit documents incorporate their requirements and then #18 is in essence that the builder confirms that the construction ie permit documents have been delivered within the construction which is the standard condition that we have seen previously.

Advice Notes

e. Refer above item 11.

Page 5 of the RAR contains a few typos within it:

The DA proposal does not have a three-bedroom apartment, Apartment 17 is a two-bedroom, 2 bathroom two-storey apartment;
We have not proposed 14 bike bays nor do we believe are we required to provide 14 bays refer Condition 8 comments above. This impacts the table on Page 10 which incorrectly notes 14 bike bays are proposed.
We have proposed 3 not 2 visitor carbays as the ACROD bay is a visitor's bay - we believe this is as required by the NCC for the retail tenancy. This is inconsistent with the last paragraph on Page 9 which follows on as also the first paragraph on Page 10.

Page 8 of the RAR contains a few typos within it:
The proposed height varies due to the fall across the site and is at a maximum 16.933m plus 625mm. Therefore the maximum height above ground level is 17.558m (not 16.9m as written in the RAR) refer A301, Elevation West;
The 'BFC' setback requirement for Orsino Boulevard is 2.5 – 3.5m (not 1m) and the proposal is nil to ~2.5m. This also impacts the second paragraph on Page 9.

Lot 9153 Orsino Boulevard, North Coogee – Mixed Use (Shop and Multiple Dwellings)

Form 1 – Responsible Authority Report
(Regulation 12)

DAP Name:	Metro Outer JDAP	
Local Government Area:	City of Cockburn	
Applicant:	MW Urban	
Owner:	Port Catherine Developments Pty Ltd	
Value of Development:	$8 million ☐ Mandatory (Regulation 5) ☒ Opt In (Regulation 6)	
Responsible Authority:	City of Cockburn	
Authorising Officer:	David King	
LG Reference:	DAP21/009	
DAP File No:	DAP/21/02123	
Application Received Date:	28 October 2021	
Report Due Date:	16 December 2021	
Application Statutory Process Timeframe:	60 Days	
Attachment(s):	1. Development Plans; 2. Plan of Subdivison; 3. Location Plan; 4. Design Review Panel Minutes; 5. Traffic Impact Statement; 6. Landscape Plan; 7. Waste Management Plan; 8. Acoutsic Report; 9. Wind Assessment	
Is the Responsible Authority Recommendation the same as the Officer Recommendation?	☒ Yes ☐ N/A	Complete Responsible Authority Recommendation section
	☐ No	Complete Responsible Authority and Officer Recommendation sections

Responsible Authority Recommendation

That the Metro Outer JDAP resolves to:

1. **Accept** that the DAP Application reference DAP/21/02123 is appropriate for consideration as a "Multiple Dwellings and Shop" land use and compatible with the objectives of the zoning table in accordance with the City of Cockburn Town Planning Scheme No. 3.

2. **Approve** DAP Application reference DAP/21/02123 and accompanying plans in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, and the

provisions of the City of Cockburn Town Planning Scheme No. 3, subject to the following conditions:

Conditions

1. Pursuant to clause 26 of the Metropolitan Region Scheme, this approval is deemed to be an approval under clause 24(1) of the Metropolitan Region Scheme.

2. This decision constitutes planning approval only and is valid for a period of ~~Four~~ Five (5~~4~~) ~~-~~years from the date of approval. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect.

3. **Prior to the** release of the Occupancy Permit (BA9) ~~**issue of a Building Permit application**~~, the landowner/applicant contributing towards development infrastructure provisions, amount as applicable at the time of the approval, pursuant to the City's Town Planning Scheme No. 3, to the City's satisfaction.

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4. **Prior to the lodgement of a Building Permit application**, a schedule of the materials, finishes and colours shall be submitted to and approved by the City. The schedule shall include details of the type of materials proposed to be used, including their colour and texture. The development shall thereafter be maintained in accordance with the approved materials schedule.

5. The Retail tenancy on the ground floor of Calypso Parade is approved for the following uses;

    a. Shop;
    b. Office;
    c. Bank;

6. **Prior to the lodgement of a Building Permit**, the owner/applicant shall:
    - submit to the City for approval a preliminary proposal for an art work designed be a professional artist at a cost of 1% of the total project cost (to a maximum of $250,000), to be to be located within the subject site as an integral part of the development;
    - submit to the City for approval an 'Application for Art Work Design';
    - enter into a contract with a professional artist/s to design and install (if appropriate) the art work approved by the City.

    The art work shall then be installed prior to occupation of the building/development and maintained thereafter to the satisfaction of the City.

7. **Prior to the lodgement of a Building Permit Application**, a stormwater management plan is to be provided to the City's satisfaction.

8. A minimum of 14 bicycle stands/racks that conform to Australian Standard 2890.3 shall be provided ~~in close proximity to the entrance of the building~~ prior to occupation of the building. Details of the bicycle parking shall be provided prior to the lodgement of a Building Permit Application.

9. **Prior to the occupation of the development**, all vehicle parking, access ways, footpaths and external lighting shall be constructed and maintained in accordance with the Australian Standards AS2890 in the form and layout depicted on the approved plans to the satisfaction of the City.

10. **Prior to the occupation of the development**, the internal traffic control devices as noted in the Cardno Traffic Impact Statement 'Proposed Mixed-Use Development – Lot 203 Orsino Boulevard, Port Coogee (For Development Application) CW1178600' dated 21 October 2021 shall be designed and installed prior to occupancy.

11. **Prior to the lodgement of a Building Permit application**, a revised landscaping plan shall be submitted to and approved by the City.

12. Landscaping including verge planting shall be installed, reticulated and/or irrigated in accordance with the/an approved plan and maintained thereafter to the satisfaction of the City. The landscaping shall be implemented during the first available planting season post completion of development, to the satisfaction of the City.

13. **Prior to the lodgement of a Building Permit application**, a construction management plan (CMP) shall be submitted to and approved by the City. The CMP shall be implemented to the satisfaction of the City.

14. The provisions identified in the Waste Management Plan provided by Cardno dated 21 October 2021 under project number CW1186100, which include recycling measures and management of commercial and residential waste, are to be implemented and maintained thereafter to the satisfaction of the City.

15. All noise attenuation measures, identified by the Lloyd George Acoustics Report "Development Application: Acoustics Lot 203 Orsino Boulevard, Port Coogee" (Ref 21086563-01_Rev3; dated 21 October 2021) and the further acoustic report required under Condition 16, are to be implemented prior to occupancy of the development and the requirements of the Acoustic Report are to be observed at all times.

16. **Prior to the lodgement of a Building Permit application**, a further Acoustic Report shall be submitted to and approved by the City, and implemented thereafter, to the satisfaction of the City.

~~17. **Prior to the lodgement of a Building Permit application**, written confirmation from the builder that all recommendations made in the Acoustic Report required under Condition 16 have been incorporated into the development plans, shall be submitted to the City.~~

~~18.~~17. **Prior to occupation of the development**, written confirmation from the builder shall be provided that the requirements of the Acoustic Report referred to in Condition 16 have been incorporated into the completed development with the Form BA7 Completion Form.

~~19.~~18. All mechanical plant and related hardware must be screened from view of adjoining properties and the primary and secondary street frontages. The

details in respect of which are to be provided to the City's satisfaction prior to lodgement of a Building Permit Application. The location of plant and equipment must also minimise the impact of noise on future occupants of the development and adjoining residents.

~~20.~~19. Any signage associated with the Retail tenancy shall maintain a 2.5m clearance from the finished floor level of the footpath

Advice Notes

a. This is a Planning Approval only and does not remove the responsibility of the applicant/owner to comply with all relevant building, health and engineering requirements of the City, or with any requirements of the City of Cockburn Town Planning Scheme No. 3 or with the requirements of any external agency.

b. The development site must be connected to the reticulated sewerage system of the Water Corporation before commencement of any use.

d. All toilets, ensuites and kitchen facilities in the development are to be provided with mechanical ventilation flued to the outside air, in accordance with the requirements of the National Construction Code (Building Code of Australia), the Sewerage (Lighting, Ventilation and Construction) Regulations 1971, Australian Standard S1668.2-1991 "The use of mechanical ventilation for acceptable indoor air quality" and the City of Cockburn Health Local Laws 2000. The City's Health Service further recommends that laundries without external windows and doors should be ventilated to external air and condensating clothes dryers installed.

~~e. With regard to Condition 11, the revised landscaping plan is requested to detail species selection along Calypso Parade as recommended under the Wind Assessment report.~~

~~f.~~e. With regard to Condition 16, the acoustic report shall be prepared by a suitably qualified and recognised acoustic consultant and demonstrate that the design and location of plant, including air conditioning, mechanical exhaust, and other sources of noise within the development will not exceed the assigned noise levels set out in the *Environmental Protection (Noise) Regulations 1997* (as amended).

~~g.~~f. The development shall comply with the noise pollution provisions of the *Environmental Protection Act 1986*, and more particularly with the requirements of the *Environmental Protection (Noise) Regulations 1997*. The installation of equipment within the development including air-conditioners, spas, pools and similar equipment shall not result in noise emissions to neighbouring properties exceeding those imposed by the *Environmental Protection (Noise) Regulations 1997* (as amended).

~~h.~~g. With regard to Condition 19, the screening of mechanical and plant equipment does not apply to solar panels.

~~i.~~h. The Construction Management Plan (CMP) shall be in accordance with the City's CMP guidelines accessed on the City's Website and shall address the following items:

a. Access to and from the site;
b. Delivery of materials and equipment to the site;
c. Storage of materials and equipment on the site;
d. Parking arrangements for contractors and subcontractors;
e. Management of construction waste;
f. Protection of existing verge trees; and
g. Other matters likely to impact on the surrounding properties.

~~j.~~i. As part of transitioning Australia to the **National Broadband Network (NBN)**, developers are encouraged to engage early with **NBN**, at least six months before the required service date, to understand requirements around future connections and the timing of infrastructure provision. This will ensure a connection is ready when residents move in. For more information please refer to https://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments or contact **NBN** on newdevelopments@nbnco.com.au or 1800 687 626.

~~k.~~j. A plan and description of any signage and advertising not exempt under Town Planning Scheme No. 3 shall be submitted to and approved by the City prior to the erection of any signage on the site/building. It is strongly advised to liaise with the City's Planning Services prior to any installation of signage to confirm what approvals, if any, are required.

~~l.~~k. All outdoor lighting shall be installed and maintained in accordance with Australian Standard AS 4282 - 1997 "*Control of the Obtrusive Effects of Outdoor Lighting*".

Reasons for Officer Recommendation

The Officers recommendation is to support the proposal which is generally consistent with the anticipated built form of the locality and the applicable planning framework.

Details: outline of development application

Region Scheme	Perth Metropolitan Region Scheme
Region Scheme - Zone/Reserve	Urban
Local Planning Scheme	City of Cockburn Town Planning Scheme No. 3
Local Planning Scheme - Zone/Reserve	Development zone
Structure Plan/Precinct Plan	Port Coogee – Revised Local Structure Plan
Structure Plan/Precinct Plan - Land Use Designation	Marina Village (Local Centre)
Use Class and permissibility:	Multiple Dwellings – 'P'; Shop – 'P'
Lot Size:	7.1962ha (1,166m^2 developable area)

Existing Land Use:	Vacant Land
State Heritage Register	N/A
Local Heritage	N/A
Design Review	Yes – City of Cockburn Design Review Panel
Bushfire Prone Area	No
Swan River Trust Area	No

Proposal:

Proposed Land Use	Shop and Multiple Dwellings – Permitted uses
Proposed Net Lettable Area	133m^2
Proposed No. Storeys	Five (5)
Proposed No. Dwellings	21 dwellings

The application (see **Attachment 1 – Development Plans**) proposes one (1) Mixed Use five (5) storey building, with the following details:

- 21 Multiple Dwellings
  - Three (3) - One bedroom/One bathroom two storey dwellings;
  - Nine (9) – Two bedroom/One-bathroom dwellings;
  - Nine~~Eight~~ (9~~8~~) – Two bedroom/Two-bathroom dwellings;
  - ~~One (1) – Three bedroom/Two bathroom two storey dwelling.~~
- Bicycle store – 14 bays;
- 37 car parking bays
  - 17 ground floor;
    - 1~~2~~ Electric vehicle charging station bay~~s~~;
    - 1 Electric vehicle charging station small car bay;
    - 2 retail bays;
    - 2 residential visitor bays
    - 1 Acrod visitor bay
  - 20 first floor bays;
    - 8 bays being tandem (associated with the same apartment);
    - ~~Apartment 19 –~~1 small car bay.
- Bin stores
  - Commercial bin store of 6m^2;
  - Residential bin store of 22m^2
- One Retail tenancy of 133m^2;
- Foyer;
- Communal work/Lounge space of 36m^2;
- Communal outdoor space;
- Landscaping.

Background:

The development site is currently part of a larger balance lot which forms the Port Coogee peninsula and breakwater. There have been multiple subdivision applications over the site, the most recent being WAPC 160542 which approved the creation of the subject lot, surrounding road reserve (laneways) and remaining lots, as well as the balance lot for the remainder of the Peninsula (see **Attachment 2 – Plan of Subdivision**).

The recently approved lot, Lot 3 on Attachment 2, is 1,166m^2 and currently vacant with temporary fencing surrounding the site. The site will be bound Orsino Boulevard (East), Calypso Parade (North), Onyx Lane (West) and future development sites to the south. Directly west and south of the site is currently vacant, the eastern side of Orsino Boulevard is characterised by existing low density single residential extending to Cockburn Road. North of Calypso Parade is the existing Woolworths Shopping Centre and a Child Care Premises (See **Attachment 3 – Location Plan**).

Legislation and Policy:

Legislation

Planning and Development Act 2005

Planning and Development (Local Planning Scheme) Regulations 2015

Planning and Development (Development Assessment Panel) Regulations 2015

State Government Policies

State Planning Policy 2.6 – State Coastal Planning (SPP 2.6)

State Planning Policy 7.0 – Design of Built Environment (SPP 7)

State Planning Policy 7.3 – Residential Design Codes (SPP 7.3) Vol. 2

Structure Plans/Activity Centre Plans

Port Coogee Revised Local Structure Plan (LSP)

The revised LSP was approved by the Western Australian Planning Commission (WAPC) in December 2016. The subject site is within the 'Port Coogee Marina Village' and has a designated zoning of 'Local Centre'.

Port Coogee Marina Village Built Form Codes (BFC)

The BFC are applicable under Development Area 22, as they are design guidelines which set criteria for development of the Marina Village. The BFC provide site specific development controls in the form of Local Development Plans, they are however, intended, to be predominantly performance based. The BFC requires each proposal to receive an endorsement from the relevant Design Review Panel prior to being lodged with the City.

Local Policies

Local Planning Policy 1.12 – Noise Attenuation (LPP 1.12)

Local Planning Policy 1.14 – Waste Management in Multiple Unit Developments (LPP 1.14)

Local Planning Policy 5.13 – Percent for Art 5.13 (LPP 5.13)

Local Planning Policy 5.16 – Design Review Panel (LPP 5.16)

Consultation:

Public Consultation

Multiple Dwellings and Retail (Shop) are both Permitted uses within the Local Centre location and do not require mandatory advertising. Given the proposals general compliance with the planning framework, no public consultation was undertaken.

Referrals/consultation with Government/Service Agencies

The proposal is not located within any buffer zones or within proximity to any regional reserves that warrant a referral to external authorities.

Design Review Panel (DRP) Advice

The proposal was seen by the City's DRP on two (2) occasions, being

- 28 July 2021; and
- 29 September 2021

Minutes from the second DRP are available for review in **Attachment 4**, with comments summarised below.

- The scale, bulk, orientation and mix of uses is considered appropriate for the site context;
- Species selection on the landscaping plan will be an important element;
- The 'loft apartment' on level five creates a point of interest to the development;
- Internal manoeuvring was queried by the DRP, specifically around the single use ramp proposed;
- Alternate opening of the storeroom doors should be considered;
- Careful consideration of the wall abutting the southern boundary should be taken into account.

Overall, the application received positive remarks from the design review and 8/10 principles received support from the DRP.

Other advice

The City is currently assessing a Local Development Plan for the smaller single dwelling type lots within the balance site. The Community Centre is a subject of discussion with the City and Developer and at this stage is likely to be located within the balance of Lot 9153 Orsino Boulevard, similar to the Hotel site.

Planning Assessment:

Use

The proposal is located within Site 5 of the Port Coogee Marina Village and subject to the specific provisions of the BFC. Site 5 requires a non-residential use at the ground floor along Calypso Parade (north) and Commercial/Residential along Orsino Boulevard (east).

The ground floor Retail (Shop) tenancy complies with the BFC and the Orsino Boulevard frontage is entirely Residential. The mandatory non-residential tenancy on Calypso Parade requires a 4m ground to ceiling floor level which the proposal seeks

to vary by 300mm. The 3.7m ground floor to ceiling height is considered minor and fulfills the intent of creating additional height for visitors to non-residential tenancies. There are no minimum ground to ceiling heights applicable to the Orsino Boulevard frontage.

Location

The subject site is one of several 'icon or gateway buildings' located within the surrounding Marina Village, as identified by the LSP and BFC. Gateway buildings shall exhibit design excellence, be constructed of materials which detail high quality and scale in specific locations which *terminate a vista, frame a view, reinforce the public domain and/or define a hierarchy of places.* In this regard, the subject development is considered an 'icon or gateway building' due to its high quality design as noted by the DRP.

The proposal is on a balance lot which is identified as one of four locations within the Marina Village for the provision of a future Hotel. It should be noted however, this specific location on the corner of Calypso Parade and Orsino Boulevard is not the specifically intended location under the LSP.

In addition to the potential use as a 'Hotel site', the subject lot is similarly identified as an alternate location for 'Community Purpose' amongst three (3) other locations within the Port Coogee Marina Village. The community purpose site is intended to include meeting rooms, history interpretation centre, art gallery and/or café which encompass an area of approximately 1,000m^2 of ground floor space of a development. The City and developer are in discussions regarding the location of the Community Centre which is intended to be upon the balance of Lot 9153 Orsino Boulevard.

Built Form

Building height			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC	Cell ends of Site 5 – 21m permitted	17.56m~~16.9m~~ top of roof	The proposal complies with the height requirements.

Site 5 provides for a gentle transition from the low density single residential lots on the eastern side of Orsino Boulevard, to the intention under the BFC for more height and intense development further along the peninsula.

Setbacks			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC	Nil – Calypso and Internal roads (Onyx lane); 2.5m – 3.5~~1~~m - Orsino	Nil proposed; Nil – 2.5~~1~~m proposed	The proposal complies with the Street setback requirements for Calypso Parade and proposes a minor variation to Orsino Boulevard.

The BFC require a nil street setback along Calypso Parade to present an attractive pedestrian streetscape, this also allows for an awning to extend over the footpath and provide further pedestrian amenity and protection from the elements.

A variation of nil~~1m~~ setback is proposed for a 7.1~~4~~m section along Orsino Boulevard, in lieu of the 2.5~~1~~m setback required. The nil setback is supported in this instance as it assists in identifying the development as an important gateway location and site to attract people down to the foreshore. The dwellings, which comprise the remainder of the Orsino Boulevard frontage, are in the majority setback a compliant 2.5~~1~~m.

Awning
An awning, in C~~o~~olo~~u~~rbond 'G~~u~~ully' cladding is provided along the full retail frontage to Calypso Parade and partially along Orsino Boulevard. The awning extends over the existing footpath for 2.45m and achieves a 3m clearance from the Natural Ground Level (NGL), which complies with the BFC. In accordance with the BFC, a condition is recommended to be imposed that future signage on the underside of the awing maintain a 2.5m clearance from the footpath.

Overshadowing
The BFC is silent on overshadowing which then reverts to State Planning Policy 7.3 – Residential Design Codes Volume 2 (SPP 7.3). The nature of the subject site being east-west orientated and the desired built form outcomes lead to inevitable overshadowing of land to the south. In this instance, the development varies SPP 7.3's acceptable outcomes, as it overshadows three of the proposed southern lots.

Whilst the variation proposed is significant, the intent for the surrounding built form should be considered when assessing the proposal. The single dwellings on the eastern side of Orsino Boulevard are in a similar situation, however an existing LDP exempts the overshadowing requirement, noting the built form intent. Notwithstanding the above, the variation to overshadowing was not advertised as the land remains under the one title and ownership (the current landowners) and an LDP currently under assessment by the City seeks to exempt visual privacy from adjoining lots.

Southern wall
The southern wall which abuts proposed Lot 4 (see Attachment 2) is the only face of the development which will not front a public street. As noted by the DRP, the southern boundary should be carefully treated to ensure an acceptable outcome is provided for future residents. The wall is shown as being finished with a textured white masonry render, which is a consistent finish proposed on the Onyx Lane façade of the development.

Solar access
All proposed dwellings obtain the required 2 hours of daylight access as required under the BFC. Naturally, the north facing apartments receive the most in 6 hours of sunlight whilst the east facing apartments receive at least 2 hours of sunlight on 21 June, the Winter solstice.

Car parking
There are a total of 37 car parking bays provided within the site which is comprised of the following;

- Ground floor (17 bays total)
    - 10 Residential bays;

- 2 Visitor bays;
- 1 Acrod visitor bay;
- 2 Retail bays;
- 2 Electric Vehicle bays.

- First floor
  - 20 Residential bays.

The BFC have specific car parking calculations which are detailed below.

Car parking			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC Residential Bays	0.3 bays per dwelling + 0.012 bay per m^2 of net internal living area (NILA)*	30 bays are provided for Residential use	21 dwellings x 0.3 = 6.3 bays +1,533m^2 of NILA x 0.012 = 18.4 bays Total = 24.7 bays
BFC Residential Visitors	0.035 bays per dwelling + 0.0015 bays per m^2 of NILA	Two (2) Residential visitor bays provided	21 dwellings x 0.035 = 0.735 0.0015 x 1,533m^2 of NILA = 2.2995 TOTAL = 3.03 Residential visitor bays required
BFC Retail use	1 bay per 18.75m^2 Net Lettable Area (NLA)	Two (2) retail bays are provided	133m^2 NLA/ 18.75m^2 = 7 Retail bays required
~~**BFC**~~ Retail use - visitors	~~1 bay per 18.75m^2 Net Lettable Area (NLA)~~	~~Two~~ One (~~1~~2) retail visitor bay~~s are~~ is provided	~~133m^2 NLA/ 18.75m^2 = 7 Retail bays required~~
SPP 7.3 Bicycle parking	0.5 space per dwellings (residential); 1 space per 10 dwellings (visitor)	12 bicycle bays required	14 bicycle bays provided

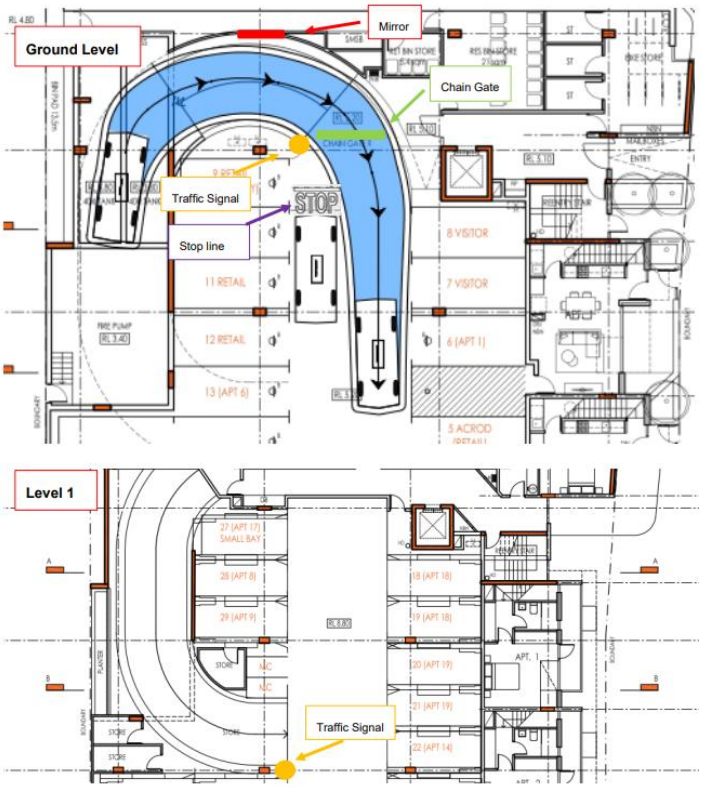
***Net Internal Living Area =** The net floorspace of the dwelling measured from the inside face of permanent external ways defining the extent of the dwelling – measured over internal walls and partitions within the dwelling, excluding any areas housing common service areas and/or ducts.*

The Residential component offers a 5.3 (5) bay surplus to requirements under the BFC. Two (2) of the three (3) required visitor bays are provided within the development site and the provision under Site 5 of the PCMVBFC allows for 50% of the visitor parking to be provided on-street. The Residential parking component is therefore compliant.

Retail
Two (2) on site visitors bays are provided to the retail tenancy in lieu of the required 7, based upon the calculations under the BFC. Notwithstanding the above however, Site 5 is afforded two (2) on-street bays to be considered towards the retail tenancy under its provisions which raises the provision to 4 bays associated with the Retail. In addition to this the ACROD bay and two (2) electric vehicle bays are not assigned to residents so they may be used by staff attending the retail tenancy. It is highly likely that only staff will be able to access the bays provided within the development due to the access gate and visitors to the site will be able to utilise existing on-street bays. Subsequently, car parking is not considered to create amenity issues within the development or surrounding road network.

Traffic and Access
The site is bound by Orsino Boulevard, a local distributor road which connects Port Coogee north to south, and Calypso Parade a local access road which is sought to be an attractive pedestrian environment through the provision of future built form. The applicant has submitted a Traffic Impact Statement, undertaken by Cardno consultants, which determines that the proposal will not lead to undue traffic congestion and safety implications for the existing and future road network (See **Attachment 5 – Traffic Impact Statement**). The BFC require that no direct vehicle access be obtained via Calypso Parade or Orsino Boulevard, the proposal complies with this requirement as access and servicing is obtained via Onyx Lane, created under the subdivision application (see Attachment 2).

Parking within the development is proposed upon the ground floor and first floor, with access to and from the first floor being via a 3.5m wide ramp, which restricts vehicle manoeuvring to one way only. Given the relatively low scale of development (21 multiple dwellings), only residential bays being on the first floor and trip generation for the apartments likely consisting of morning peak morning and peak afternoon trips in the same direction, the City recommends the imposition of a condition to ensure the recommendations (see below) contained in the TIS are implemented prior to the occupancy of the development. The TIS recommends the below.



- A stop line be marked on the ground floor to require vehicles traversing up the ramp to wait in a location that provides enough room for vehicles exiting the ramp;
- A chain gate positioned at the ramp entrance (ground floor) and able to be lowered when there is no conflict on the ramp;
- Safety mirrors provided to the middle of the ramp to provide additional sight lines;
- Traffic signals to be provided at the ramp entrance on the ground and first floors added to the ground floor and first floor to advise when vehicles can enter the ramp.

Landscaping and Open Space

Open Space			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC Balconies and Courtyards	Every dwelling with a gross floor area of 80m^2 or more shall have a private open space of 10m^2	Balconies/Courtyards of a minimum 10m^2 + and dimensions of 2.4m +	Variation – The north facing apartments have a 2.4m dimension. However are

	and minimum dimension of 2.5m		provided with a surplus to the required size under the BFC. It is noted compliance with the Apartment codes is achieved.
SPP 7.3 Communal space	6m^2 per dwelling up to a maximum 300m^2 21 dwellings x 6m^2 = 126m^2	169m^2 provided	Complies
SPP 7.3 Deep Soil Area (DSA)	10% of the site area (1,166m^2) = 116.6m^2	No DSA which meets the definitions provided.	Variation – see discussion below

A landscape plan has been provided by LD Total which demonstrates compliance with the communal open space requirement of the SPP 7.3, the west facing communal area is 169m^2, proposing a surplus of 43m^2 **(see Attachment 6 – Landscape Plan)**. The communal open space offers surveillance of the future Public Open Space on the western side of the laneway (Onyx Lane).

The DSA provision is significantly reduced from the requirements under SPP 7.3, which requires 10% of the site area, being 116.6m^2 for this development. A provision of 13m^2 has been provided which is considered to meet the DSA definition as it is not provided on structure. A total of 82m^2 soil area is provided within the development.
Notwithstanding the above, the proposal is considered to have been provided with a suitable level of amenity in terms of landscaping provision. Trees and planter boxes presented to Orsino Boulevard and Calypso Parade present an attractive streetscape and residents are provided with a large communal open space. In addition, the POS provided on the western side of the laneway accounts for some of the deep soil provision that could otherwise be attributed to development sites.

Consideration of Waste
A Waste Management Plan (WMP) is required to be provided in accordance the City's Local Planning Policy 1.14 – Waste Management in Multiple Unit Developments (LPP 1.14). A WMP (**Attachment 7 – Waste Management Plan**) has been provided by Cardno, which details the following:

- A separate commercial bin store of 6m^2 and residential bin store of 22m^2;
- Use of the City's services is proposed, however should the retail component change and require more waste collection services then a private collector may be required;
- Dwellings receive 1 set of bins per three dwellings which equates to
    - 7 sets of bins (recyclables and general waste);

- 2 sets of bins for the Retail (recyclables and general waste).

Collection of waste is via a 13.5m bin pad serviced from Onyx Lane via the City's 9.6m side lift waste truck with the strata caretaker being responsible for transferring bins to and from the bin pad. The WMP is recommended to be conditioned to ensure the measures contained within are implemented and maintained throughout the developments lifecycle.

Consideration of Noise

An Acoustic Report, completed by Lloyd George Acoustics, was provided with the application in accordance with the BFC and City's Local Planning Policy 1.12 – Noise Attenuation (LPP 1.12) (**Attachment 8 –** Acoustic Report). The subject site, being vacant, is largely separated from existing commercial noise with the majority of external noise resulting from the commercial shopping centre on the northern side of Calypso Parade.

The impacts of noise upon and from the development have been relevantly considered by the acoustic report and the measures within the report are recommended to be imposed upon the determination. The report recommends a further acoustic report be provided at the detailed building stage which will specify the locations of infrastructure such as car park exhaust, air conditioning, bin store exhaust and fire pumps, the City supports this recommendation for a further acoustic report being provided. The City also recommends written confirmation, from the builder that the requirements from the acoustic reports have been implemented within the development plans prior to lodgement of the building permit application and prior to occupancy of the building. To satisfy these conditions the applicant is required to confirm via letter that the recommendations have been demonstrated on the building permit plans.

Consideration of Wind

The site is located within an area known for high wind exposure given its close proximity to the Indian Ocean. The BFC note this and require wind assessments to be provided for all development applications within the Marina Village. Subsequently, a Wind Assessment has been undertaken by SLR Consulting (see **Attachment 9 – Wind Assessment).**

The wind assessment noted the following

- The only location of non-compliance with the BFC wind provisions may occur during winter/early spring along the retail frontage to Calypso Parade, other development frontages comply with the specific wind provisions;
- The communal open space area is only subject to wind from the west and is not considered to be subject to any further wind mitigation.

In light of the recommendations from the Wind Assessment, a revised landscaping plan is recommended to provide detailed species selection along Calypso Parade to assist in mitigating potential wind impacts.

Consideration of Public Art

The City's Local Planning Policy 5.13 – Percent for Art is adopted pursuant to TPS 3 and details when an application is required to contribute towards the provision of public art. The application for Multiple Dwellings, with a value of more than $2 million will require a contribution of 1% the development value up to a maximum of $250,000.

The applicant has indicated the public art component will take place in the form of a mural upon the future laneway (Onyx Lane). The details and engagement of an artist has not occurred yet, however the City considers that this can be addressed through the imposition of a condition on the approval. Based upon the 1% estimated cost of development, the approximate cost of the public art provision is $80,000.

Other considerations

Development Contributions
The subject site falls within Development Contribution Area 13 (DCA 13), within which applications proposing residential density in addition to what already exists is required to financially contribute towards community infrastructure such as roads, drainage, sporting, community and recreational facilities.

Part 5.3 – Development Contribution Areas (DCA) of TPS 3 details the provisions for DCA liabilities to arise and when the contribution shall be paid.

Clause 5.3.13.2 of TPS 3 states;

"*An owner's liability to pay the owner's cost contribution to the local government arises on the earlier of –*

i. The Western Australian Planning Commission endorsing its approval on deposited plan or survey strata plan of the subdivision of the owner's land within the development contribution area;
ii. ***The commencement of any development on the owner's land within the development contribution area****; **(emphasis added)***
iii. The approval of any strata plan by the local government or Western Australian Planning Commission on the owner's land within the development contribution area; or
iv. The approval of a change or extension of use by the local government on the owner's land within the development contribution area.

The liability arises only once upon the earliest of the above listed events.

The City notes the applicants request that the DCA 13 liability be conditioned to apply upon the creation of titles, due to the associated cost of development. The City recommends that the DCA liability be required prior to the issue of a building permit as this is procedurally the most appropriate time for the contribution to be collected.

Development approval timeframe
Clause 16A (2) of the Development Assessment Panel (Local Planning Scheme) Regulations 2011 states

2 If the development approval is granted by a DAP pursuant to a DAP application
a) The development must be substantially commenced within the period of 4 years beginning on the date on which the determination is made; and
b) The approval lapses if the development has not substantially commenced within that period.

The above clause was inserted into the *Planning and Development (Development Assessment Panel) Regulations 2015* only last year, and allowed an additional two (2) years timeframe for substantial commencement in light of the COVID-19 pandemic, amongst a raft of other changes to the planning framework. Considering the

justification relating to COVID-19, the City recommends the standard 4 year timeframe remain on conditional approval. Should the development not have substantially commenced within 4 years then the applicant can seek a renewal under the planning framework at the time.

Conclusion:

The proposal for Mixed Use development consisting of 21 multiple dwellings and one retail tenancy of 133m^2 is considered to be generally compliant with the relevant planning framework and consistent with surrounding built form. The built form is considered to be of high amenity and will add value to the existing streetscape and future intent of the Port Coogee Marina Village. Future residents are provided with large, highly functional dwellings as well as communal areas in excess of the statutory requirements. The application is recommended for approval subject to conditions.

SANTORINI PROMENADE, 101 (2018), ALKIMOS - EDUCATION ESTABLISHMENT, ALKIMOS COLLEGE STAGE 2

Form 1 – Responsible Authority Report
(Regulation 12)

DAP Name:	Metro Outer JDAP	
Local Government Area:	City of Wanneroo	
Applicant:	Mr Marc Karol, T&Z Architects	
Owner:	Ms Lenore Stanton, Department of Education	
Value of Development:	$29.29 million ☒ Mandatory (Regulation 5)	
Responsible Authority:	Western Australian Planning Commission	
Authorising Officer:	Director, Metropolitan Planning North	
LG Reference:	DA2021/1865	
DAP File No:	DAP/21/02127	
Application Received Date:	23 November 2021	
Report Due Date:	03 January 2022	
Application Statutory Process Timeframe:	60 Days	
Attachment(s):	1. Development Plans 2. Location Plan 3. DSP 39 and LSP 60 Plans	
Is the Responsible Authority Recommendation the same as the Officer Recommendation?	☒ Yes ☐ N/A	Complete Responsible Authority Recommendation section
	☐ No	Complete Responsible Authority and Officer Recommendation sections

Responsible Authority Recommendation

That the Metro Outer JDAP resolves to:

1. **Approve** DAP Application reference DAP/21/02127 and accompanying plans (dated 19/10/2021) in accordance with the provisions of the Metropolitan Region Scheme subject to the following conditions:

Conditions

1. Pursuant to clause 26 of the Metropolitan Region Scheme, this approval is deemed to be an approval under the Metropolitan Region Scheme.

2. This decision constitutes planning approval only relating to the proposed Education Establishment - Stage 2 as highlighted on the attached plans and is valid for a period of two years from the date of approval. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect.

3. Planting and Landscaping shall be carried out in accordance with the plans as submitted prior to the occupation of the building and thereafter maintained to the specification of the City of Wanneroo and the satisfaction of the Western Australian Planning Commission.

4. The development is to comply at all times with the Environmental Acoustics Noise Emissions Report prepared by Gabriels Hearne Farrell dated 15 November 2021.

5. Parking areas, driveways and point of ingress and egress shall be designed and constructed in accordance with the Australian Standard for Offstreet Carparking (AS2890) and shall be drained, sealed, marked and maintained to the specification of the City of Wanneroo and the satisfaction of the Western Australian Planning Commission.

6. Detailed civil engineering drawings and specifications, including signage and pavement marking, detailing works within the public road reserve (earthworks, parking, footpath, roads and drainage) shall be lodged for approval to the City prior to commencement of construction works. Engineering drawings shall be prepared in accordance with the City's specifications and works shall be undertaken in accordance with the approved engineering drawings, to the satisfaction of the Western Australian Planning Commission.

7. The parking areas and associated access indicated on the approved plans shall not be used for the purpose of storage or obstructed in any way at any time without the prior approval of the City of Wanneroo, to the satisfaction of the Western Australian Planning Commission.

8. Stormwater and any other water run-off from buildings and/or paved areas shall be collected and retained on site.

9. The applicant shall undertake adequate measures during construction to minimise any adverse impacts caused by sand drift and dust from the site.

10. A construction management plan shall be submitted to the City of Wanneroo for approval when application is made for a building licence. This plan is to detail how construction will be managed to minimise disruption in the area and shall include:
    a. The delivery of and delivery times for materials and equipment to the site;
    b. Storage of materials and equipment on site;
    c. Parking arrangements for contractors and sub-contractors ;
    d. The impact on traffic movement;
    e. Construction times;
    f. The relocation of public footpaths;
    g. The relocation/disruption of any public transport infrastructure;
    h. Management of sand drift and dust from the site; and
    i. Any other matter required by the City of Wanneroo.

11. Any damage or removal of a City of Wanneroo asset (including vegetation) shall be replaced or repaired at the cost of the applicant/landowner and to the specification of the City of Wanneroo.

Advice Notes

1. The applicant/landowner is to take measures to minimise any adverse impacts caused by sand drift and dust from the site during construction in accordance with the requirements contained in the Department of Environmental Regulation's '*A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities*'.

Details: outline of development application

Region Scheme	Metropolitan Region Scheme
Region Scheme - Zone/Reserve	Urban
Local Planning Scheme	City of Wanneroo District Planning Scheme No.2
Local Planning Scheme - Zone	Urban Development
Structure Plan/Precinct Plan	Lots 1001 and 1002 Marmion Avenue, Alkimos Local Structure Plan No. 60
Structure Plan/Precinct Plan - Land Use Designation	Government High School
Use Class and permissibility:	Education Establishment (D)
Lot Size:	90,001m^2
Existing Land Use:	Education Establishment
State Heritage Register	No
Local Heritage	☒ N/A ☐ Heritage List ☐ Heritage Area
Design Review	☒ N/A
Bushfire Prone Area	No
Swan River Trust Area	No

Proposal:

The application has been lodged on behalf of the Department of Education and seeks approval for new school buildings and associated works at Lot 2018 (101) Santorini Promenade, Alkimos to complement the existing Alkimos College. The application includes:

1. Construction of three new buildings, each over 1 or 2 levels, housing:
    - Block F (Arts Block) incorporating visual arts, drama, performing arts, dance, music and media;
    - Block E - Learning Community 2; and
    - Block G - Learning Community 3

2. Refurbishment works to Stage 1:
    - Conversion of drama room into teaching cafe (furniture only);
    - Conversion of drama studio into Food Technology 3 (Cert 2 kitchen facility);
    - Conversion of Visual Arts studio 1 into STEM laboratory;
    - Conversion of Visual Arts studio 2 into Building and Construction workshop;
    - Conversion of Media room into Mechatronics laboratory

3. External works including 135 additional car parking bays and 50 additional bike racks (**Attachment 1 - Development Plans**).

The proposed built form includes three separate double-storey buildings, comprising: Learning communities 2 and 3 (Blocks E and G); and the Arts Learning area (Block F). The building layout forms a courtyard sheltered from the prevailing western weather which is intended to provide for passive and active recreation on hard and soft landscaped surfaces.

Covered external walkways at both ground and upper levels provide primary access to the classrooms.

The works are required to fit within the existing campus infrastructure and ensure the continuity of school operations are safely maintained until handover of the new facilities prior to commencement of Term 1, 2024.

Proposed Land Use	Education Establishment
Proposed Net Lettable Area	N/A
Proposed No. Storeys	2
Proposed No. Dwellings	N/A

Background:

The site is bound by Santorini Promenade to the north, Hollington Boulevard to the west, North Butler Primary School to the south and Lot 9041, and district open space to the east (**Attachment 2 - Location Plan**).

Alkimos College Stage 1, located on the northern portion of the subject land, was completed in 2020 comprising single and double storey buildings to accommodate 700 students. Facilities include administration, student services and medical centre, information resource centre (library), staff room, classroom block, science learning area, technology & enterprise learning area, food & textiles studios, art and drama studio, health & physical education learning block, cafeteria and outdoor dining area, outdoor play area and eight multi-purpose courts, and associated hard and soft landscaping.

The proposed Stage 2, located on the south-west portion of the site, will accommodate a further 750 students and is expected to be complete for commencement of Term 1 in 2024. The site has been cleared and is ready for development. An additional classroom block adjacent to Block G is anticipated to be constructed at a future Stage 3.

The application has been submitted with an Acoustic Report, Transport Impact Assessment, Bushfire Attack Level Assessment, and Stormwater Drainage Plan that have been considered as part of the assessment.

Legislation and Policy:

Legislation

Planning and Development (DAPs) Regulations 2011

The abovementioned works have an estimated cost of $29,290,000. In accordance with Regulation 5(c) of the Planning and Development (DAPs) Regulations 2011, the determining authority is the Metro Outer JDAP.

Planning and Development Act 2005 and Public Works Act 1902

The proposed development is defined as public works under the *Public Works Act 1902,* as it relates to *public schools or any other schools authorised to be established wholly or in part at the public cost by any Act in force for the time being, universities, colleges, technical and other educational institutions, including residences or hostels for teachers or students, and play-grounds*. Under the *Planning and Development Act 2005*, public authorities are exempt from the requirement to obtain development approval for a public work under a local planning scheme, but are bound by region planning schemes.

Metropolitan Region Scheme

Section 24(1) of the MRS requires the approval of the responsible authority under the Scheme for the development of land zoned under the Scheme. Clause 30 of the MRS requires the WAPC to have regard to the following factors when determining a development application:

- the purpose for which the land is zoned or reserved under the Scheme;
- the orderly and proper planning of the locality; and
- the preservation of the amenities of the locality.

State Government Policies

State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7)

The site was previously identified as bushfire prone under the Department of Fire and Emergency Services (DFES) *Map of Bushfire Prone areas*. Progressive development in the locality surrounding the subject land has reduced the bushfire risk and consequently DFES mapping has been updated to remove the designation of bushfire prone.

The applicant submitted a Bushfire Attack Level (BAL) Assessment which indicates the site has a BAL rating of BAL-Low. No concerns are raised in this regard.
Western Australian Planning Commission Development Control Policy 2.4 - School Sites

The WAPC's Development Control Policy 2.4 *School Sites* (DC 2.4) provides guidance in relation to the location, configuration and access of landholdings to accommodate school sites, which in this instance has already been undertaken through the preparation of LSP 60 and the subsequent subdivision of the land which created the subject lot.

Structure Plans/Activity Centre Plans

The subject land is identified for Civic and Cultural - Government High School under the Butler-Jindalee District Structure Plan No. 39 (DSP 39) and Public Use - High School/Primary School and District Open Space under the Lots 1001 & 1002 Marmion Avenue, Alkimos Local Structure Plan No. 60 (LSP 60) (**Attachment 3 - DSP 39 and LSP 60 Zoning Plan**).

Consultation:

Public Consultation

The application is to be determined under the provisions of the MRS. Under the MRS there is no specific requirement for public consultation in respect of planning applications. Further, no public consultation was undertaken by the City as part of its consideration of the application. It should be noted that there is a community expectation that a high school will be developed on the subject site, as the location of the high school has been identified through structure planning which has occurred at the district and local levels.

Referrals/consultation with Government/Service Agencies

The City of Wanneroo recommend the development be approved subject to conditions and advice.

The application was also referred to the Department of Water and Environmental Regulation, Western Power and Water Corporation. No comments or objections were raised by these agencies.

Design Review Panel Advice

Not applicable.

Planning Assessment:

The proposal and supporting documentation has been assessed against all the relevant legislative requirements of the local and State planning framework as outlined in the Legislation and Policy section of this report. The following matters have been identified as key considerations for the determination of this development application:

The purpose for which the land is zoned or reserved under the Scheme

The existing use of the land for a high school is consistent with the Urban zoning of the land under the MRS. The proposed high school extension is responsive to growing student demand in Alkimos which is a greenfield urban development area.

The orderly and proper planning of the locality

The WAPC's DC 2.4 provides guidance in relation to the location, configuration and access to proposed school sites. In this instance, the provisions of DC 2.4 have already been addressed through the preparation of DSP 39 and LSP 60, the subsequent subdivision of the land which created the subject lot, and approval to Stage 1 of the development of Alkimos College.

The proposed development is consistent with the provisions of LSP 60 and has also been assessed by the City to be compliant with DPS 2. The proposal is therefore considered to be consistent with the orderly and proper planning of the locality.

The preservation of the amenities of the locality

It is considered that the proposed development will not detract from the amenity of the surrounding locality and no issues have been raised by the City in this regard. Appropriate conditions of approval relating to landscaping, car parking and dust management during construction are recommended to ensure that any potential amenity impacts are minimised.

Access

The application proposes three new areas of carparking and one additional crossover:

- a new carpark (66 bays) at the south-western corner of the site accessed via a new crossover to Hollington Boulevard;
- an extension to the existing western carpark (25 additional bays); and
- an extension to the existing northern carpark (54 additional bays).

The City identified that the proposed extension to the northern carpark results in a four-way cross intersection in the middle of the car park where vehicle priority is not clear. This is to be addressed with signage/line marking/or minor alterations to the parking layout as part of the detailed design process. A condition is recommended requiring parking areas to be designed and constructed in accordance with the relevant Australian Standard, and this condition is considered to sufficiently address any changes.

Conclusion:

The proposed development is consistent with the zoning of the land under the Metropolitan Region Scheme and structure planning undertaken for the locality. The proposed Stage 2 expansion of the existing high school will provide an essential community facility for the growing residential population in the area. Further, the proposed development does not raise any issues relating to amenity or the orderly and proper planning of the locality. Accordingly, conditional approval is recommended.

DRAWING INDEX		
No.	TITLE	CURRENT REVISION
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A2.200	BLOCK B - REFURBISHMENTS - FLOOR, CEILING AND ROOF PLANS	A
A3.200	BLOCK C - REFURBISHMENTS - FLOOR PLANS	A
A3.210	BLOCK C - REFURBISHMENTS - FLOOR AND CEILING PLANS	A
A4.200	OVERALL GROUND FLOOR PLAN	F
A4.201	OVERALL FIRST FLOOR PLAN	F
A5.200	BLOCK E - COMMUNITY 2 - GROUND FLOOR PLAN	E
A5.210	BLOCK E - COMMUNITY 2 - FIRST FLOOR PLAN	E
A5.220	BLOCK E - COMMUNITY 2 - ROOF PLAN	E
A5.500	BLOCK E - COMMUNITY 2 - BUILDING ELEVATIONS	E
A5.501	BLOCK E - COMMUNITY 2 - BUILDING ELEVATIONS	E
A5.600	BLOCK E - COMMUNITY 2 - BUILDING SECTIONS	E
A6.200	BLOCK F - ARTS LEARNING AREA - GROUND FLOOR PLAN PART 1	E
A6.201	BLOCK F - ARTS LEARNING AREA - GROUND FLOOR PLAN PART 2	E
A6.210	BLOCK F - ARTS LEARNING AREA - FIRST FLOOR PLAN PART 1	E
A6.211	BLOCK F - ARTS LEARNING AREA - FIRST FLOOR PLAN PART 2	E
A6.220	BLOCK F - ARTS LEARNING AREA - ROOF PLAN	E
A6.500	BLOCK F - ARTS LEARNING AREA - BUILDING ELEVATIONS	E
A6.501	BLOCK F - ARTS LEARNING AREA - BUILDING ELEVATIONS	E
A6.502	BLOCK F - ARTS LEARNING AREA - BUILDING ELEVATIONS	E
A6.600	BLOCK F - ARTS LEARNING AREA - BUILDING SECTIONS	E
A6.601	BLOCK F - ARTS LEARNING AREA - BUILDING SECTIONS	E
A7.200	BLOCK G - COMMUNITY 3 - GROUND FLOOR PLAN	E
A7.210	BLOCK G - COMMUNITY 3 - FIRST FLOOR PLAN	E
A7.220	BLOCK G - COMMUNITY 3 - ROOF PLAN	E
A7.500	BLOCK G - COMMUNITY 3 - BUILDING ELEVATIONS	E
A7.501	BLOCK G - COMMUNITY 3 - BUILDING ELEVATIONS	E
SD.001	PERSPECTIVE VIEW 01	B
SD.002	PERSPECTIVE VIEW 02	B
SD.003	PERSPECTIVE VIEW 03	B

Grand total: 31

ALKIMOS COLLEGE - STAGE 2

SPE	SIMILAR PRODUCT EQUIVALENT
	OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE

REV	DATE	DESCRIPTION	APP
A	19/10/21	ISSUED FOR DA	AE

PRELIMINARY

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T&Z architects
L3, 679 Murray Street, West Perth, WA
P.O. Box 830, West Perth 679, (08) 9423 0000
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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

COVER SHEET - SHEET LIST

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A0.001	REV. A
DF PROJ No. 15101	DF File No.		

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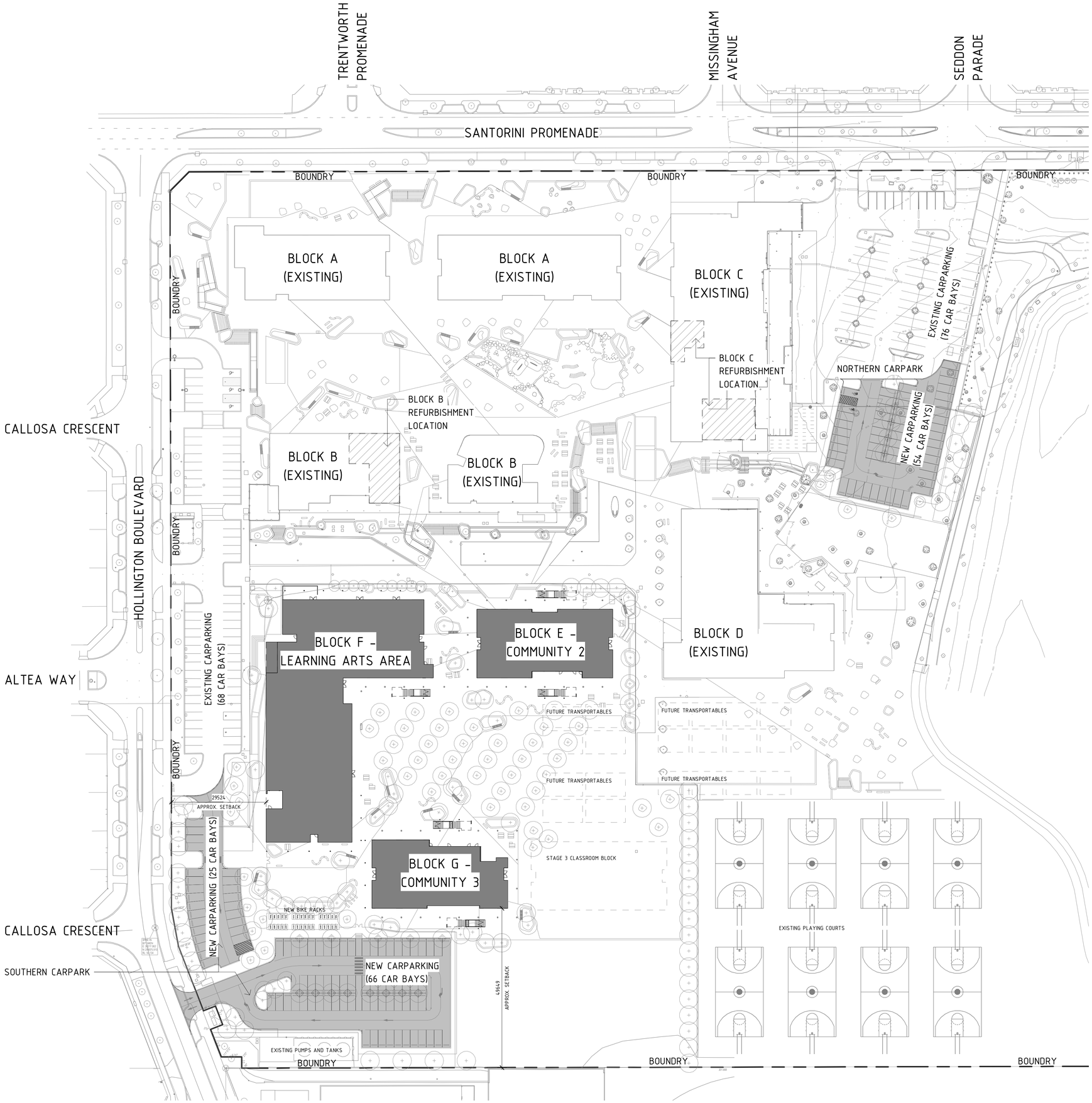
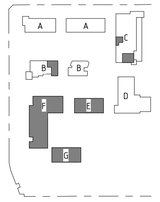
TZ JOB NO: 422001 ALKCA000





STAGE 2 CAR PARKING LEGEND

SOUTHERN CARPARK PARKING BAYS TOTAL:	90 NET NEW BAYS
NORTHEN CARPARK PARKING BAYS TOTAL:	45 NET NEW BAYS
STAGE 2 OVERALL PARKING BAYS TOTAL:	135 NET NEW BAYS

SPE	SIMILAR PRODUCT EQUIVALENT		
	OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE		

REV	DATE	DESCRIPTION	APP
E	19/10/21	ISSUED FOR DA	AE
D	12/10/21	ISSUED FOR INFORMATION	AE
C	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE
B	21/09/21	ISSUED FOR INFORMATION	AE
A	17/09/21	ISSUED TO QS	AE

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

LOCATION PLAN

DRAWN AE	DESIGNED MK	REDUCTION 0	
CHECKED MK	PRINCIPAL		
APPROVED MK			
SCALE 1 : 600 @ A1	DATE 19/10/21	DRAWING No. A1.001	REV. E
DF PROJ No. 15101	DF File No.		

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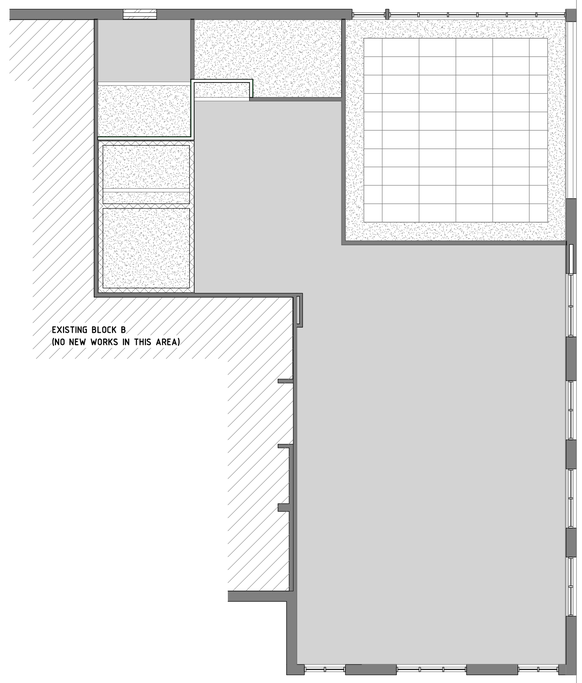

3 A2.800 PROPOSED RCP_BLOCK B REFURB
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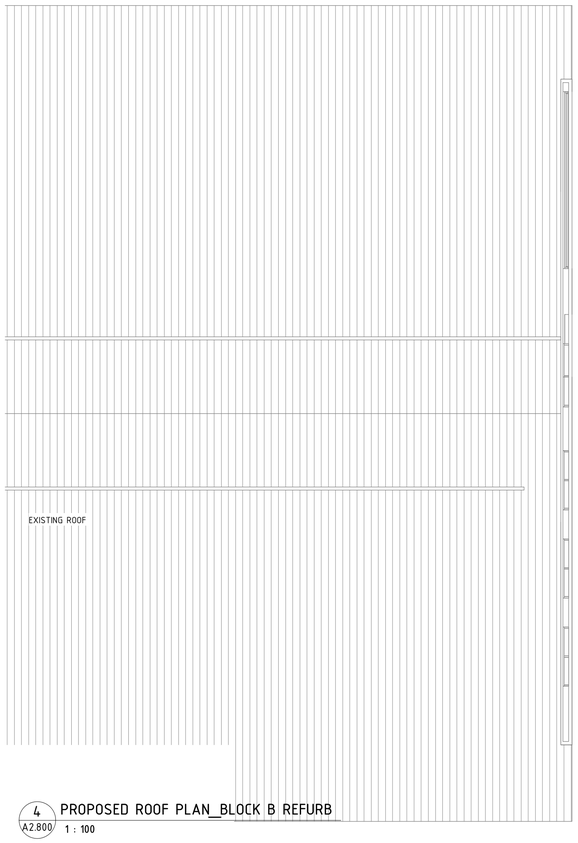

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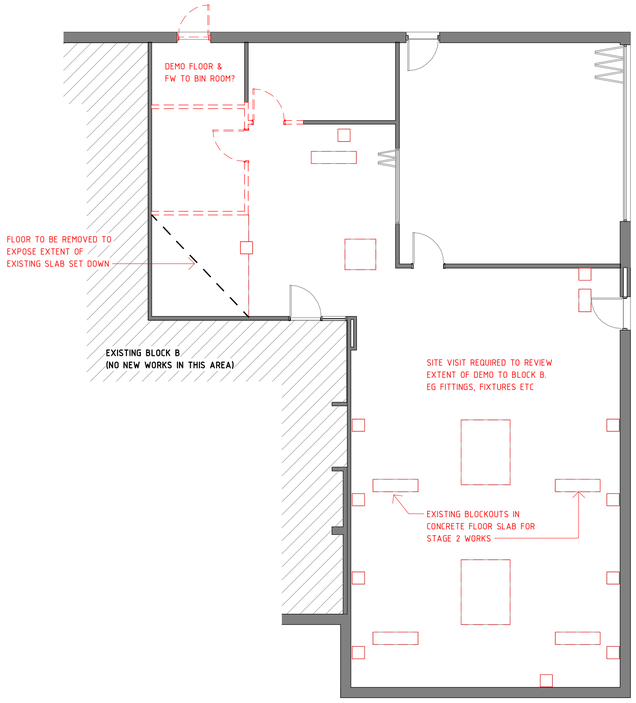

1 A2.800 EXISTING / DEMOLITION FLOOR PLAN_BLOCK B REFURB
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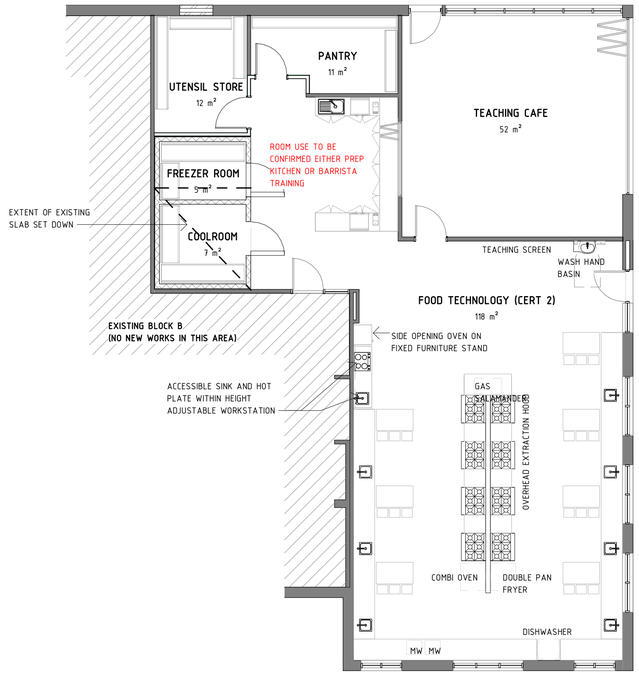

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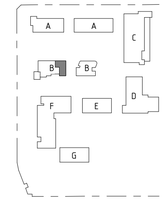

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A	13/09/21	ISSUED FOR INFORMATION	AE

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L3, 679 Murray Street, West Perth, WA
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ALKIMOS COLLEGE STAGE 2
#101 SANTORINI PROMENADE, ALKIMOS
BLOCK B – REFURBISHMENT
FLOOR, CEILING AND ROOF PLANS

DRAWN AE	DESIGNED MK	REDUCTION	
CHECKED MK	PRINCIPAL	0	
APPROVED MK			
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DF PROJ No. 15101	DF File No.		

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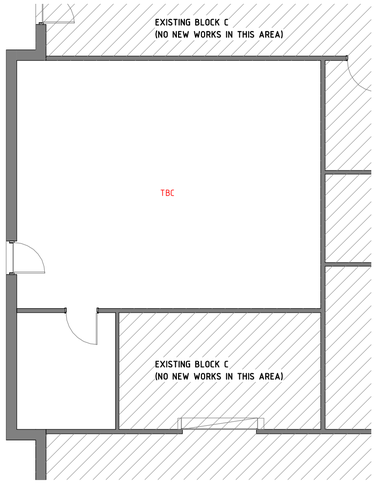

1 EXISTING / DEMOLITION FLOOR PLAN_MECHATRONICS

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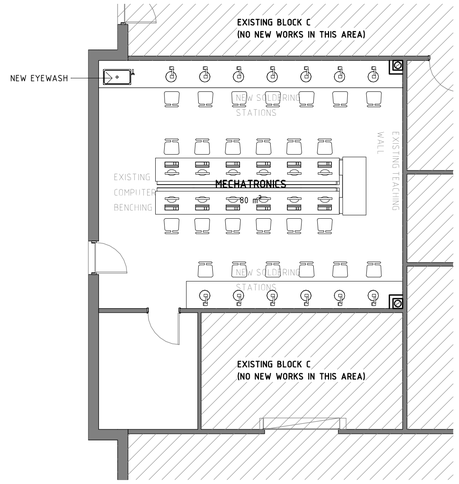
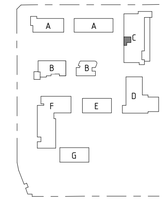


2 PROPOSED FLOOR PLAN_MECHATRONICS

1 : 100



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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK C - REFURBISHMENT
FLOOR PLANS

DRAWN AE	DESIGNED MK	REDUCTION 0
CHECKED MK	PRINCIPAL	
APPROVED MK		
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DF PROJ No. 15101	DF File No.	

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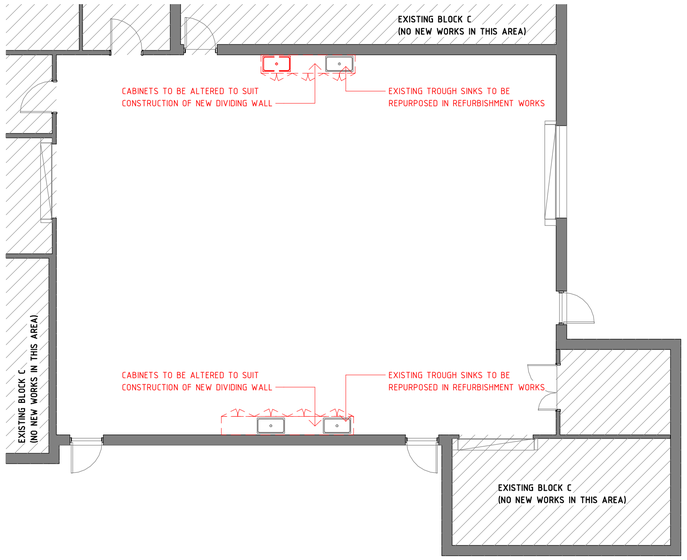

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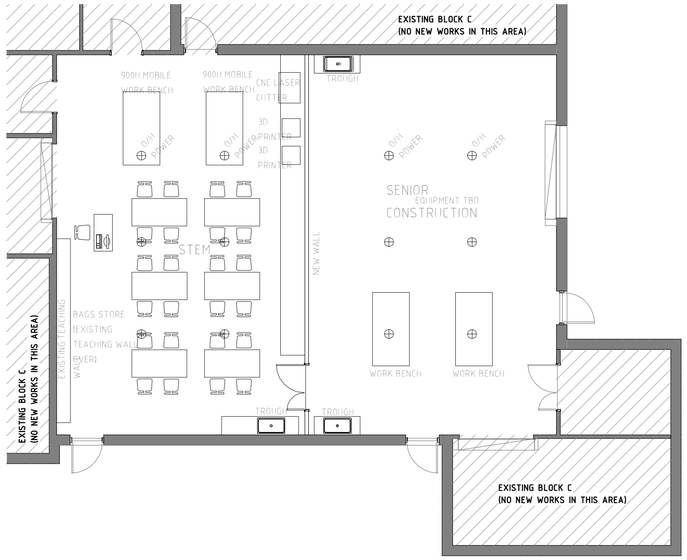

2 PROPOSED FLOOR PLAN_STEM / SENIOR CONSTRUCTION
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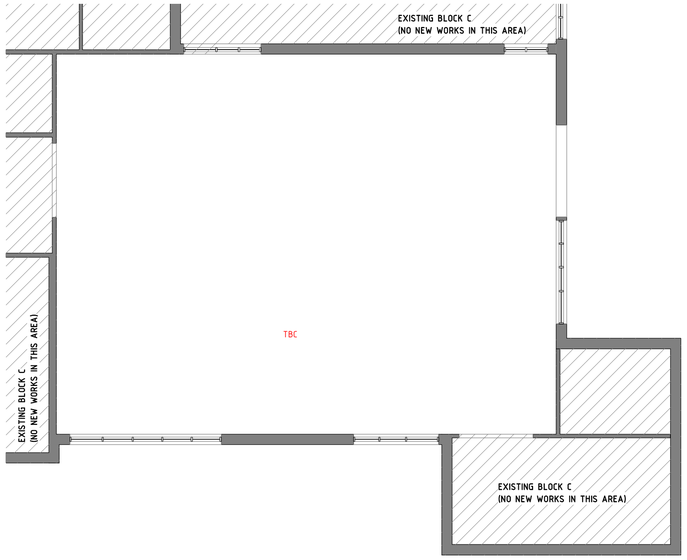

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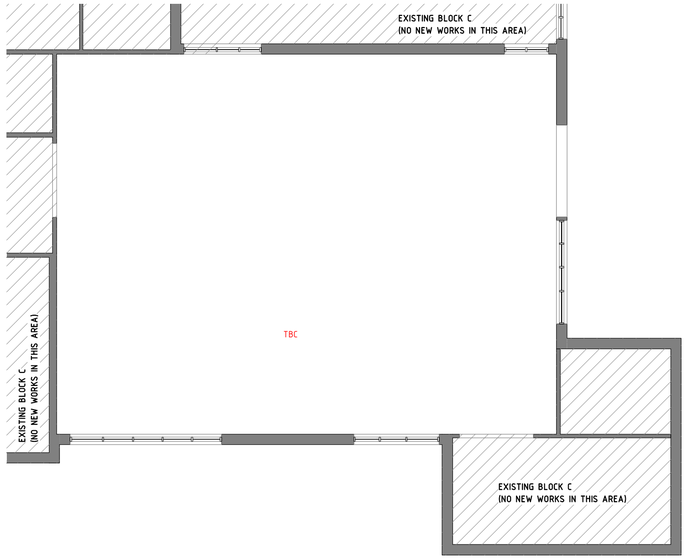

4 PROPOSED RCP_STEM / SENIOR CONSTRUCTION
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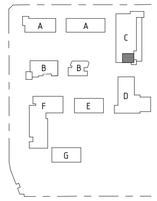

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK C - REFURBISHMENT

FLOOR AND CEILING PLANS

DRAWN AE	DESIGNED MK	REDUCTION	
CHECKED MK	PRINCIPAL	0	
APPROVED MK			
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DF PROJ No. 15101	DF File No.		

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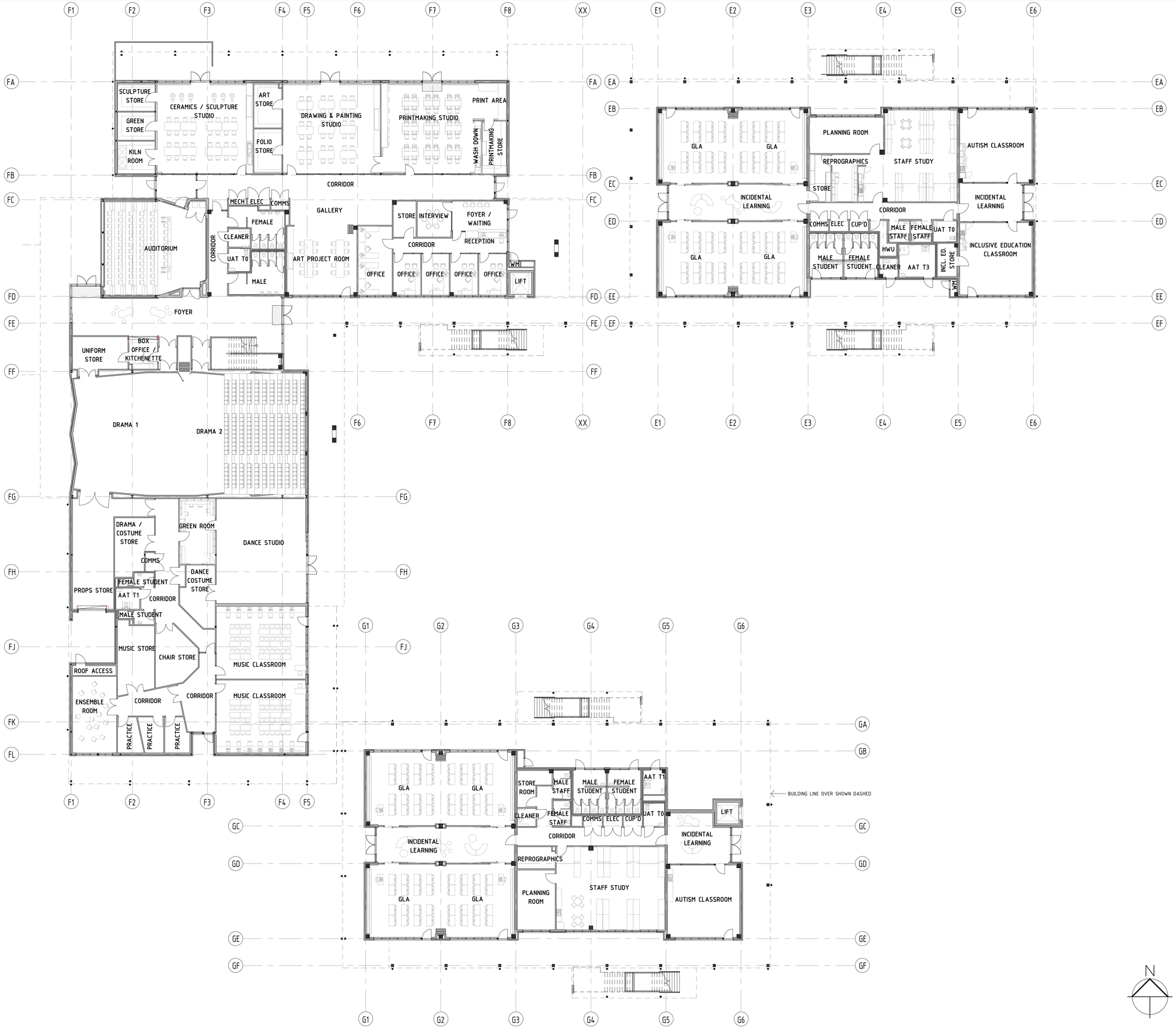

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E	12/10/21	ISSUED FOR INFORMATION	AE
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A	09/09/21	ISSUED FOR INFORMATION	AE

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

OVERALL GROUND FLOOR PLAN

DRAWN	Author	DESIGNED	Designer
CHECKED	Checker	PRINCIPAL	
APPROVED	Approver		
SCALE	1 : 200 @ A1	DATE	19/10/21
DF PROJ No.	15101	DF File No.	

REDUCTION 0

DRAWING No. A4.200 REV. F

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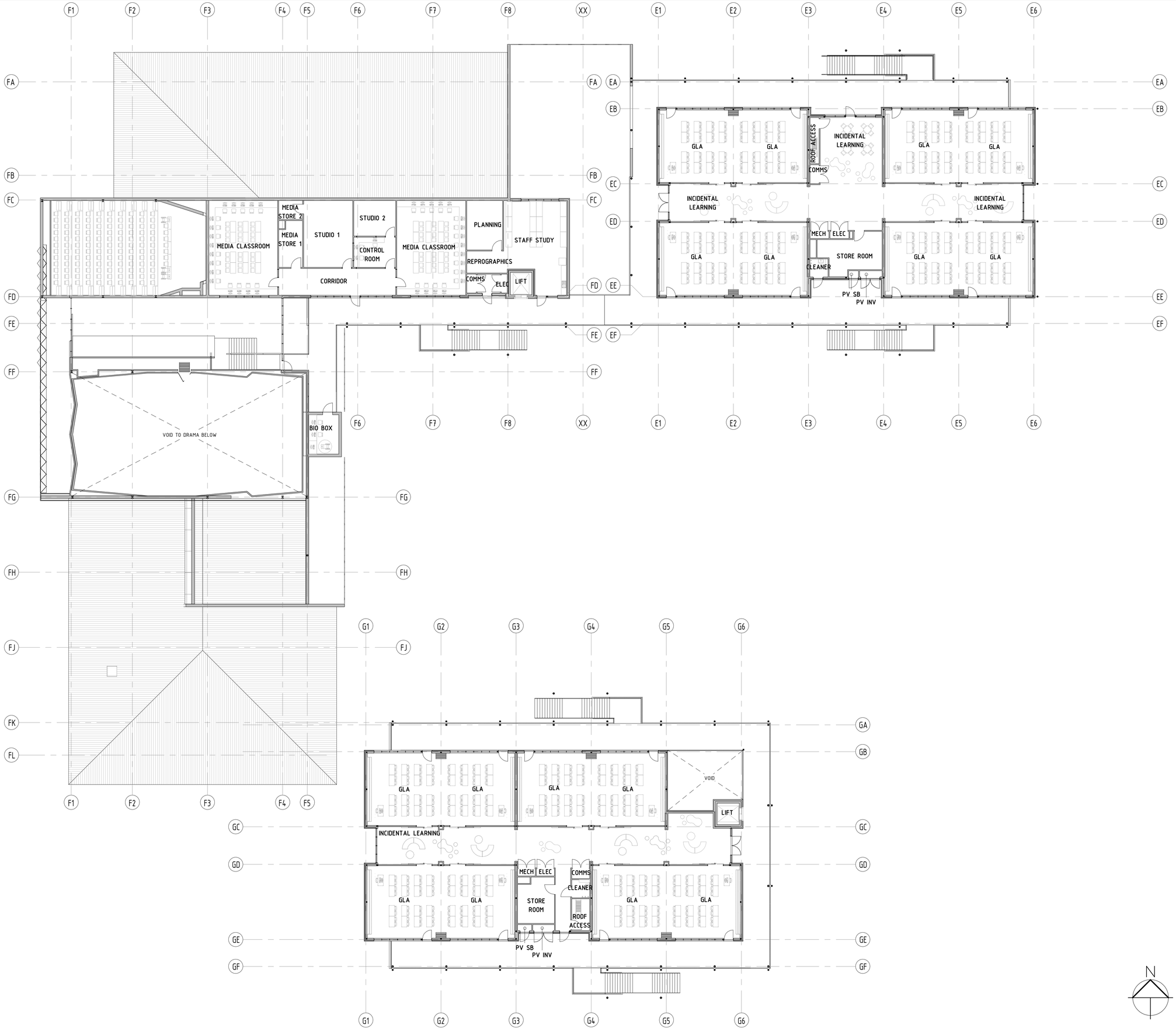

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

OVERALL FIRST FLOOR PLAN

DRAWN AE	DESIGNED MK	REDUCTION 0	
CHECKED MK	PRINCIPAL		
APPROVED MK			
SCALE 1 : 200 @ A1	DATE 19/10/21	DRAWING No. A4.201	REV. F
DF PROJ No. 15101	DF File No.		

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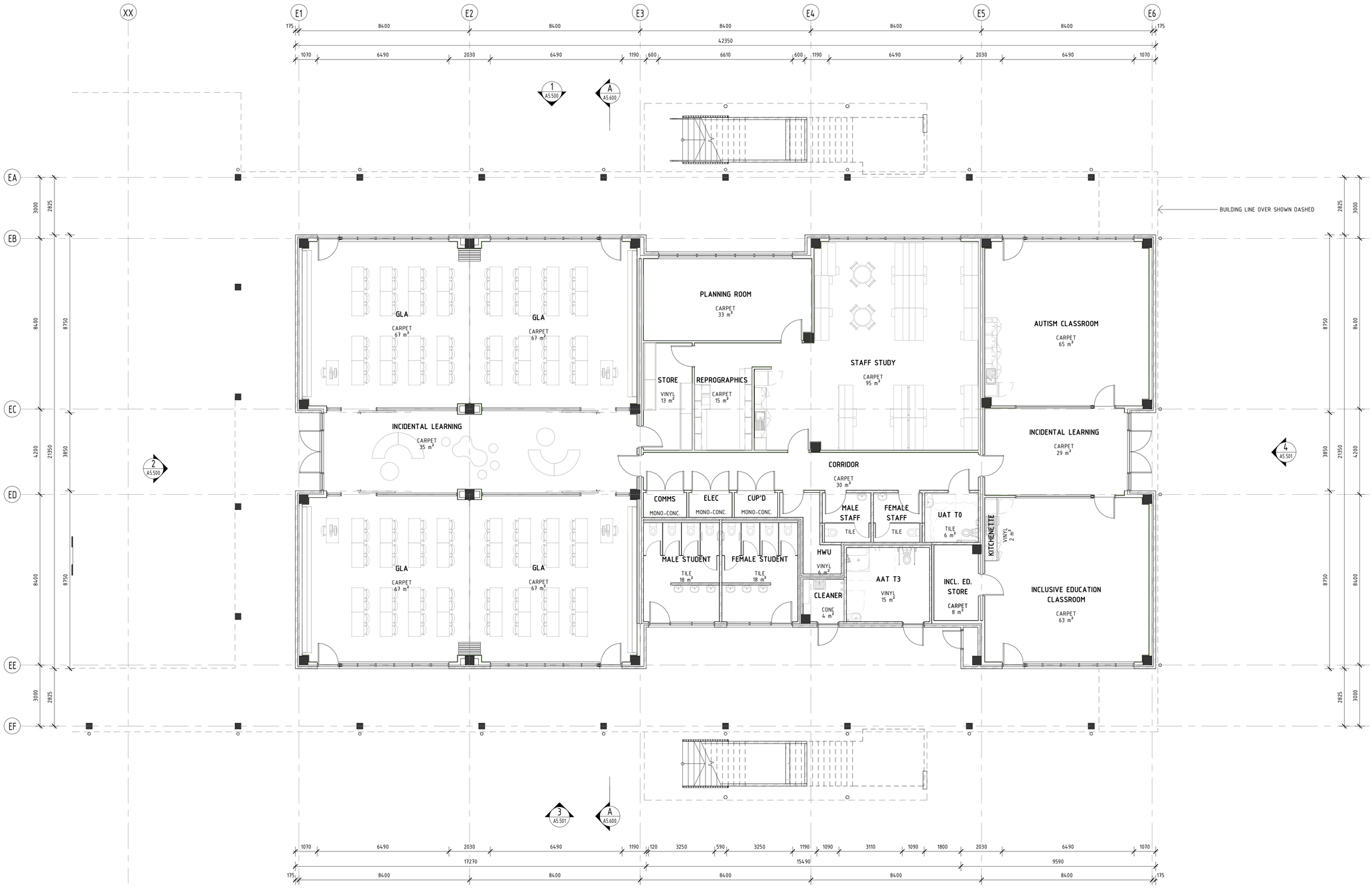

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK E - COMMUNITY 2
GROUND FLOOR PLAN

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A5.200	REV. E
DF PROJ No. 15101	DF File No.		

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TZ JOB NO: 422001 ALKC

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK E - COMMUNITY 2
FIRST FLOOR PLAN

DRAWN Author	DESIGNED Designer	REDUCTION	
CHECKED Checker	PRINCIPAL	0	
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A5.210	REV. E
DF PROJ No. 15101	DF File No.		

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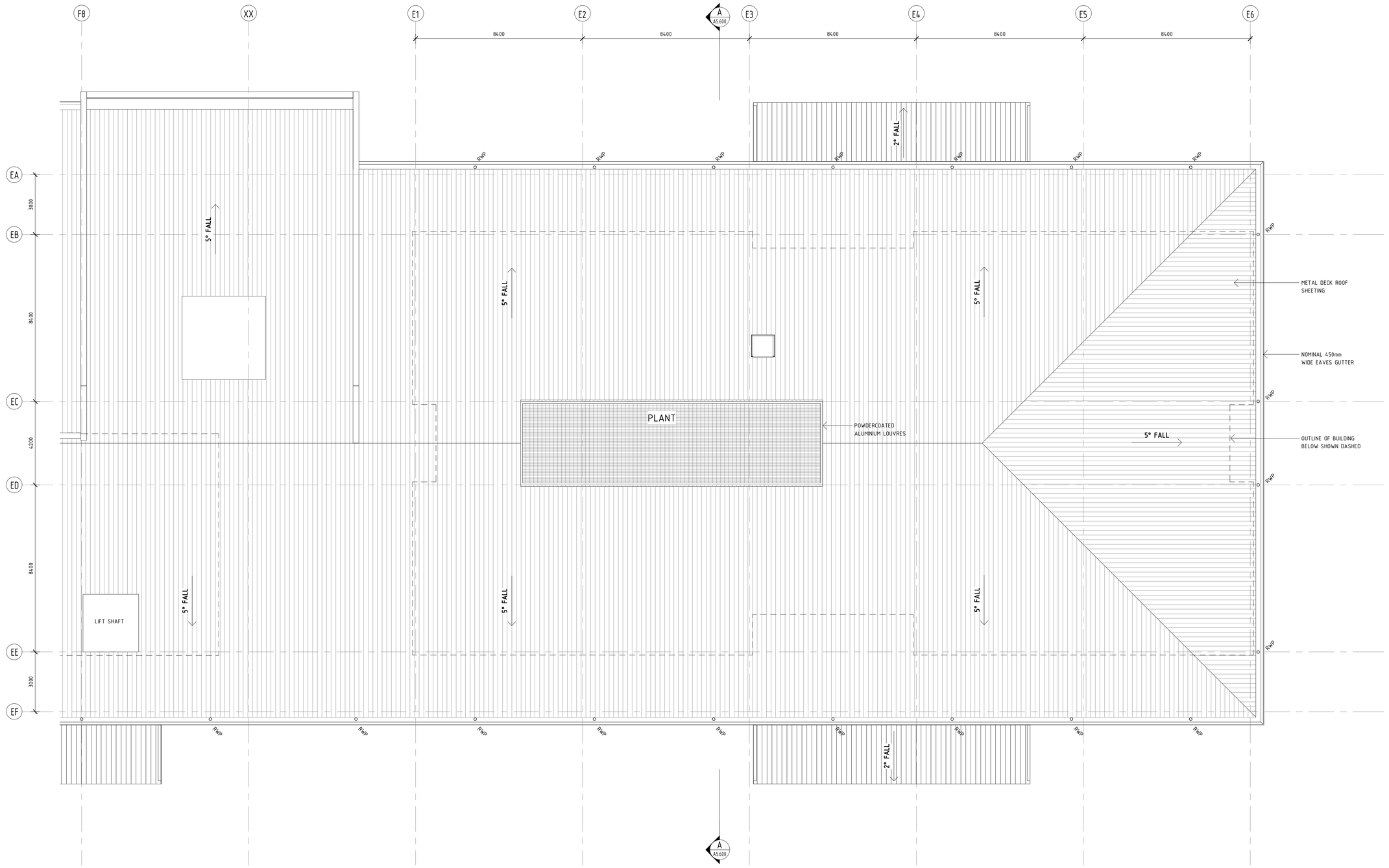

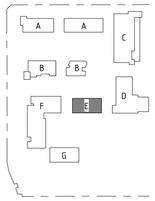

SPE	SIMILAR PRODUCT EQUIVALENT OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE

REV	DATE	DESCRIPTION	APP
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D	12/10/21	ISSUED FOR INFORMATION	AE
C	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE
B	21/09/21	ISSUED FOR INFORMATION	AE
A	17/09/21	ISSUED TO QS	AE

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK E – COMMUNITY 2
ROOF PLAN

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A5.220	REV. E
DF PROJ No. 15101	DF File No.		

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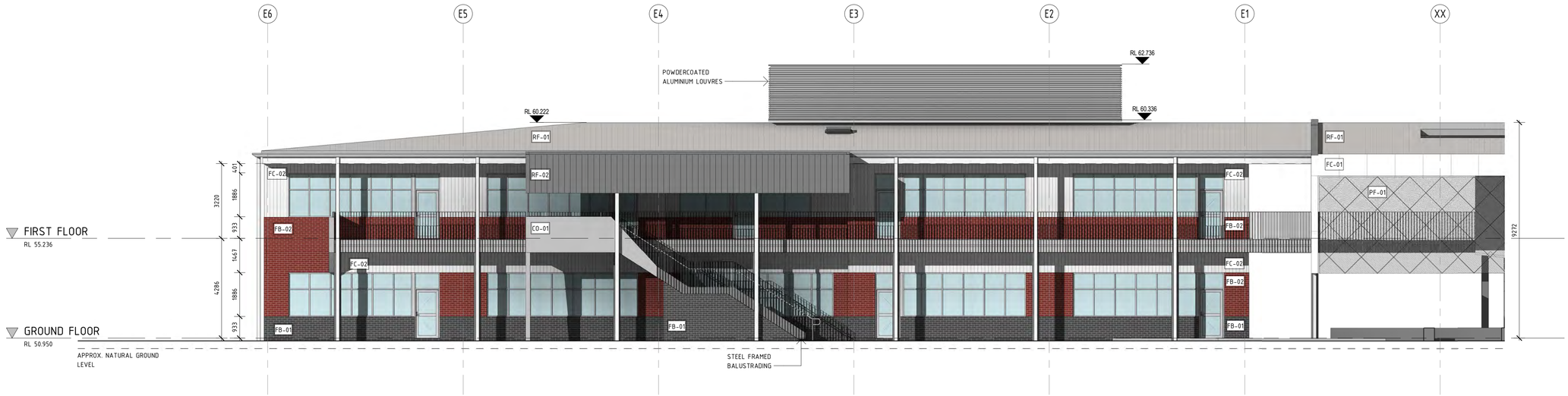
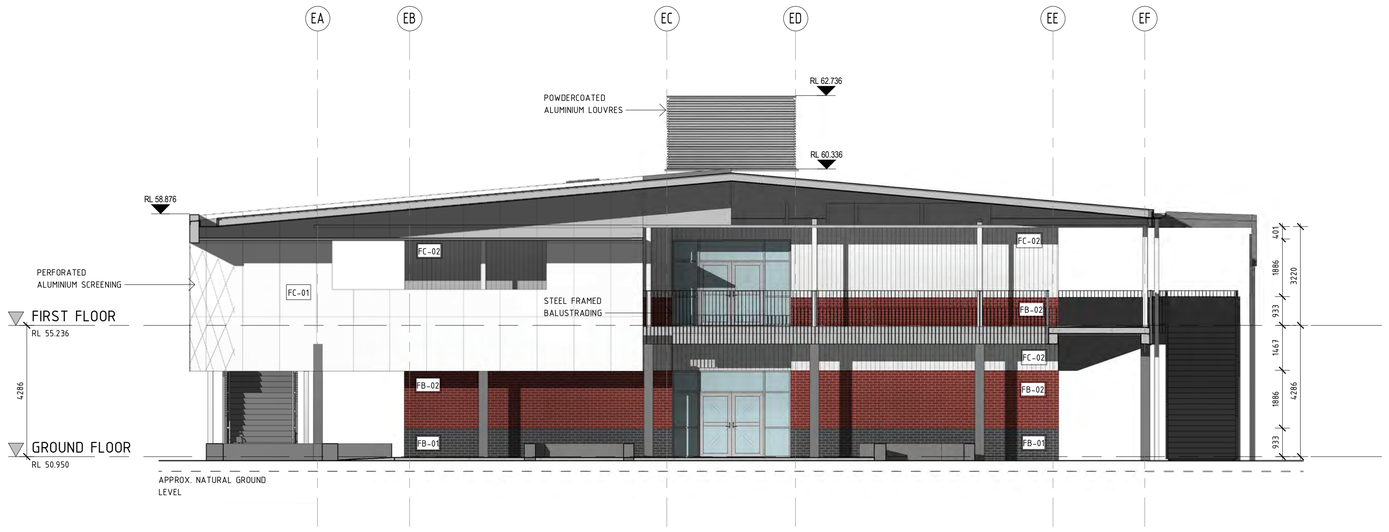
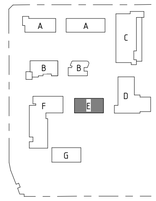


1 A5.200 BUILDING ELEVATION - BLOCK E - NORTH
1 : 100



2 A5.200 BUILDING ELEVATION - BLOCK E - WEST
1 : 100



EXTERNAL ELEVATION FINISHES SCHEDULE

MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
FC-02	CFC WALL CLADDING - LINEAR GROOVED
MC-01	PREFINISHED ALUMINIUM SHINGLE CLADDING
PF-01	PERFORATED METAL
RF-01	PREFINISHED CONCEALED FIX PROFILED METAL ROOF SHEETING
RF-02	PREFINISHED STANDING SEAM METAL SHEETING

SPE	SIMILAR PRODUCT EQUIVALENT
	OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE

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D	12/10/21	ISSUED FOR INFORMATION	AE
C	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE
B	21/09/21	ISSUED FOR INFORMATION	AE
A	17/09/21	ISSUED TO QS	AE

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK E - COMMUNITY 2
BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A5.500	REV. E
DF PROJ No. 15101	DF File No.		

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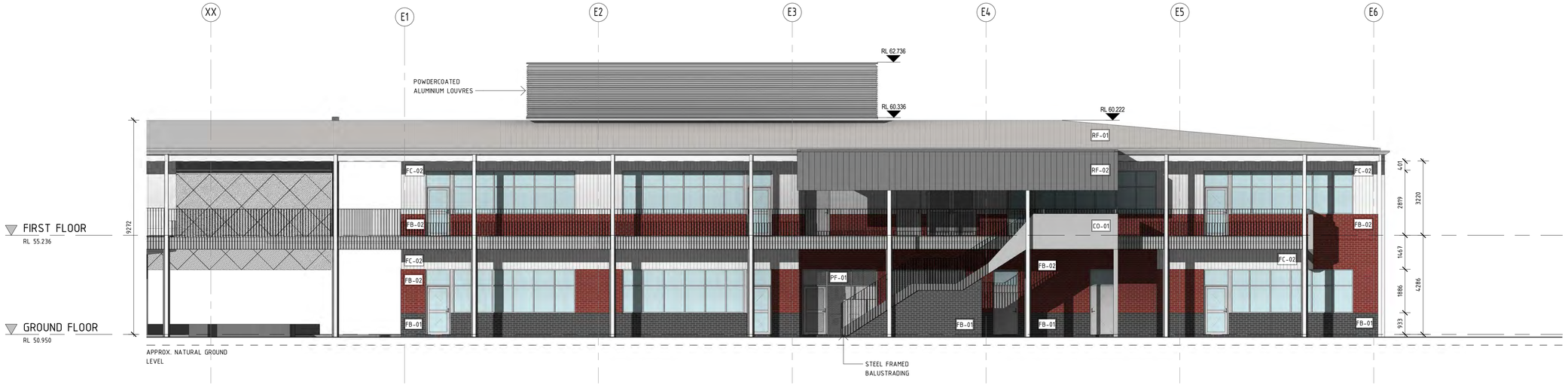
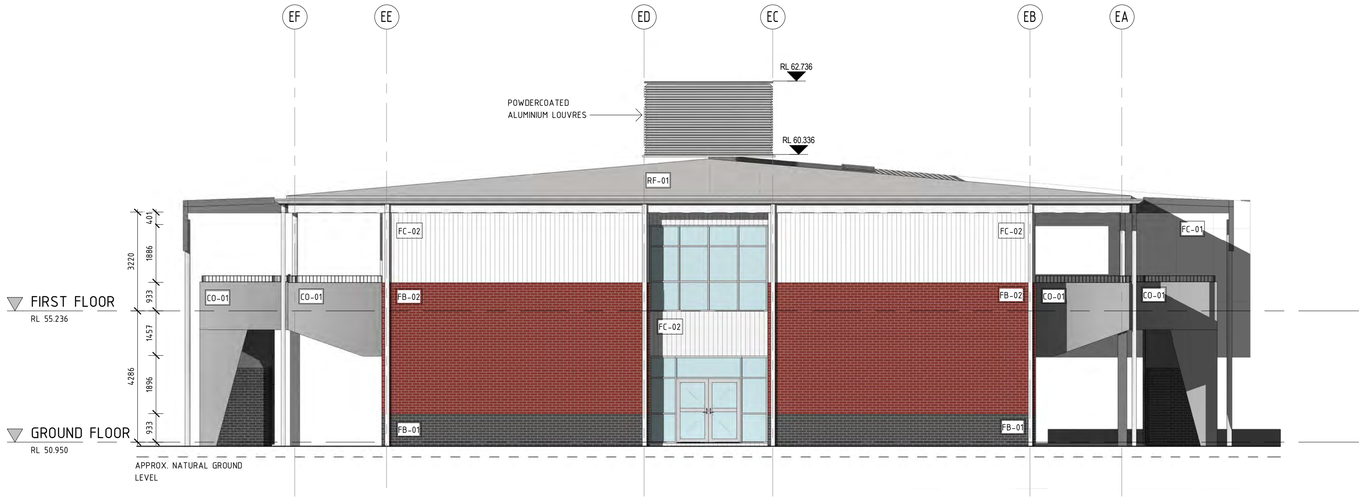
TZ JOB NO: 422001 ALKC



3 A5.200 BUILDING ELEVATION - BLOCK E - SOUTH

1 : 100



4 A5.200 BUILDING ELEVATION - BLOCK E - EAST

1 : 100

EXTERNAL ELEVATION FINISHES SCHEDULE	
MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
FC-02	CFC WALL CLADDING - LINEAR GROOVED
MC-01	PREFINISHED ALUMINIUM SHINGLE CLADDING
PF-01	PERFORATED METAL
RF-01	PREFINISHED CONCEALED FIX PROFILED METAL ROOF SHEETING
RF-02	PREFINISHED STANDING SEAM METAL SHEETING

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C	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE
B	21/09/21	ISSUED FOR INFORMATION	AE
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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK E - COMMUNITY 2

BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A5.501	REV. E
DF PROJ No. 15101	DF File No.		

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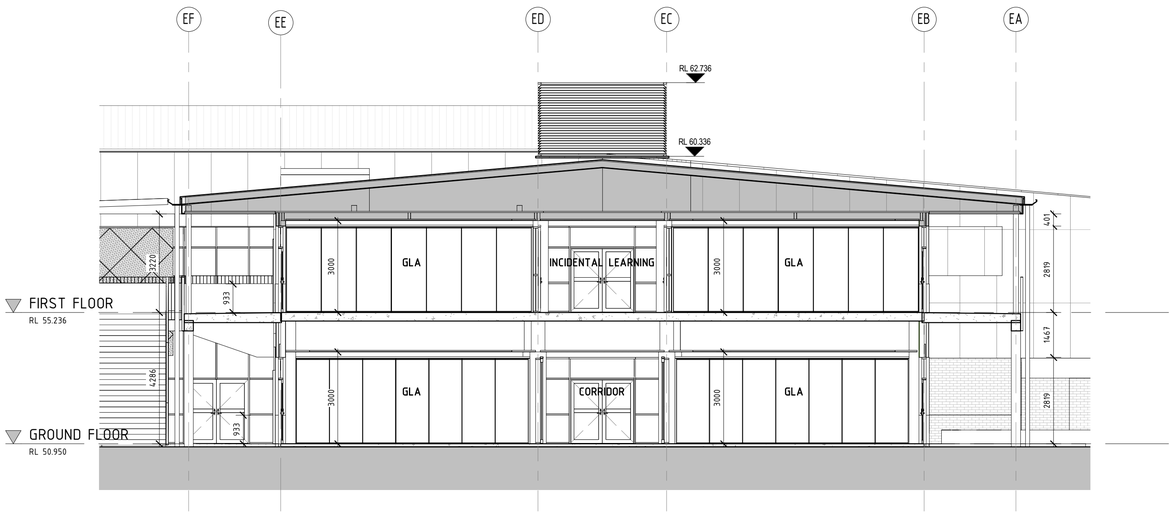

A A5.200 BUILDING SECTION A
1 : 100

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK E - COMMUNITY 2
BUILDING SECTIONS

DRAWN AE	DESIGNED MK	REDUCTION	
CHECKED MK	PRINCIPAL	0	
APPROVED MK			
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DF PROJ No. 15101	DF File No.		

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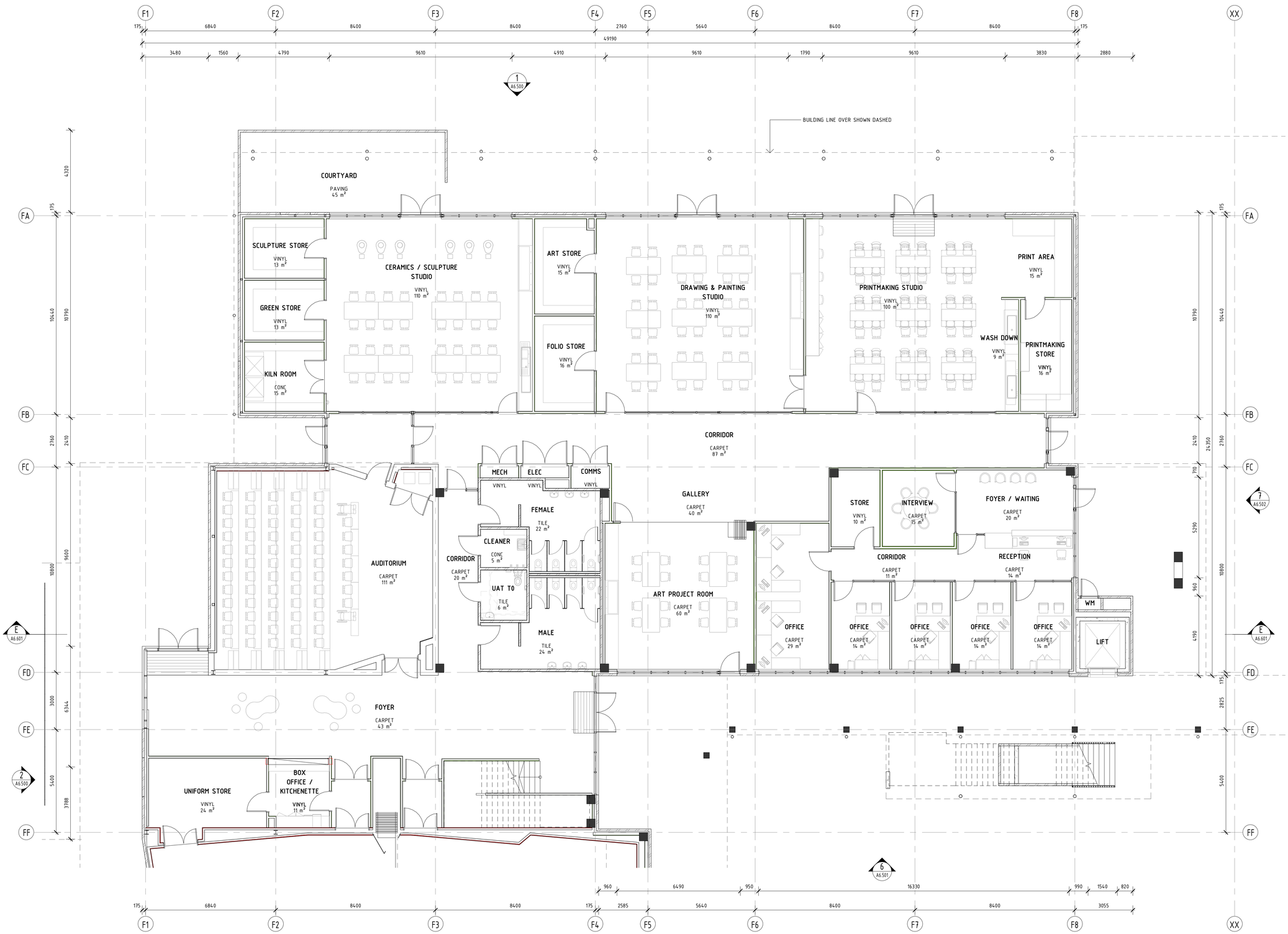

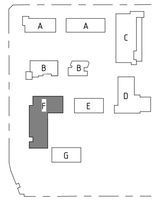

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
GROUND FLOOR PLAN PART 1

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.200	REV. E
DF PROJ No. 15101	DF File No.		

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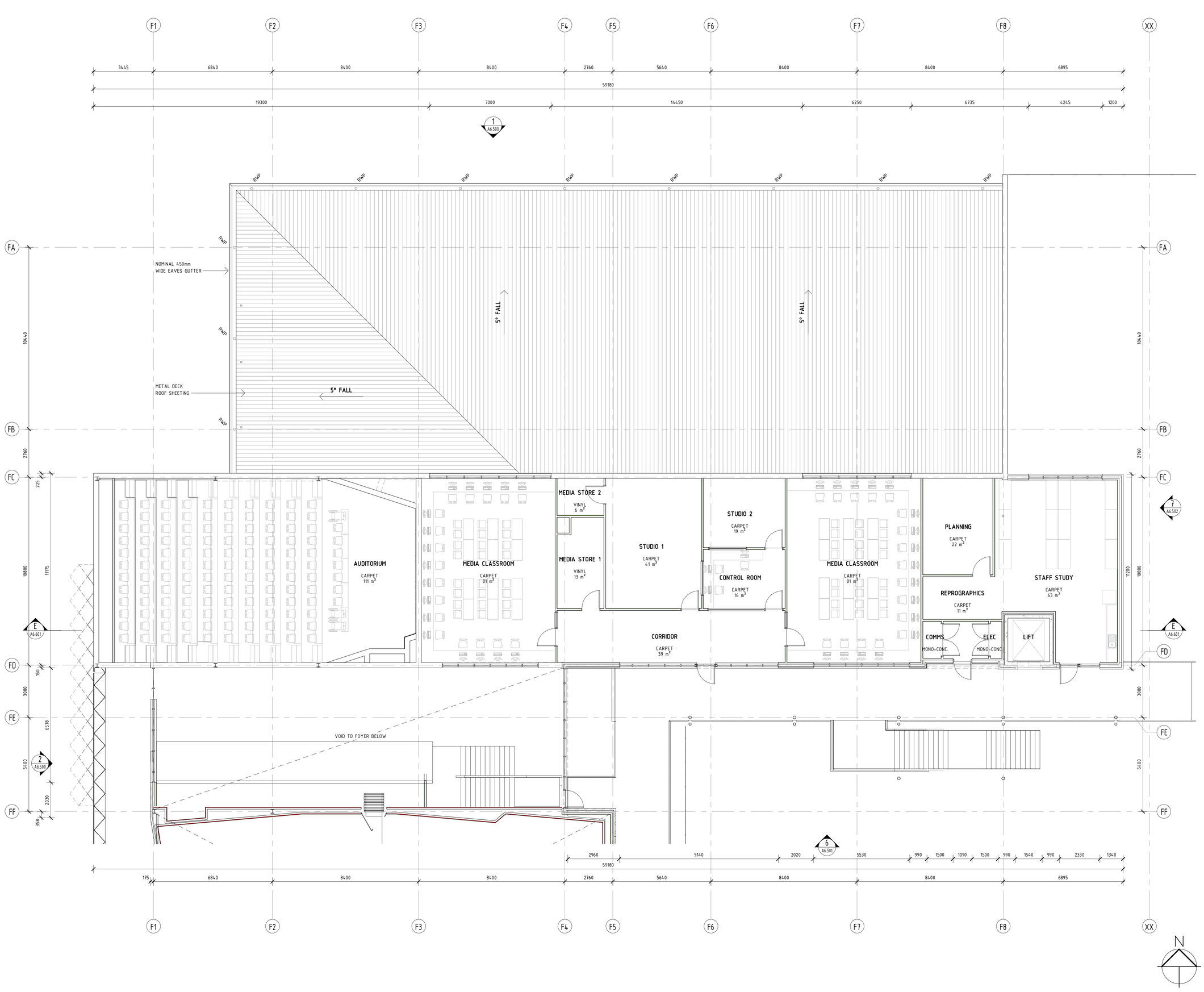

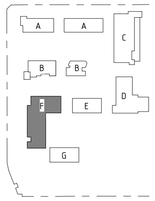

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
FIRST FLOOR PLAN PART 1

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.210	REV. E
DF PROJ No. 15101	DF File No.		

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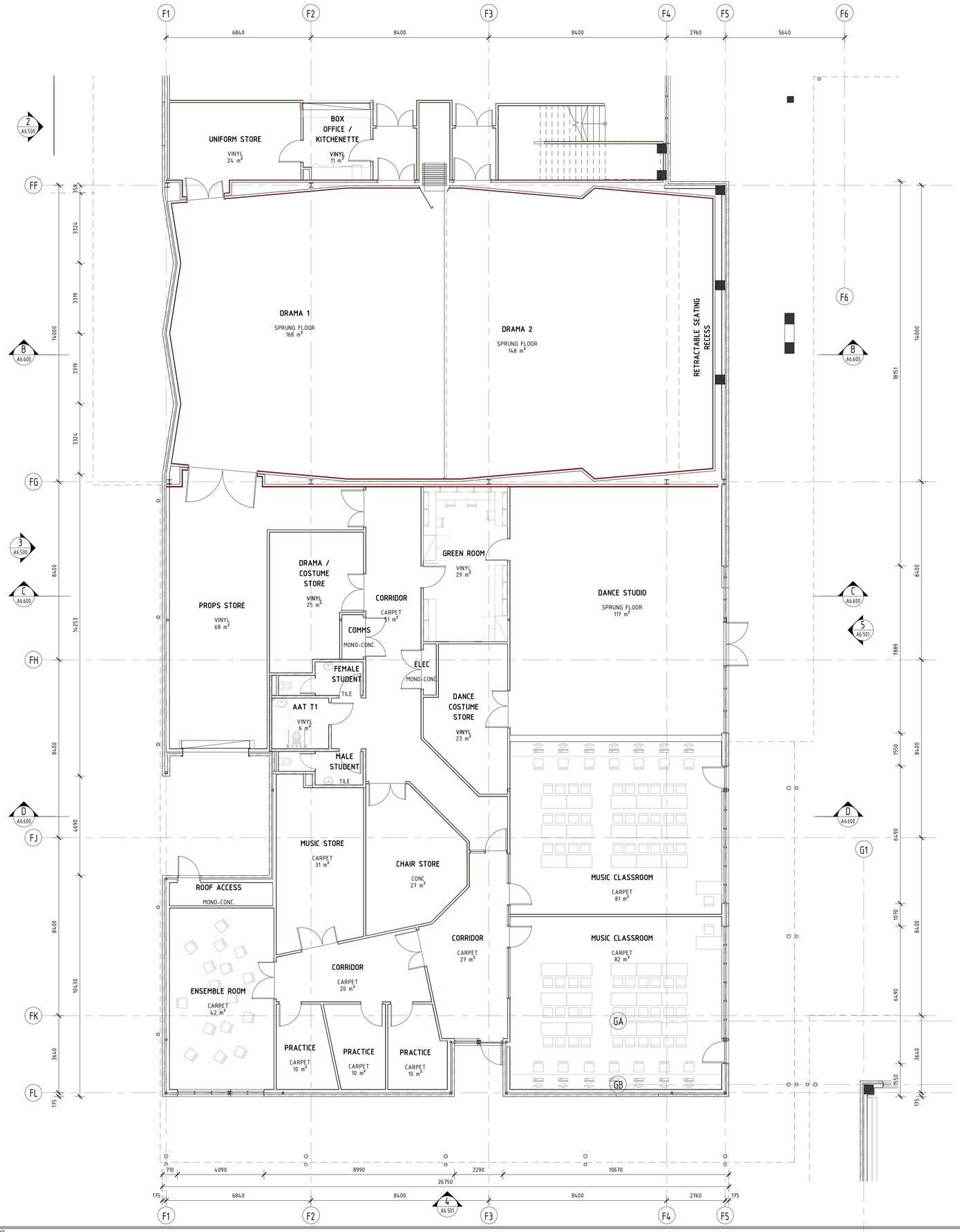

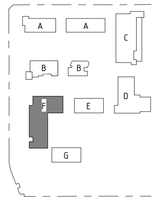

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
GROUND FLOOR PLAN PART 2

DRAWN	Author	DESIGNED	Designer
CHECKED	Checker	PRINCIPAL	
APPROVED	Approver		
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DF PROJ No.	15101	DF File No.	

REDUCTION 0

DRAWING No. A6.201 REV. E

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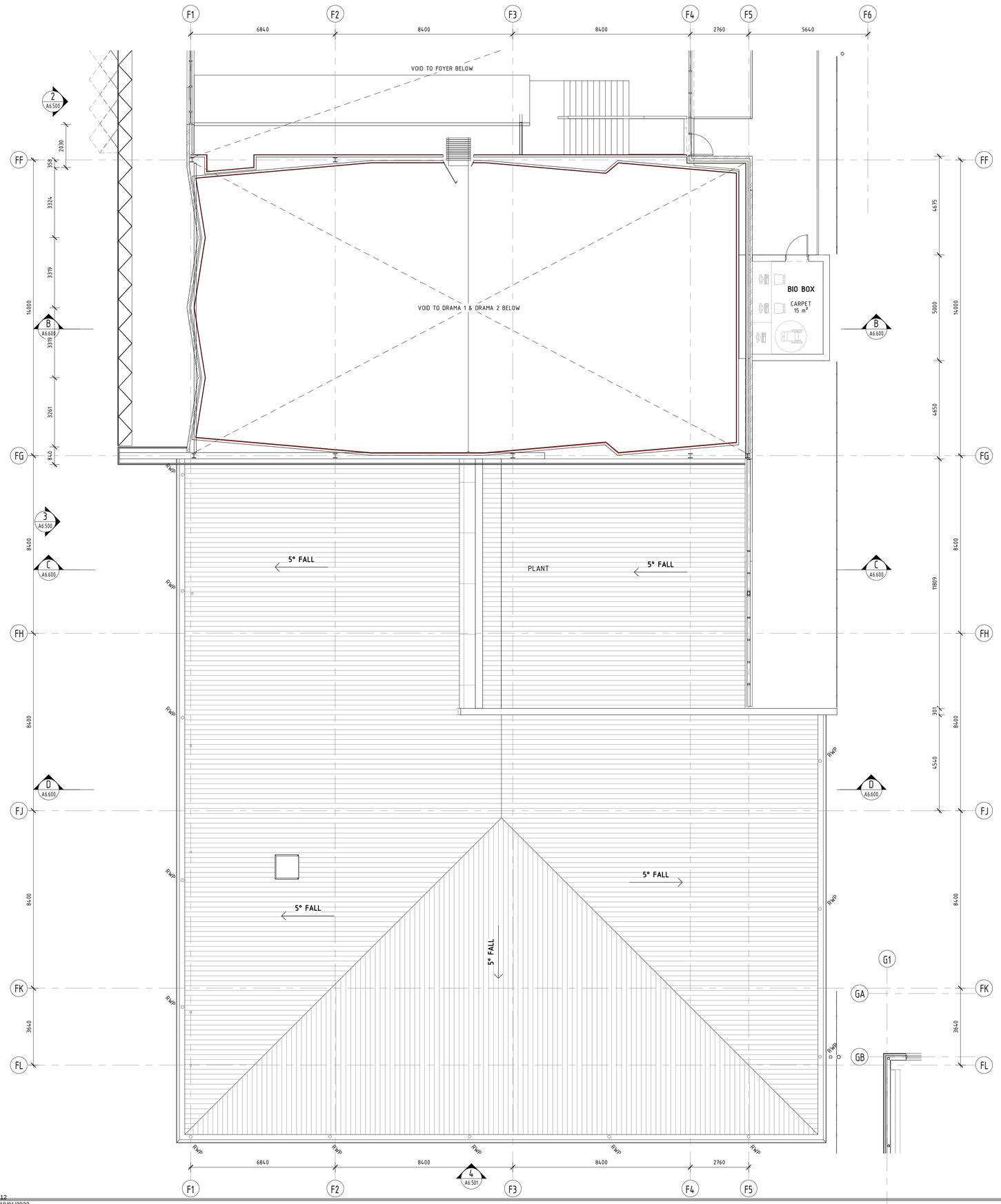

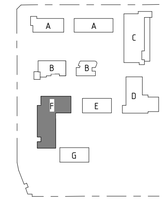

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F – ARTS LEARNING AREA
FIRST FLOOR PLAN PART 2

DRAWN Author	DESIGNED Designer	REDUCTION	
CHECKED Checker	PRINCIPAL	0	
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.211	REV. E
DF PROJ No. 15101	DF File No.		

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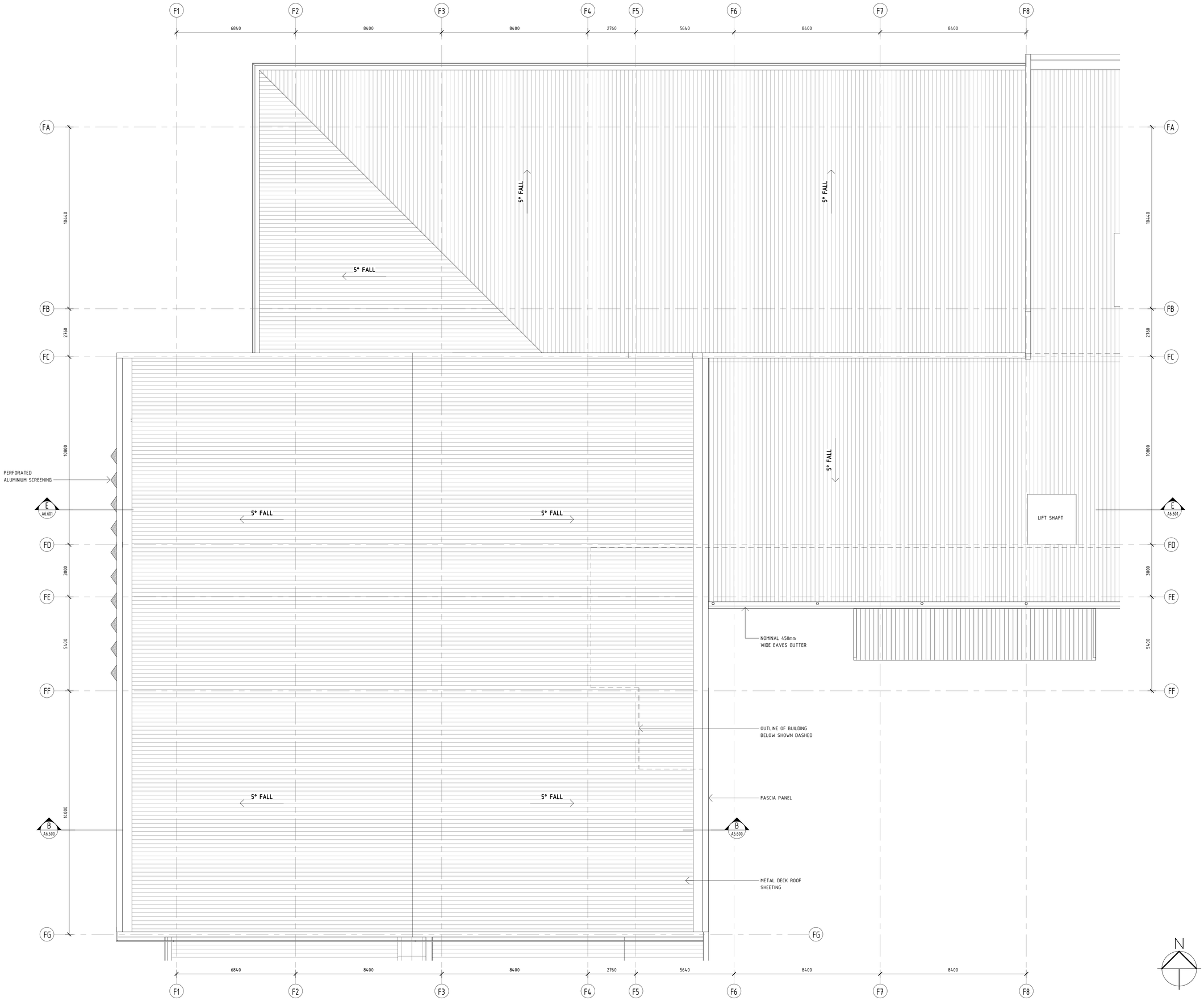

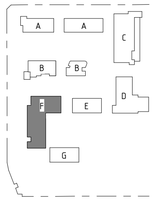

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
ROOF PLAN

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.220	REV. E
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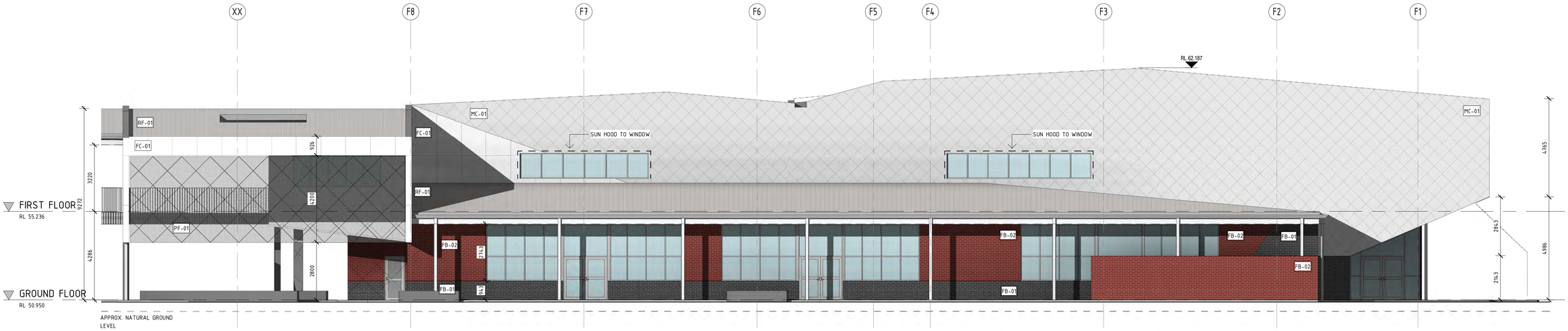
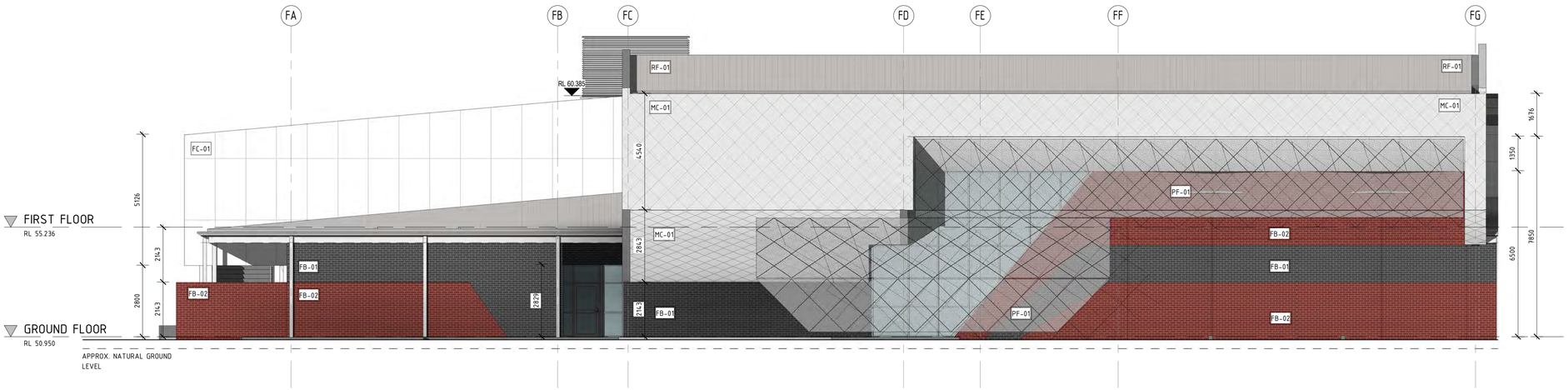


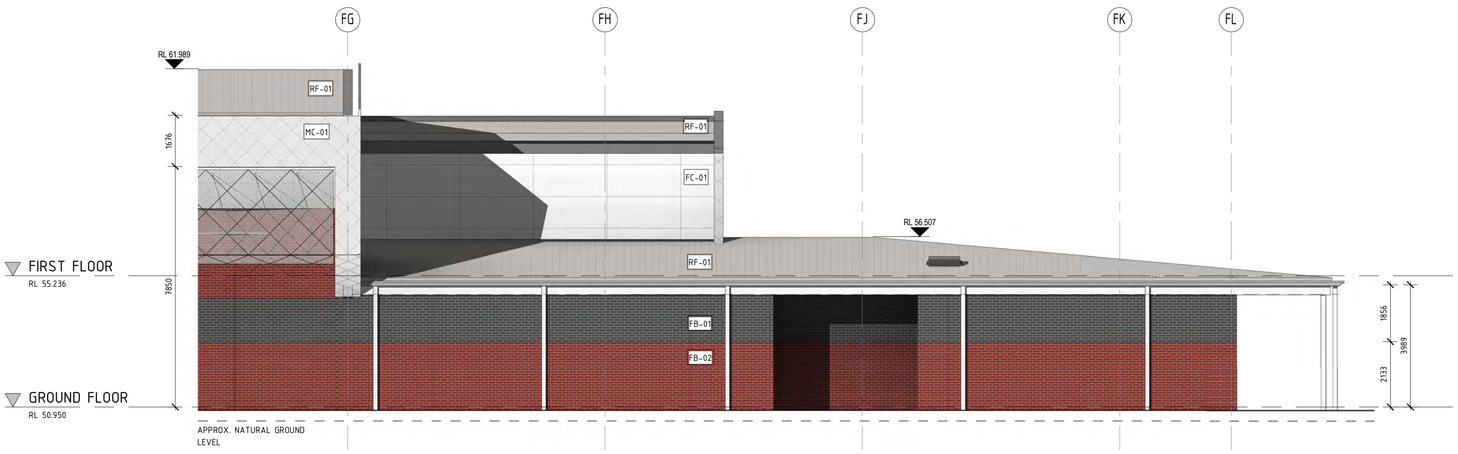
1 A6.200 BUILDING ELEVATION - BLOCK F - NORTH

1 : 100



2 A6.200 BUILDING ELEVATION - BLOCK F - WEST

1 : 100



3 A6.201 BUILDING ELEVATION - BLOCK F - WEST CONT'D

1 : 100

EXTERNAL ELEVATION FINISHES SCHEDULE	
MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK F - ARTS LEARNING AREA

BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.500	REV. E
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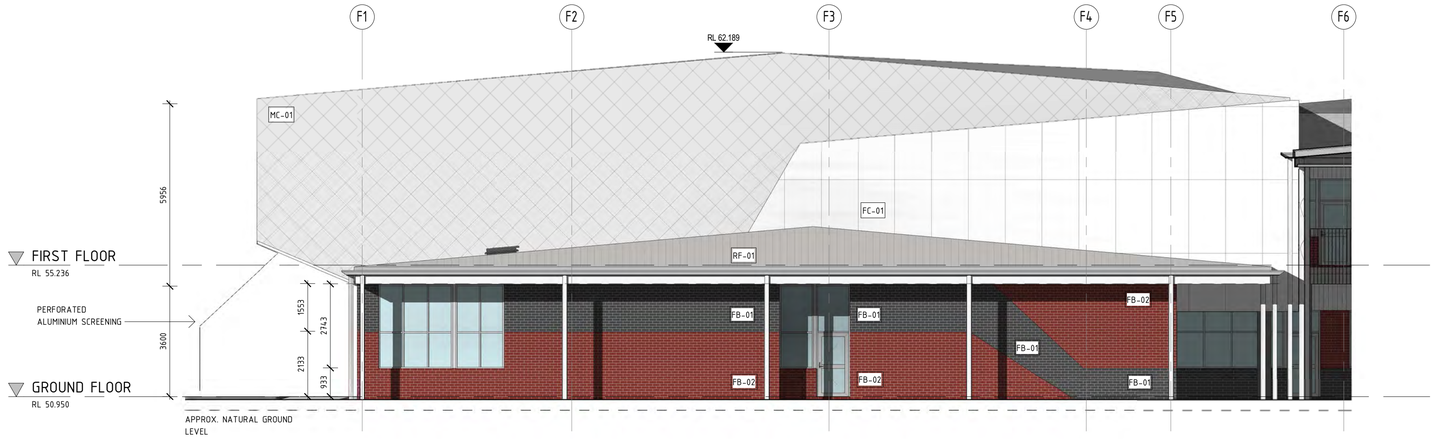
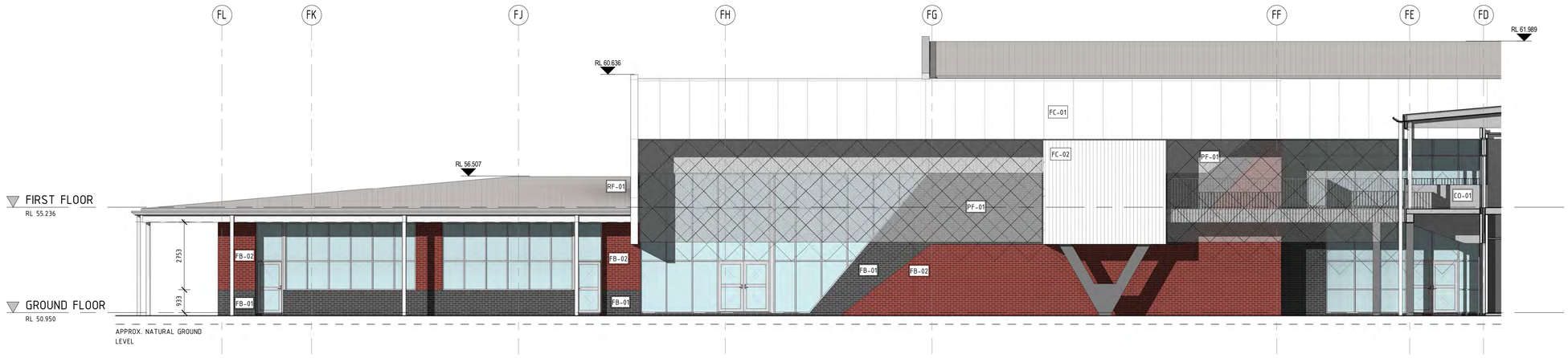
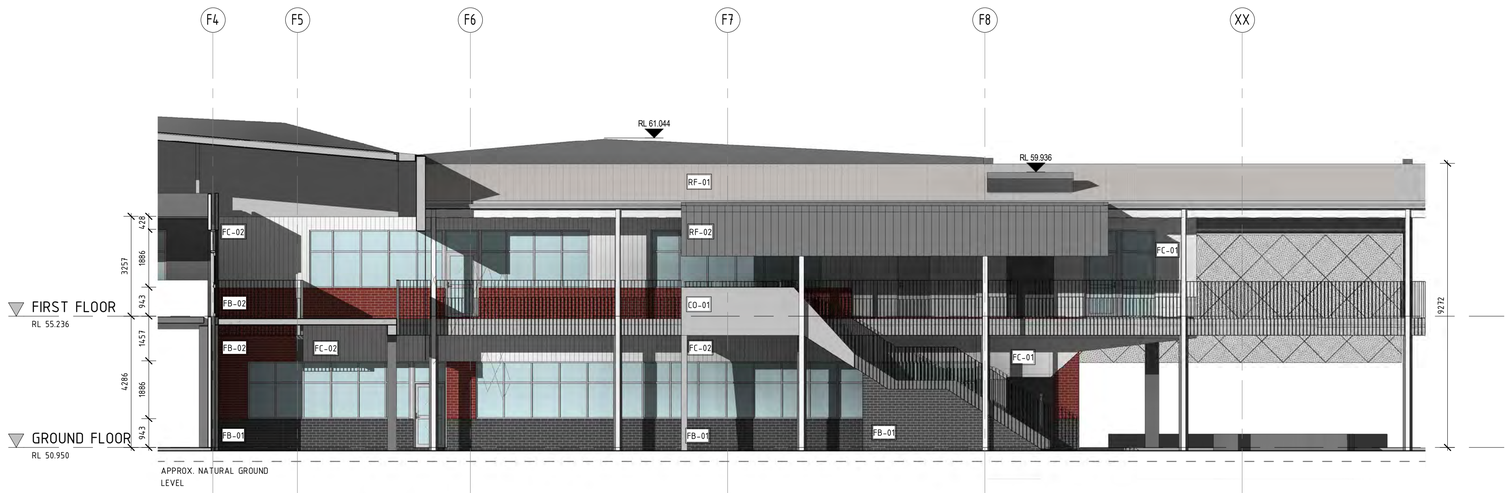


4 A6.201 BUILDING ELEVATION - BLOCK F - SOUTH A
1 : 100



5 A6.201 BUILDING ELEVATION - BLOCK F - EAST A
1 : 100



6 A6.200 BUILDING ELEVATION - BLOCK F - SOUTH B
1 : 100

EXTERNAL ELEVATION FINISHES SCHEDULE	
MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
FC-02	CFC WALL CLADDING - LINEAR GROOVED
MC-01	PREFINISHED ALUMINIUM SHINGLE CLADDING
PF-01	PERFORATED METAL
RF-01	PREFINISHED CONCEALED FIX PROFILED METAL ROOF SHEETING
RF-02	PREFINISHED STANDING SEAM METAL SHEETING

SPE	SIMILAR PRODUCT EQUIVALENT
	OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT'S REPRESENTATIVE

REV	DATE	DESCRIPTION	APP
E	19/10/21	ISSUED FOR DA	AE
D	12/10/21	ISSUED FOR INFORMATION	AE
C	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE
B	21/09/21	ISSUED FOR INFORMATION	AE
A	17/09/21	ISSUED TO QS	AE

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ARCHITECTURAL

ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
BUILDING ELEVATIONS

DRAWN	Author	DESIGNED	Designer
CHECKED	Checker	PRINCIPAL	
APPROVED	Approver		
SCALE	1 : 100 @ A1	DATE	19/10/21
DF PROJ No.	15101	DF File No.	

REDUCTION 0

DRAWING No. A6.501 REV. E

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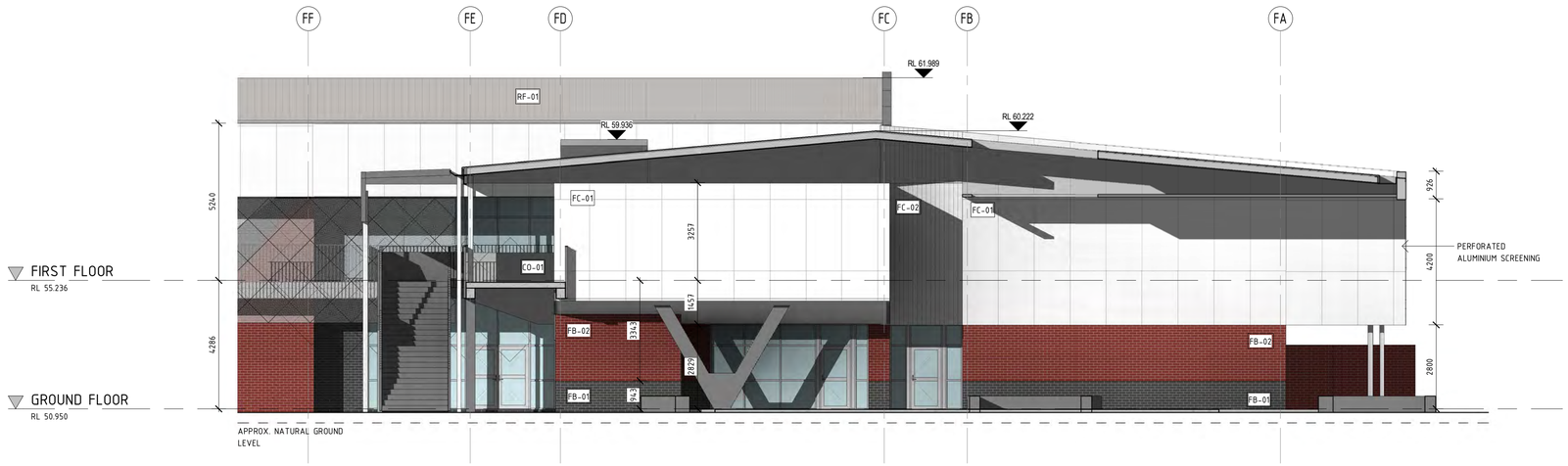

7 / A6.200 BUILDING ELEVATION - BLOCK F - EAST B

1 : 100

EXTERNAL ELEVATION FINISHES SCHEDULE	
MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
FC-02	CFC WALL CLADDING - LINEAR GROOVED
MC-01	PREFINISHED ALUMINUM SHINGLE CLADDING
PF-01	PERFORATED METAL
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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK F - ARTS LEARNING AREA

BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.502	REV. E
DF PROJ No. 15101	DF File No.		

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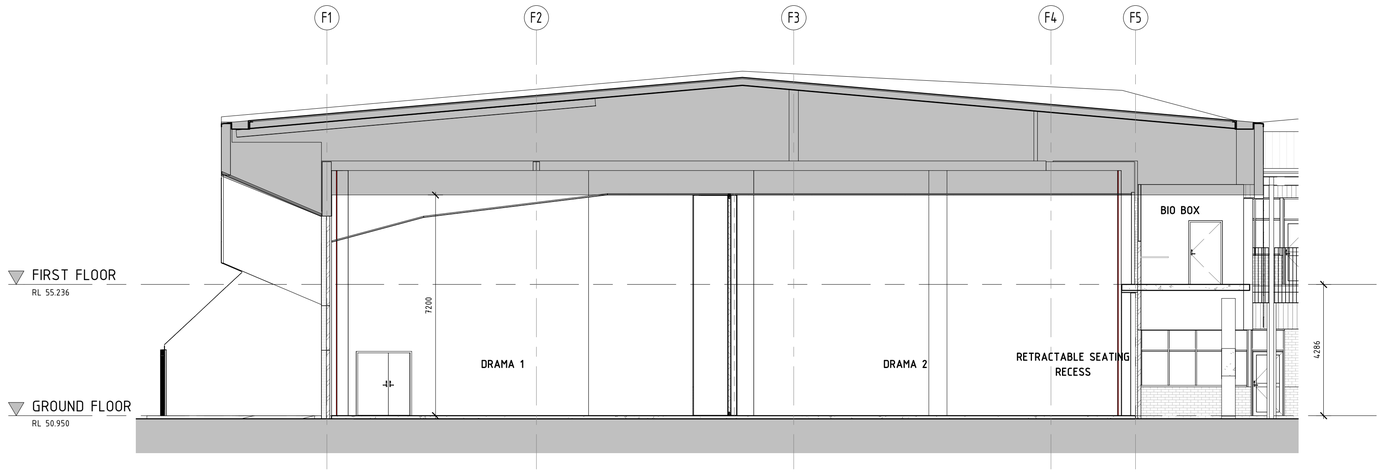
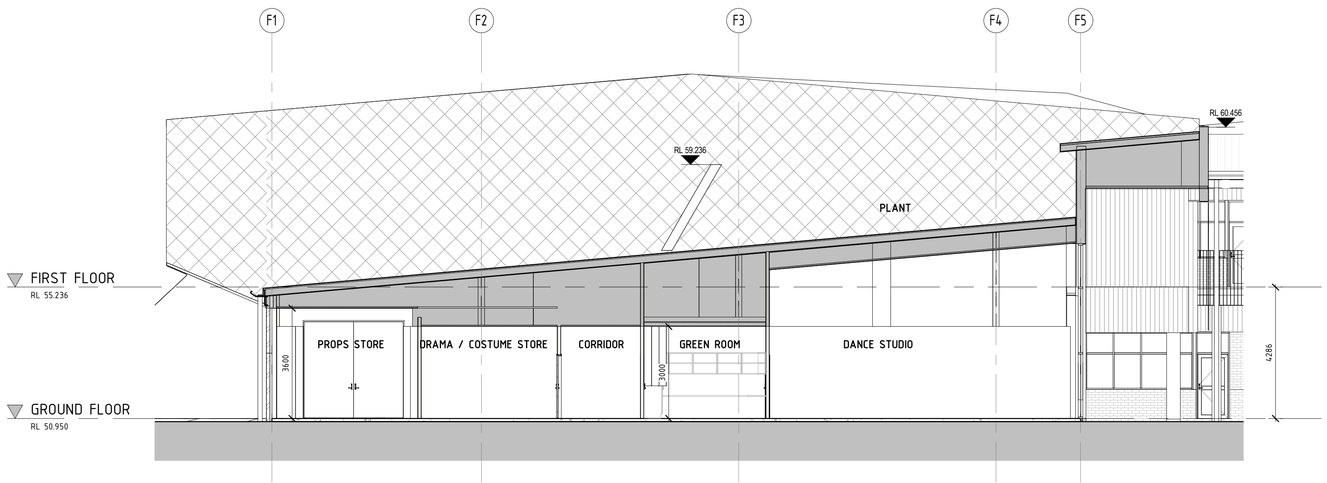
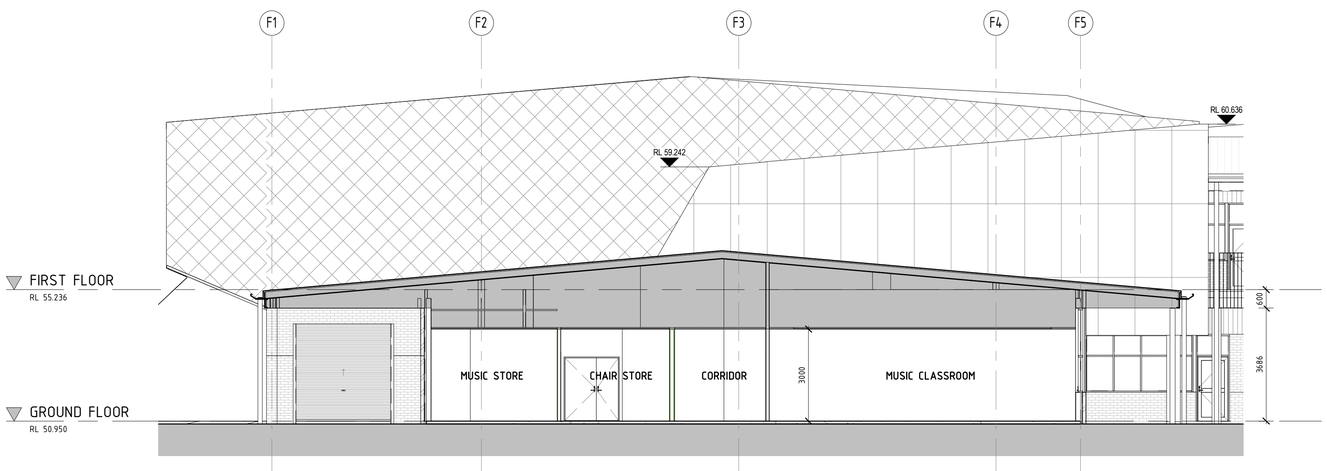


B A6.201 BUILDING SECTION B
1 : 100



C A6.201 BUILDING SECTION C
1 : 100



D A6.201 BUILDING SECTION D
1 : 100

SPE	SIMILAR PRODUCT EQUIVALENT
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ARCHITECTURAL

ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
BUILDING SECTIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.600	REV. E
DF PROJ No. 15101	DF File No.		

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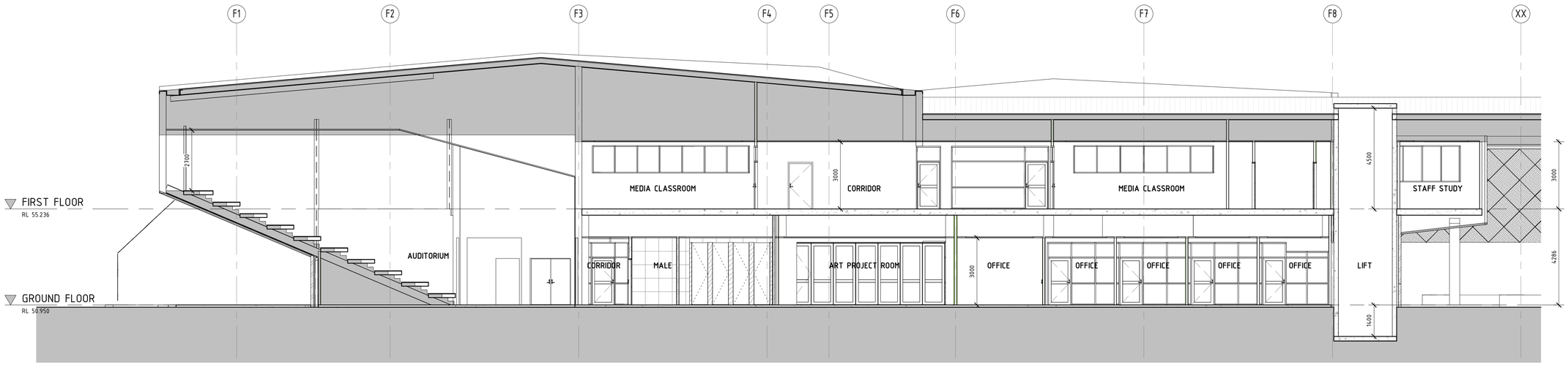

E A6.200 BUILDING SECTION E
1 : 100

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK F - ARTS LEARNING AREA
BUILDING SECTIONS

DRAWN AE	DESIGNED MK	REDUCTION 0	
CHECKED MK	PRINCIPAL		
APPROVED MK			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A6.601	REV. E
DF PROJ No. 15101	DF File No.		

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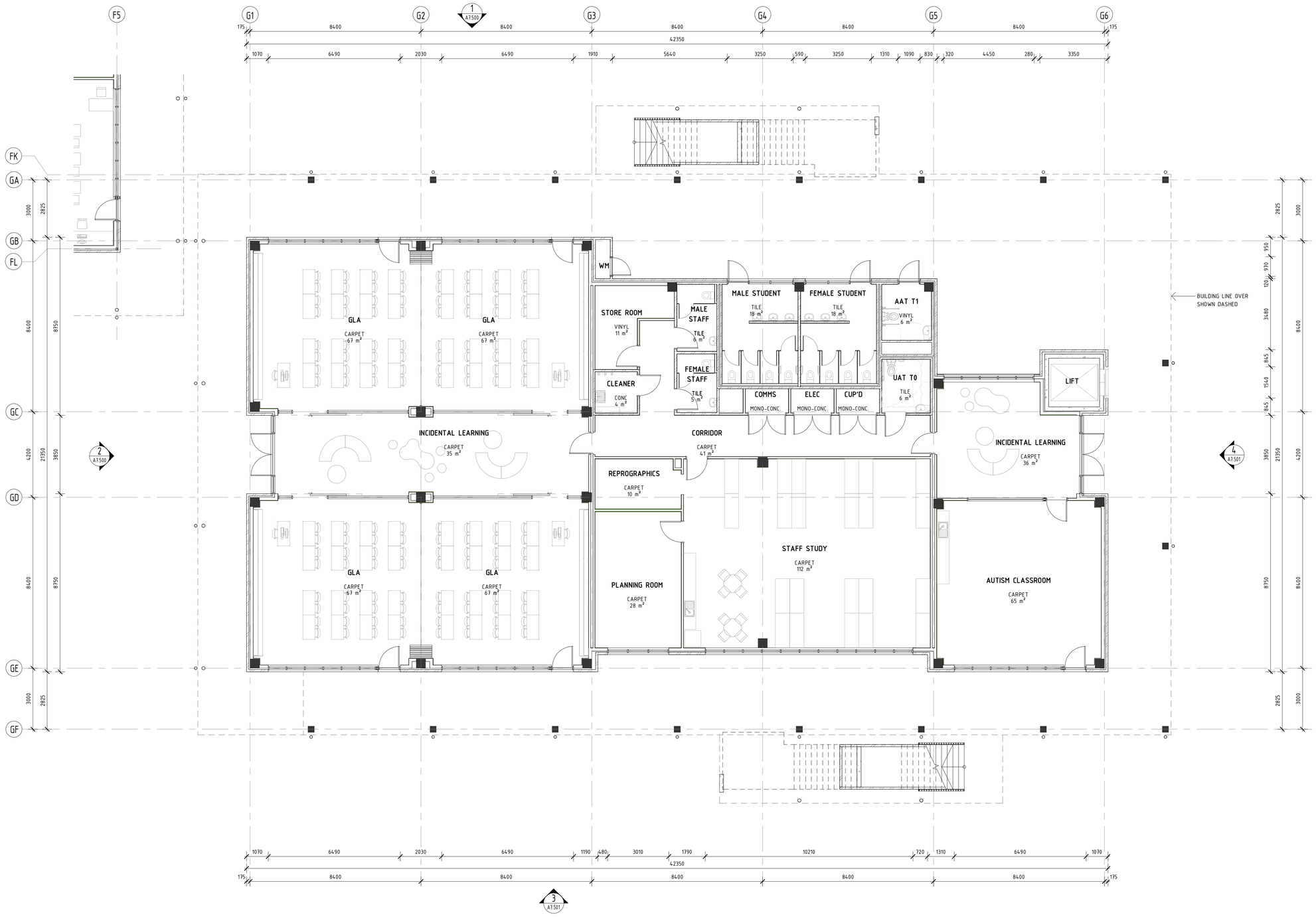

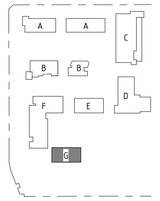

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK G - COMMUNITY 3
GROUND FLOOR PLAN

DRAWN	Author	DESIGNED	Designer
CHECKED	Checker	PRINCIPAL	
APPROVED	Approver		
SCALE	1 : 100 @ A1	DATE	19/10/21
DF PROJ No.	15101	DF File No.	

REDUCTION 0

DRAWING No. A7.200 REV. E

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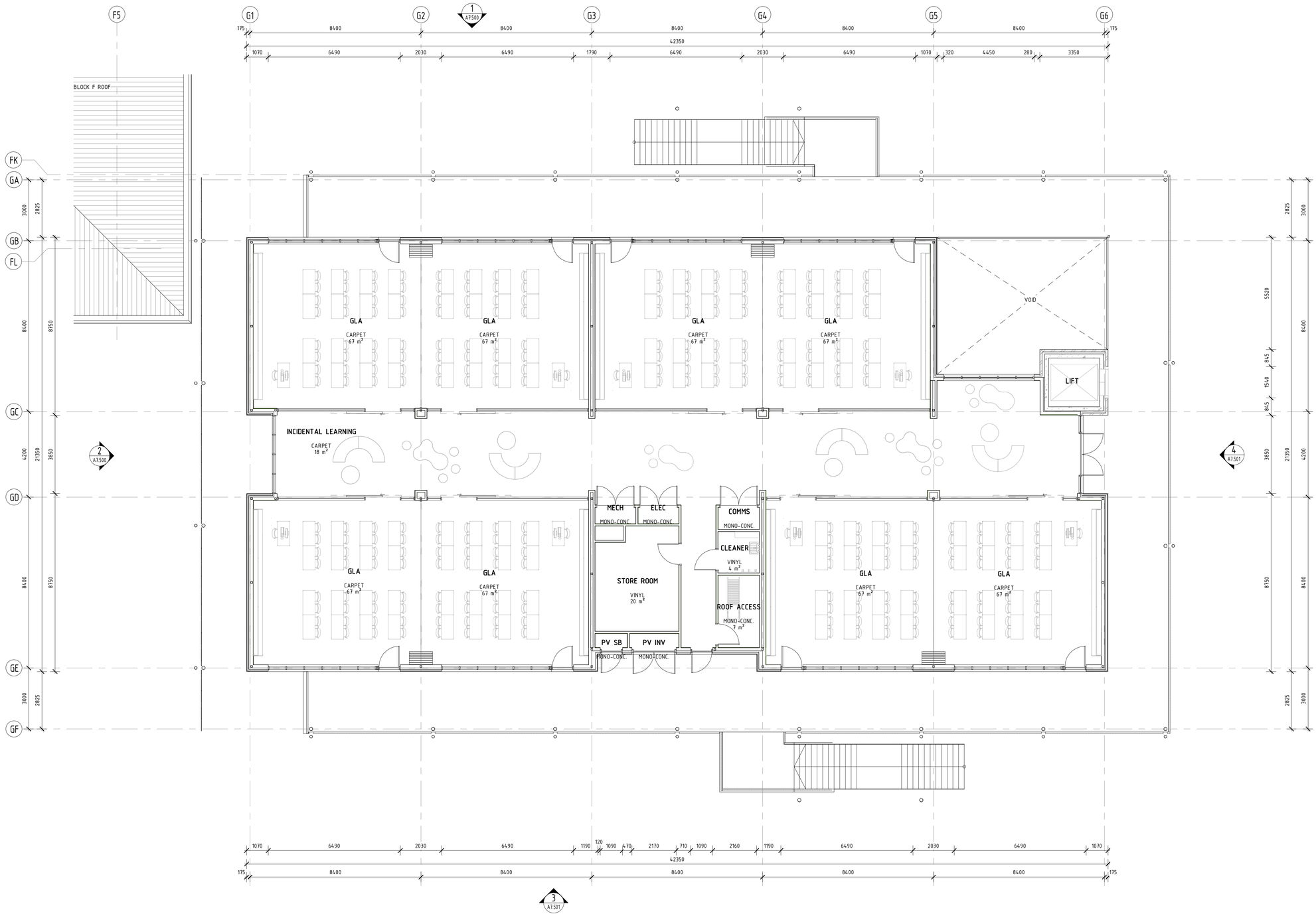

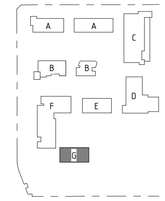

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK G - COMMUNITY 3
FIRST FLOOR PLAN

DRAWN Author	DESIGNED Designer	REDUCTION	
CHECKED Checker	PRINCIPAL	0	
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A7.210	REV. E
DF PROJ No. 15101	DF File No.		

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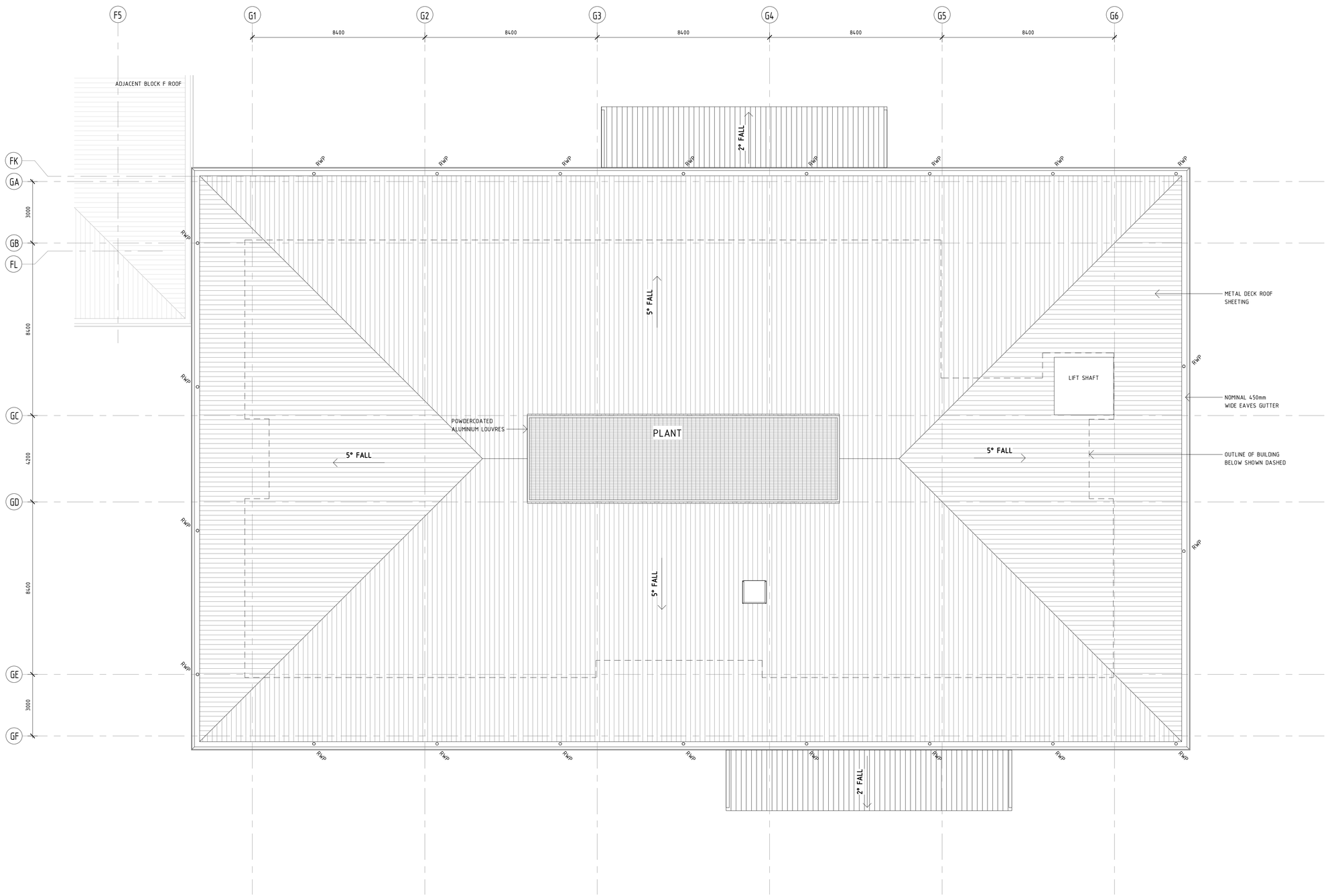

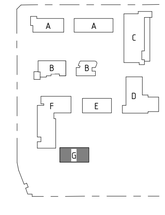

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK G - COMMUNITY 3

ROOF PLAN

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A7.220	REV. E
DF PROJ No. 15101	DF File No.		

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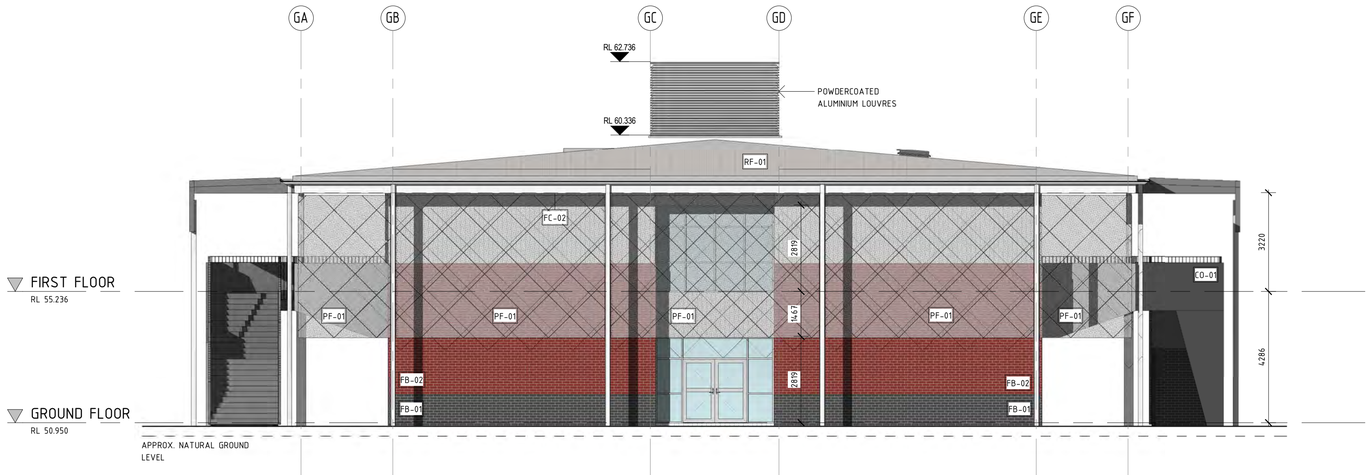
ALKC

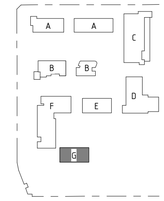
1 A6.211 BUILDING ELEVATION - BLOCK G - NORTH

1 : 100



2 A6.211 BUILDING ELEVATION - BLOCK G - WEST

1 : 100



EXTERNAL ELEVATION FINISHES SCHEDULE	
MARK	DESCRIPTION
CO-01	CLASS 2 FINISH CONCRETE
FB-01	FACE BRICK DARK COLOUR
FB-02	FACE BRICK RED COLOUR
FC-01	CFC WALL CLADDING - PREFINISHED
FC-02	CFC WALL CLADDING - LINEAR GROOVED
MC-01	PREFINISHED ALUMINIUM SHINGLE CLADDING
PF-01	PERFORATED METAL
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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS
BLOCK G - COMMUNITY 3
BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION	
CHECKED Checker	PRINCIPAL	0	
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A7.500	REV. E
DF PROJ No. 15101	DF File No.		

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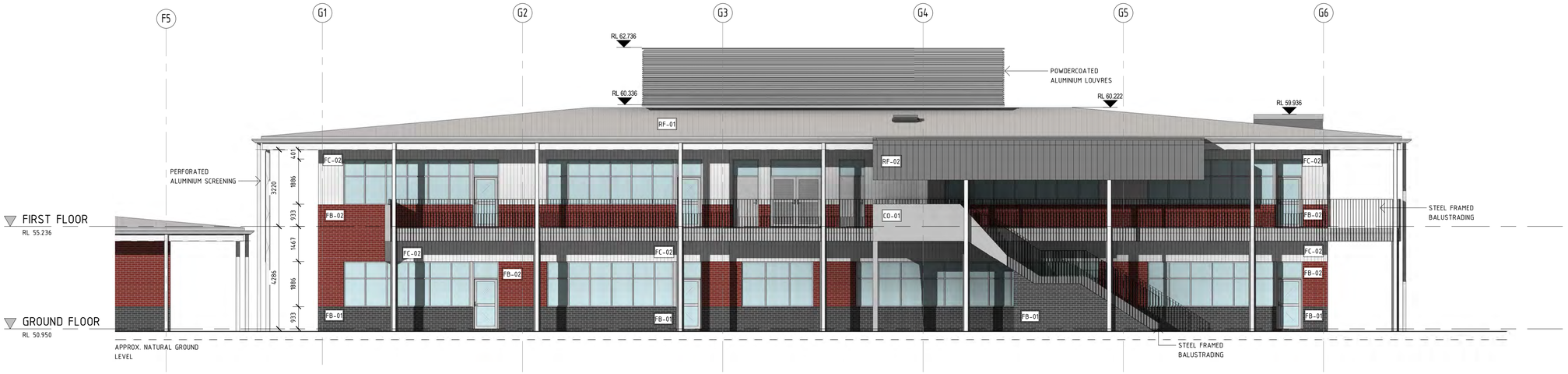
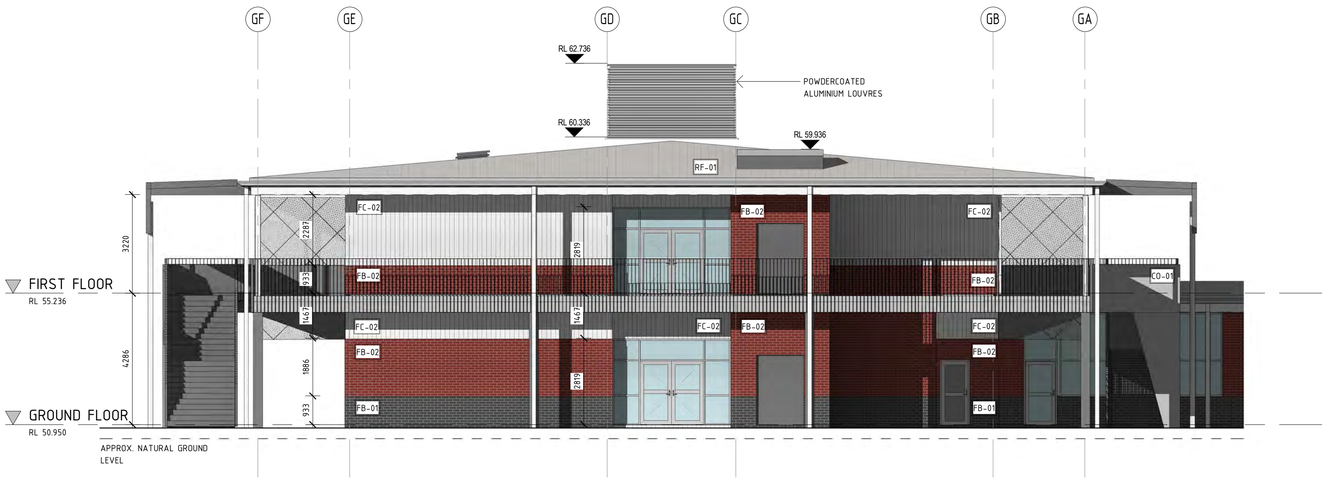


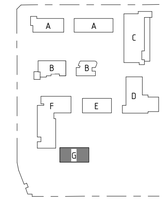
3 A7.200 BUILDING ELEVATION - BLOCK G - SOUTH

1 : 100



4 A7.200 BUILDING ELEVATION - BLOCK G - EAST

1 : 100



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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

BLOCK G - COMMUNITY 3

BUILDING ELEVATIONS

DRAWN Author	DESIGNED Designer	REDUCTION 0	
CHECKED Checker	PRINCIPAL		
APPROVED Approver			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. A7.501	REV. E
DF PROJ No. 15101	DF File No.		

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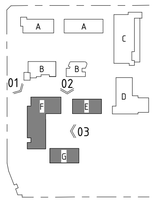

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ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

PERSPECTIVE VIEW 01

DRAWN KS	DESIGNED MK	REDUCTION 0
CHECKED MK	PRINCIPAL	
APPROVED MK		
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. SD.001 REV. B
DF PROJ No. 15101	DF File No.	

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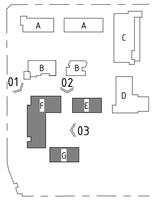

REV	DATE	DESCRIPTION	APP
B	19/10/21	ISSUED FOR DA	AE
A	01/10/21	ISSUED FOR SCHEMATIC DESIGN	AE

PRELIMINARY

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architects

L3, 679 Murray Street, West Perth, WA
P.O. Box 830, West Perth 679, (08) 9423 0000
reception@tz.com.au www.tz.com.au

Government of Western Australia
Department of Finance
Buildings and Contracts

ARCHITECTURAL

ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

PERSPECTIVE VIEW 02

DRAWN KS	DESIGNED MK	REDUCTION 0
CHECKED MK	PRINCIPAL	
APPROVED MK		
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. SD.002 REV. B
DF PROJ No. 15101	DF File No.	

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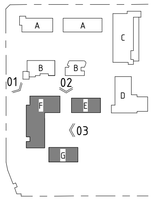

REV	DATE	DESCRIPTION	APP
B	19/10/21	ISSUED FOR DA	AE
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PRELIMINARY

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ARCHITECTURAL

ALKIMOS COLLEGE STAGE 2

#101 SANTORINI PROMENADE, ALKIMOS

PERSPECTIVE VIEW 03

DRAWN KS	DESIGNED MK	REDUCTION	
CHECKED MK	PRINCIPAL	0	
APPROVED MK			
SCALE 1 : 100 @ A1	DATE 19/10/21	DRAWING No. SD.003	REV. B
DF PROJ No. 15101	DF File No.		

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TZ JOB NO: 422001
ACS2

Department of **Planning, Lands and Heritage**

GOVERNMENT OF WESTERN AUSTRALIA

Legend

- [ ] Cadastre (View 1)

InQuiry Map

DPLH BUSINESS USE ONLY

Internal Spatial Viewer

N

0 0.10 0.19 Kilometres

1: 4,514

at A4

Projection: WGS 1984 Web Mercator Auxiliary Sphere

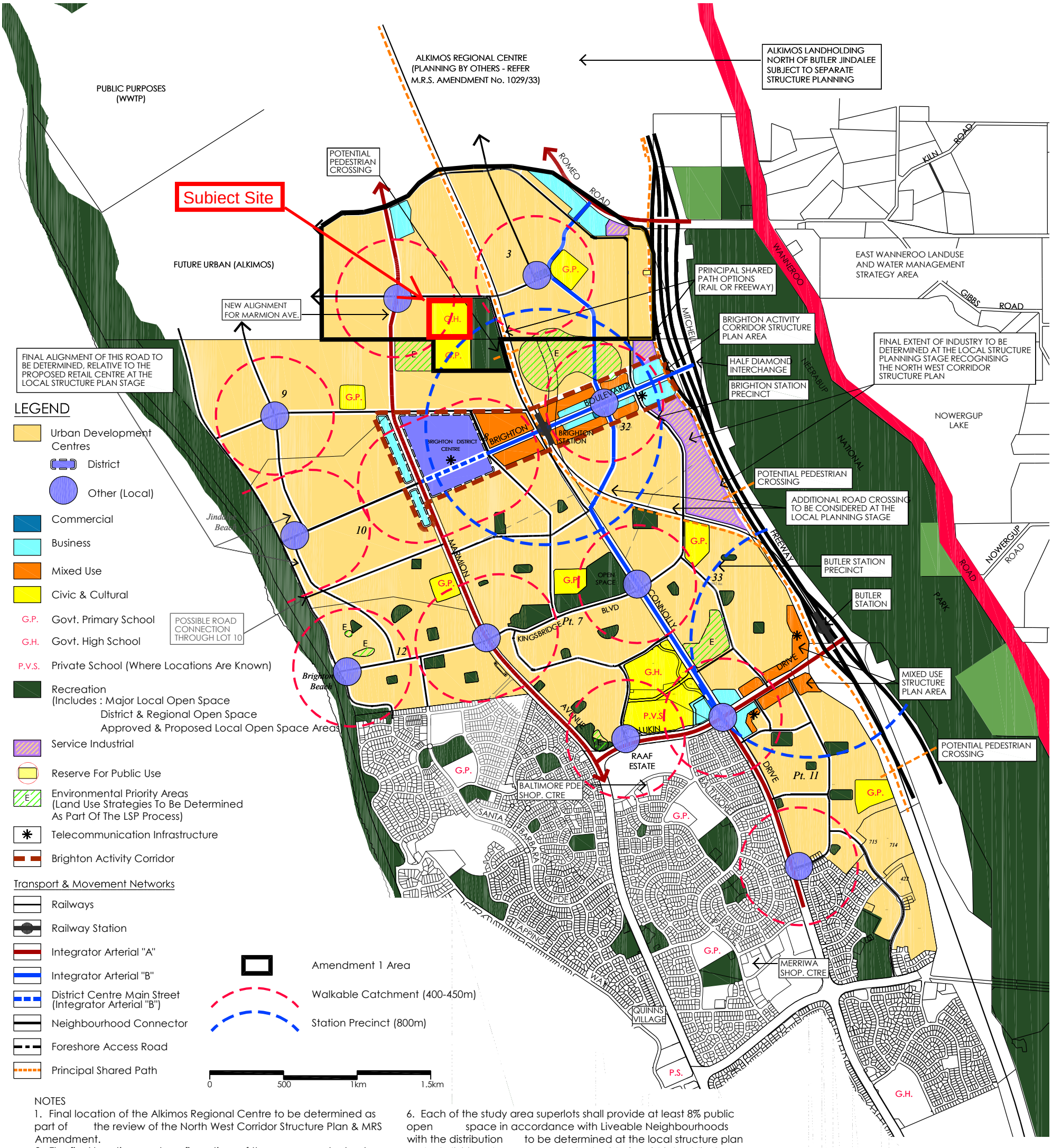
Notes:

* The data that appears on the map may be out of date, not intended to be used at the scale displayed, or subject to license agreements. The map should only be used in matters related to Department of Planning, Lands and Heritage business.

* This map is not intended for measurement purposes.

Map was produced using DPLH's InQuiry.

Date produced: 14-Dec-2021



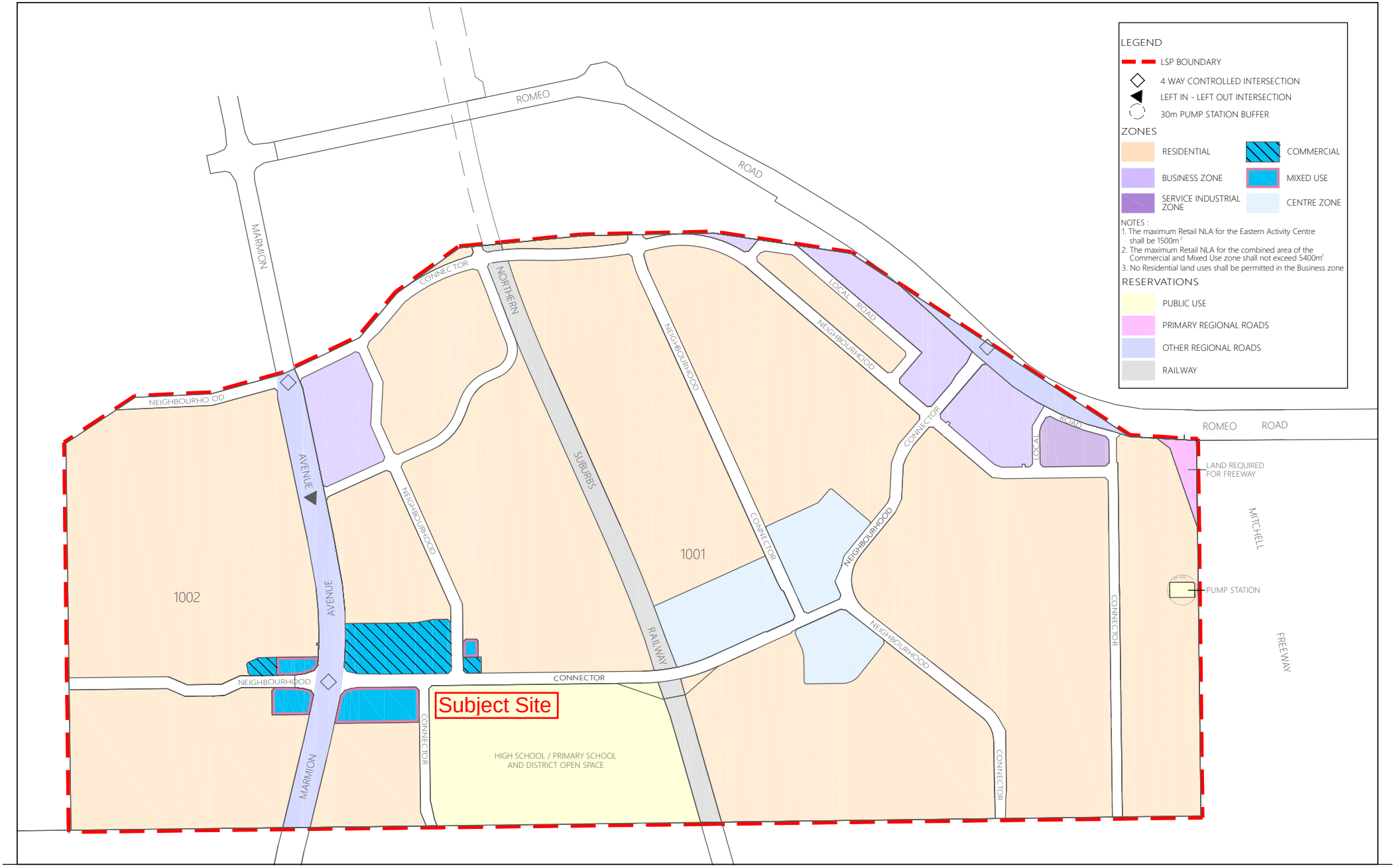
NOTES

1. Final location of the Alkimos Regional Centre to be determined as part of the review of the North West Corridor Structure Plan & MRS Amendment.
2. The final locations and configurations of the government schools depicted on this Structure Plan will occur at the local structure planning stage through landowner consultation with the Department of Education and Training and the Department for Planning & Infrastructure. Locations depicted are notional and approximate to reflect catchment requirements.
3. Further study will be required to identify appropriate pedestrian/cycle crossing locations once final levels along the rail are known.
4. All Centre retail floorspace allocations to be determined through reference to the Metropolitan Centres Policy, the City Of Wanneroo Retail Strategy and the Shrapnel Urban Planning Retail Assessment included within the District Structure Plan report.
5. Concerning public open space this Structure Plan depicts;
   - Regional Open Space
   - The nominated District Open Space site
   - Major local open space areas
   - Other local open spaces either approved or proposed as part
6. Each of the study area superlots shall provide at least 8% public open space in accordance with Liveable Neighbourhoods with the distribution to be determined at the local structure plan and subdivision phases. Land set aside for District Public Open Space will count towards the 8% requirement.
7. The Structure Plan nominates a Brighton Activity Corridor, extending from the Mitchell Freeway to Marmion Avenue, encompassing the Station and District Centre Precinct. This area will require a separate amendment to the Butler Ridgewood local structure plan which pursues an adaptable and flexible urban framework to facilitate higher residential densities and mixed use development once the railway and other major transit infrastructure is in place.
8. The structure plan nominates a Mixed Use Area extending from the future Butler Station, along Lukin Drive to Connolly Drive. This area will require a separate amendment to the Butler Ridgewood local structure plan to establish the extent of mixed use development, residential densities and built form provisions to ensure appropriate development in close proximity to the station.

THE ORIGINAL BJDSP WAS PREPARED BY CHAPPELL & LAMBERT (2005)
THIS BASE PLAN HAS BEEN PROVIDED BY CLE TOWN PLANNING & DESIGN AND HAS BEEN MODIFIED BY GRAY & LEWIS LANDUSE PLANNERS TO ILLUSTRATE AMENDMENT 1

PLAN 1

22nd January 2016



AGREED LOCAL STRUCTURE PLAN 60

PLAN 3 - ZONING PLAN

N

0 400m

SCALE 1:10 000 @ A3

5th APRIL 2017

GRAY & LEWIS
LAND USE PLANNERS

Suite 5, 2 Hardy Street
South Perth, WA 6151
T (08) 9474 1722
F (08) 9474 1172
perth@graylewis.com.au

Lot 9153 Orsino Boulevard, North Coogee – Mixed Use (Shop and Multiple Dwellings)

Form 1 – Responsible Authority Report
(Regulation 12)

DAP Name:	Metro Outer JDAP	
Local Government Area:	City of Cockburn	
Applicant:	MW Urban	
Owner:	Port Catherine Developments Pty Ltd	
Value of Development:	$8 million ☐ Mandatory (Regulation 5) ☒ Opt In (Regulation 6)	
Responsible Authority:	City of Cockburn	
Authorising Officer:	David King	
LG Reference:	DAP21/009	
DAP File No:	DAP/21/02123	
Application Received Date:	28 October 2021	
Report Due Date:	16 December 2021	
Application Statutory Process Timeframe:	60 Days	
Attachment(s):	1. Development Plans; 2. Plan of Subdivison; 3. Location Plan; 4. Design Review Panel Minutes; 5. Traffic Impact Statement; 6. Landscape Plan; 7. Waste Management Plan; 8. Acoutsic Report; 9. Wind Assessment	
Is the Responsible Authority Recommendation the same as the Officer Recommendation?	☒ Yes ☐ N/A	Complete Responsible Authority Recommendation section
	☐ No	Complete Responsible Authority and Officer Recommendation sections

Responsible Authority Recommendation

That the Metro Outer JDAP resolves to:

1. **Accept** that the DAP Application reference DAP/21/02123 is appropriate for consideration as a "Multiple Dwellings and Shop" land use and compatible with the objectives of the zoning table in accordance with the City of Cockburn Town Planning Scheme No. 3.

2. **Approve** DAP Application reference DAP/21/02123 and accompanying plans in accordance with Clause 68 of Schedule 2 (Deemed Provisions) of the *Planning and Development (Local Planning Schemes) Regulations 2015*, and the provisions of the City of Cockburn Town Planning Scheme No. 3, subject to the following conditions:

Conditions

1. Pursuant to clause 26 of the Metropolitan Region Scheme, this approval is deemed to be an approval under clause 24(1) of the Metropolitan Region Scheme.

2. This decision constitutes planning approval only and is valid for a period of Four (4) years from the date of approval. If the subject development is not substantially commenced within the specified period, the approval shall lapse and be of no further effect.

3. **Prior to the issue of a Building Permit application**, the landowner/applicant contributing towards development infrastructure provisions pursuant to the City's Town Planning Scheme No. 3, to the City's satisfaction.

4. **Prior to the lodgement of a Building Permit application**, a schedule of the materials, finishes and colours shall be submitted to and approved by the City. The schedule shall include details of the type of materials proposed to be used, including their colour and texture. The development shall thereafter be maintained in accordance with the approved materials schedule.

5. The Retail tenancy on the ground floor of Calypso Parade is approved for the following uses;

   a. Shop;
   b. Office;
   c. Bank;

6. **Prior to the lodgement of a Building Permit**, the owner/applicant shall:
   - submit to the City for approval a preliminary proposal for an art work designed be a professional artist at a cost of 1% of the total project cost (to a maximum of $250,000), to be to be located within the subject site as an integral part of the development;
   - submit to the City for approval an 'Application for Art Work Design';
   - enter into a contract with a professional artist/s to design and install (if appropriate) the art work approved by the City.

   The art work shall then be installed prior to occupation of the building/development and maintained thereafter to the satisfaction of the City.

7. **Prior to the lodgement of a Building Permit Application**, a stormwater management plan is to be provided to the City's satisfaction.

8. A minimum of 14 bicycle stands/racks that conform to Australian Standard 2890.3 shall be provided in close proximity to the entrance of the building prior to occupation of the building. Details of the bicycle parking shall be provided prior to the lodgement of a Building Permit Application.

9. **Prior to the occupation of the development**, all vehicle parking, access ways, footpaths and external lighting shall be constructed and maintained in accordance with the Australian Standards AS2890 in the form and layout depicted on the approved plans to the satisfaction of the City.

10. **Prior to the occupation of the development**, the internal traffic control devices as noted in the Cardno Traffic Impact Statement 'Proposed Mixed-Use Development – Lot 203 Orsino Boulevard, Port Coogee (For Development Application) CW1178600' dated 21 October 2021 shall be designed and installed prior to occupancy.

11. **Prior to the lodgement of a Building Permit application**, a revised landscaping plan shall be submitted to and approved by the City.

12. Landscaping including verge planting shall be installed, reticulated and/or irrigated in accordance with the/an approved plan and maintained thereafter to the satisfaction of the City. The landscaping shall be implemented during the first available planting season post completion of development, to the satisfaction of the City.

13. **Prior to the lodgement of a Building Permit application**, a construction management plan (CMP) shall be submitted to and approved by the City. The CMP shall be implemented to the satisfaction of the City.

14. The provisions identified in the Waste Management Plan provided by Cardno dated 21 October 2021 under project number CW1186100, which include recycling measures and management of commercial and residential waste, are to be implemented and maintained thereafter to the satisfaction of the City.

15. All noise attenuation measures, identified by the Lloyd George Acoustics Report "Development Application: Acoustics Lot 203 Orsino Boulevard, Port Coogee" (Ref 21086563-01_Rev3; dated 21 October 2021) and the further acoustic report required under Condition 16, are to be implemented prior to occupancy of the development and the requirements of the Acoustic Report are to be observed at all times.

16. **Prior to the lodgement of a Building Permit application**, a further Acoustic Report shall be submitted to and approved by the City, and implemented thereafter, to the satisfaction of the City.

17. **Prior to the lodgement of a Building Permit application**, written confirmation from the builder that all recommendations made in the Acoustic Report required under Condition 16 have been incorporated into the development plans, shall be submitted to the City.

18. **Prior to occupation of the development**, written confirmation from the builder shall be provided that the requirements of the Acoustic Report referred to in Condition 16 have been incorporated into the completed development with the Form BA7 Completion Form.

19. All mechanical plant and related hardware must be screened from view of adjoining properties and the primary and secondary street frontages. The details in respect of which are to be provided to the City's satisfaction prior to lodgement of a Building Permit Application. The location of plant and equipment must also minimise the impact of noise on future occupants of the development and adjoining residents.

20. Any signage associated with the Retail tenancy shall maintain a 2.5m clearance from the finished floor level of the footpath

Advice Notes

a. This is a Planning Approval only and does not remove the responsibility of the applicant/owner to comply with all relevant building, health and engineering requirements of the City, or with any requirements of the City of Cockburn Town Planning Scheme No. 3 or with the requirements of any external agency.

b. The development site must be connected to the reticulated sewerage system of the Water Corporation before commencement of any use.

c. All toilets, ensuites and kitchen facilities in the development are to be provided with mechanical ventilation flued to the outside air, in accordance with the requirements of the National Construction Code (Building Code of Australia), the Sewerage (Lighting, Ventilation and Construction) Regulations 1971, Australian Standard S1668.2-1991 "The use of mechanical ventilation for acceptable indoor air quality" and the City of Cockburn Health Local Laws 2000. The City's Health Service further recommends that laundries without external windows and doors should be ventilated to external air and condensating clothes dryers installed.

d. With regard to Condition 11, the revised landscaping plan is requested to detail species selection along Calypso Parade as recommended under the Wind Assessment report.

e. With regard to Condition 16, the acoustic report shall be prepared by a suitably qualified and recognised acoustic consultant and demonstrate that the design and location of plant, including air conditioning, mechanical exhaust, and other sources of noise within the development will not exceed the assigned noise levels set out in the *Environmental Protection (Noise) Regulations 1997* (as amended).

f. The development shall comply with the noise pollution provisions of the *Environmental Protection Act 1986*, and more particularly with the requirements of the *Environmental Protection (Noise) Regulations 1997*. The installation of equipment within the development including air-conditioners, spas, pools and similar equipment shall not result in noise emissions to neighbouring properties exceeding those imposed by the *Environmental Protection (Noise) Regulations 1997* (as amended).

g. With regard to Condition 19, the screening of mechanical and plant equipment does not apply to solar panels.

h. The Construction Management Plan (CMP) shall be in accordance with the City's CMP guidelines accessed on the City's Website and shall address the following items:

    a. Access to and from the site;
    b. Delivery of materials and equipment to the site;
    c. Storage of materials and equipment on the site;
    d. Parking arrangements for contractors and subcontractors;
    e. Management of construction waste;
    f. Protection of existing verge trees; and
    g. Other matters likely to impact on the surrounding properties.

i. As part of transitioning Australia to the **National Broadband Network (NBN)**, developers are encouraged to engage early with **NBN**, at least six months before the required service date, to understand requirements around future connections and the timing of infrastructure provision. This will ensure a connection is ready when residents move in. For more information please refer to https://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments or contact **NBN** on newdevelopments@nbnco.com.au or 1800 687 626.

j. A plan and description of any signage and advertising not exempt under Town Planning Scheme No. 3 shall be submitted to and approved by the City prior to the erection of any signage on the site/building. It is strongly advised to liaise with the City's Planning Services prior to any installation of signage to confirm what approvals, if any, are required.

k. All outdoor lighting shall be installed and maintained in accordance with Australian Standard AS 4282 - 1997 "*Control of the Obtrusive Effects of Outdoor Lighting*".

Reasons for Officer Recommendation

The Officers recommendation is to support the proposal which is generally consistent with the anticipated built form of the locality and the applicable planning framework.

Details: outline of development application

Region Scheme	Perth Metropolitan Region Scheme
Region Scheme - Zone/Reserve	Urban
Local Planning Scheme	City of Cockburn Town Planning Scheme No. 3
Local Planning Scheme - Zone/Reserve	Development zone
Structure Plan/Precinct Plan	Port Coogee – Revised Local Structure Plan
Structure Plan/Precinct Plan - Land Use Designation	Marina Village (Local Centre)
Use Class and permissibility:	Multiple Dwellings – 'P'; Shop – 'P'
Lot Size:	7.1962ha (1,166m^2 developable area)
Existing Land Use:	Vacant Land
State Heritage Register	N/A
Local Heritage	N/A
Design Review	Yes – City of Cockburn Design Review Panel
Bushfire Prone Area	No
Swan River Trust Area	No

Proposal:

Proposed Land Use	Shop and Multiple Dwellings – Permitted uses
Proposed Net Lettable Area	133m^2
Proposed No. Storeys	Five (5)
Proposed No. Dwellings	21 dwellings

The application (see **Attachment 1 – Development Plans**) proposes one (1) Mixed Use five (5) storey building, with the following details:

- 21 Multiple Dwellings
    - Three (3) - One bedroom/One bathroom two storey dwellings;
    - Nine (9) – Two bedroom/One-bathroom dwellings;
    - Eight (8) – Two bedroom/Two-bathroom dwellings;
    - One (1) – Three bedroom/Two-bathroom two storey dwelling.
- Bicycle store – 14 bays;
- 37 car parking bays
    - 17 ground floor;
        - 2 Electric vehicle charging station bays;
        - 2 retail bays;
        - 2 residential visitor bays
    - 20 first floor bays;
        - 8 bays being tandem (associated with the same apartment);
        - Apartment 19 – small car bay.
- Bin stores
    - Commercial bin store of 6m^2;
    - Residential bin store of 22m^2
- One Retail tenancy of 133m^2;
- Foyer;
- Communal work/Lounge space of 36m^2;
- Communal outdoor space;
- Landscaping.

Background:

The development site is currently part of a larger balance lot which forms the Port Coogee peninsula and breakwater. There have been multiple subdivision applications over the site, the most recent being WAPC 160542 which approved the creation of the subject lot, surrounding road reserve (laneways) and remaining lots, as well as the balance lot for the remainder of the Peninsula (see **Attachment 2 – Plan of Subdivision**).

The recently approved lot, Lot 3 on Attachment 2, is 1,166m^2 and currently vacant with temporary fencing surrounding the site. The site will be bound Orsino Boulevard (East), Calypso Parade (North), Onyx Lane (West) and future development sites to the south. Directly west and south of the site is currently vacant, the eastern side of Orsino Boulevard is characterised by existing low density single residential extending to Cockburn Road. North of Calypso Parade is the existing Woolworths Shopping Centre and a Child Care Premises (See **Attachment 3 – Location Plan**).

Legislation and Policy:

Legislation

Planning and Development Act 2005

Planning and Development (Local Planning Scheme) Regulations 2015

Planning and Development (Development Assessment Panel) Regulations 2015

State Government Policies

State Planning Policy 2.6 – State Coastal Planning (SPP 2.6)

State Planning Policy 7.0 – Design of Built Environment (SPP 7)

State Planning Policy 7.3 – Residential Design Codes (SPP 7.3) Vol. 2

Structure Plans/Activity Centre Plans

Port Coogee Revised Local Structure Plan (LSP)

The revised LSP was approved by the Western Australian Planning Commission (WAPC) in December 2016. The subject site is within the 'Port Coogee Marina Village' and has a designated zoning of 'Local Centre'.

Port Coogee Marina Village Built Form Codes (BFC)

The BFC are applicable under Development Area 22, as they are design guidelines which set criteria for development of the Marina Village. The BFC provide site specific development controls in the form of Local Development Plans, they are however, intended, to be predominantly performance based. The BFC requires each proposal to receive an endorsement from the relevant Design Review Panel prior to being lodged with the City.

Local Policies

Local Planning Policy 1.12 – Noise Attenuation (LPP 1.12)

Local Planning Policy 1.14 – Waste Management in Multiple Unit Developments (LPP 1.14)

Local Planning Policy 5.13 – Percent for Art 5.13 (LPP 5.13)

Local Planning Policy 5.16 – Design Review Panel (LPP 5.16)

Consultation:

Public Consultation

Multiple Dwellings and Retail (Shop) are both Permitted uses within the Local Centre location and do not require mandatory advertising. Given the proposals general compliance with the planning framework, no public consultation was undertaken.

Referrals/consultation with Government/Service Agencies

The proposal is not located within any buffer zones or within proximity to any regional reserves that warrant a referral to external authorities.

Design Review Panel (DRP) Advice

The proposal was seen by the City's DRP on two (2) occasions, being

- 28 July 2021; and
- 29 September 2021

Minutes from the second DRP are available for review in **Attachment 4**, with comments summarised below.

- The scale, bulk, orientation and mix of uses is considered appropriate for the site context;
- Species selection on the landscaping plan will be an important element;

- The ‘loft apartment’ on level five creates a point of interest to the development;
- Internal manoeuvring was queried by the DRP, specifically around the single use ramp proposed;
- Alternate opening of the storeroom doors should be considered;
- Careful consideration of the wall abutting the southern boundary should be taken into account.

Overall, the application received positive remarks from the design review and 8/10 principles received support from the DRP.

Other advice
The City is currently assessing a Local Development Plan for the smaller single dwelling type lots within the balance site. The Community Centre is a subject of discussion with the City and Developer and at this stage is likely to be located within the balance of Lot 9153 Orsino Boulevard, similar to the Hotel site.

Planning Assessment:

Use
The proposal is located within Site 5 of the Port Coogee Marina Village and subject to the specific provisions of the BFC. Site 5 requires a non-residential use at the ground floor along Calypso Parade (north) and Commercial/Residential along Orsino Boulevard (east).

The ground floor Retail (Shop) tenancy complies with the BFC and the Orsino Boulevard frontage is entirely Residential. The mandatory non-residential tenancy on Calypso Parade requires a 4m ground to ceiling floor level which the proposal seeks to vary by 300mm. The 3.7m ground floor to ceiling height is considered minor and fulfills the intent of creating additional height for visitors to non-residential tenancies. There are no minimum ground to ceiling heights applicable to the Orsino Boulevard frontage.

Location

The subject site is one of several ‘icon or gateway buildings’ located within the surrounding Marina Village, as identified by the LSP and BFC. Gateway buildings shall exhibit design excellence, be constructed of materials which detail high quality and scale in specific locations which *terminate a vista, frame a view, reinforce the public domain and/or define a hierarchy of places.* In this regard, the subject development is considered an ‘icon or gateway building’ due to its high quality design as noted by the DRP.

The proposal is on a balance lot which is identified as one of four locations within the Marina Village for the provision of a future Hotel. It should be noted however, this specific location on the corner of Calypso Parade and Orsino Boulevard is not the specifically intended location under the LSP.

In addition to the potential use as a ‘Hotel site’, the subject lot is similarly identified as an alternate location for ‘Community Purpose’ amongst three (3) other locations within the Port Coogee Marina Village. The community purpose site is intended to include meeting rooms, history interpretation centre, art gallery and/or café which encompass an area of approximately 1,000m^2 of ground floor space of a development. The City and developer are in discussions regarding the location of the Community Centre which is intended to be upon the balance of Lot 9153 Orsino Boulevard.

Built Form

Building height			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC	Cell ends of Site 5 – 21m permitted	16.9m top of roof	The proposal complies with the height requirements.

Site 5 provides for a gentle transition from the low density single residential lots on the eastern side of Orsino Boulevard, to the intention under the BFC for more height and intense development further along the peninsula.

Setbacks			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC	Nil – Calypso and Internal roads (Onyx lane); 1m - Orsino	Nil proposed; Nil – 1m proposed	The proposal complies with the Street setback requirements for Calypso Parade and proposes a minor variation to Orsino Boulevard.

The BFC require a nil street setback along Calypso Parade to present an attractive pedestrian streetscape, this also allows for an awning to extend over the footpath and provide further pedestrian amenity and protection from the elements.

A variation of 1m is proposed for a 4m section along Orsino Boulevard, in lieu of the 1m setback required. The nil setback is supported in this instance as it assists in identifying the development as an important gateway location and site to attract people down to the foreshore. The dwellings, which comprise the remainder of the Orsino Boulevard frontage, are setback a compliant 1m.

Awning
An awning, in colourbond ‘gully’ cladding is provided along the full retail frontage to Calypso Parade and partially along Orsino Boulevard. The awning extends over the existing footpath for 2.45m and achieves a 3m clearance from the Natural Ground Level (NGL), which complies with the BFC. In accordance with the BFC, a condition is recommended to be imposed that future signage on the underside of the awing maintain a 2.5m clearance from the footpath.

Overshadowing
The BFC is silent on overshadowing which then reverts to State Planning Policy 7.3 – Residential Design Codes Volume 2 (SPP 7.3). The nature of the subject site being east-west orientated and the desired built form outcomes lead to inevitable overshadowing of land to the south. In this instance, the development varies SPP 7.3’s acceptable outcomes, as it overshadows three of the proposed southern lots.

Whilst the variation proposed is significant, the intent for the surrounding built form should be considered when assessing the proposal. The single dwellings on the eastern side of Orsino Boulevard are in a similar situation, however an existing LDP exempts the overshadowing requirement, noting the built form intent. Notwithstanding the above, the variation to overshadowing was not advertised as the land remains

under the one title and ownership (the current landowners) and an LDP currently under assessment by the City seeks to exempt visual privacy from adjoining lots.

Southern wall
The southern wall which abuts proposed Lot 4 (see Attachment 2) is the only face of the development which will not front a public street. As noted by the DRP, the southern boundary should be carefully treated to ensure an acceptable outcome is provided for future residents. The wall is shown as being finished with a textured white masonry render, which is a consistent finish proposed on the Onyx Lane façade of the development.

Solar access
All proposed dwellings obtain the required 2 hours of daylight access as required under the BFC. Naturally, the north facing apartments receive the most in 6 hours of sunlight whilst the east facing apartments receive at least 2 hours of sunlight on 21 June, the Winter solstice.

Car parking
There are a total of 37 car parking bays provided within the site which is comprised of the following;

- Ground floor (17 bays total)
    - 10 Residential bays;
    - 2 Visitor bays;
    - 1 Acrod bay;
    - 2 Retail bays;
    - 2 Electric Vehicle bays.
- First floor
    - 20 Residential bays.

The BFC have specific car parking calculations which are detailed below.

Car parking			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC Residential Bays	0.3 bays per dwelling + 0.012 bay per m^2 of net internal living area (NILA)*	30 bays are provided for Residential use	21 dwellings x 0.3 = 6.3 bays +1,533m^2 of NILA x 0.012 = 18.4 bays Total = 24.7 bays
BFC Residential Visitors	0.035 bays per dwelling + 0.0015 bays per m^2 of NILA	Two (2) Residential visitor bays provided	21 dwellings x 0.035 = 0.735 0.0015 x 1,533m^2 of NILA = 2.2995 TOTAL = 3.03 Residential visitor bays required
BFC Retail use	1 bay per 18.75m^2 Net Lettable Area (NLA)	Two (2) retail bays are provided	133m^2 NLA/ 18.75m^2 = 7 Retail bays required

SPP 7.3 Bicycle parking	0.5 space per dwellings (residential); 1 space per 10 dwellings (visitor)	12 bicycle bays required	14 bicycle bays provided

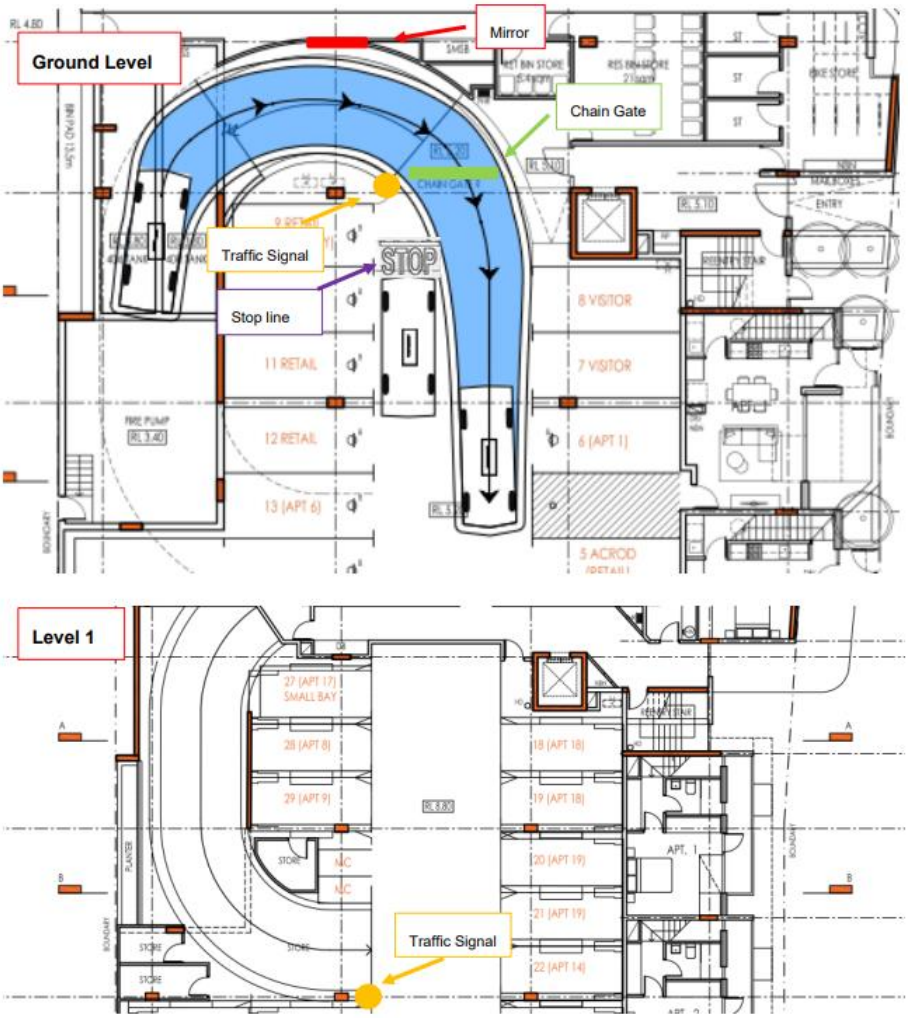
***Net Internal Living Area =** The net floorspace of the dwelling measured from the inside face of permanent external ways defining the extent of the dwelling – measured over internal walls and partitions within the dwelling, excluding any areas housing common service areas and/or ducts.*

The Residential component offers a 5.3 (5) bay surplus to requirements under the BFC. Two (2) of the three (3) required visitor bays are provided within the development site and the provision under Site 5 of the PCMVBFC allows for 50% of the visitor parking to be provided on-street. The Residential parking component is therefore compliant.

Retail
Two (2) on site visitors bays are provided to the retail tenancy in lieu of the required 7, based upon the calculations under the BFC. Notwithstanding the above however, Site 5 is afforded two (2) on-street bays to be considered towards the retail tenancy under its provisions which raises the provision to 4 bays associated with the Retail. In addition to this the ACROD bay and two (2) electric vehicle bays are not assigned to residents so they may be used by staff attending the retail tenancy. It is highly likely that only staff will be able to access the bays provided within the development due to the access gate and visitors to the site will be able to utilise existing on-street bays. Subsequently, car parking is not considered to create amenity issues within the development or surrounding road network.

Traffic and Access
The site is bound by Orsino Boulevard, a local distributor road which connects Port Coogee north to south, and Calypso Parade a local access road which is sought to be an attractive pedestrian environment through the provision of future built form. The applicant has submitted a Traffic Impact Statement, undertaken by Cardno consultants, which determines that the proposal will not lead to undue traffic congestion and safety implications for the existing and future road network (See **Attachment 5 – Traffic Impact Statement**). The BFC require that no direct vehicle access be obtained via Calypso Parade or Orsino Boulevard, the proposal complies with this requirement as access and servicing is obtained via Onyx Lane, created under the subdivision application (see Attachment 2).

Parking within the development is proposed upon the ground floor and first floor, with access to and from the first floor being via a 3.5m wide ramp, which restricts vehicle manoeuvring to one way only. Given the relatively low scale of development (21 multiple dwellings), only residential bays being on the first floor and trip generation for the apartments likely consisting of morning peak morning and peak afternoon trips in the same direction, the City recommends the imposition of a condition to ensure the recommendations (see below) contained in the TIS are implemented prior to the occupancy of the development. The TIS recommends the below.



- A stop line be marked on the ground floor to require vehicles traversing up the ramp to wait in a location that provides enough room for vehicles exiting the ramp;
- A chain gate positioned at the ramp entrance (ground floor) and able to be lowered when there is no conflict on the ramp;
- Safety mirrors provided to the middle of the ramp to provide additional sight lines;
- Traffic signals to be provided at the ramp entrance on the ground and first floors added to the ground floor and first floor to advise when vehicles can enter the ramp.

Landscaping and Open Space

Open Space			
Provision	**Requirement**	**Proposal**	**Assessment**
BFC Balconies and Courtyards	Every dwelling with a gross floor area of 80m^2 or more shall have a private open space of 10m^2 and minimum dimension of 2.5m	Balconies/Courtyards of a minimum 10m^2 + and dimensions of 2.4m +	Variation – The north facing apartments have a 2.4m dimension. However are provided with a surplus to the required size

			under the BFC. It is noted compliance with the Apartment codes is achieved.
SPP 7.3 Communal space	6m^2 per dwelling up to a maximum 300m^2 21 dwellings x 6m^2 = 126m^2	169m^2 provided	Complies
SPP 7.3 Deep Soil Area (DSA)	10% of the site area (1,166m^2) = 116.6m^2	No DSA which meets the definitions provided.	Variation – see discussion below

A landscape plan has been provided by LD Total which demonstrates compliance with the communal open space requirement of the SPP 7.3, the west facing communal area is 169m^2, proposing a surplus of 43m^2 **(see Attachment 6 – Landscape Plan)**. The communal open space offers surveillance of the future Public Open Space on the western side of the laneway (Onyx Lane).

The DSA provision is significantly reduced from the requirements under SPP 7.3, which requires 10% of the site area, being 116.6m^2 for this development. A provision of 13m^2 has been provided which is considered to meet the DSA definition as it is not provided on structure. A total of 82m^2 soil area is provided within the development.
Notwithstanding the above, the proposal is considered to have been provided with a suitable level of amenity in terms of landscaping provision. Trees and planter boxes presented to Orsino Boulevard and Calypso Parade present an attractive streetscape and residents are provided with a large communal open space. In addition, the POS provided on the western side of the laneway accounts for some of the deep soil provision that could otherwise be attributed to development sites.

Consideration of Waste

A Waste Management Plan (WMP) is required to be provided in accordance the City's Local Planning Policy 1.14 – Waste Management in Multiple Unit Developments (LPP 1.14). A WMP (**Attachment 7 – Waste Management Plan**) has been provided by Cardno, which details the following:

- A separate commercial bin store of 6m^2 and residential bin store of 22m^2;
- Use of the City's services is proposed, however should the retail component change and require more waste collection services then a private collector may be required;
- Dwellings receive 1 set of bins per three dwellings which equates to
    - 7 sets of bins (recyclables and general waste);
    - 2 sets of bins for the Retail (recyclables and general waste).

Collection of waste is via a 13.5m bin pad serviced from Onyx Lane via the City's 9.6m side lift waste truck with the strata caretaker being responsible for transferring bins to and from the bin pad. The WMP is recommended to be conditioned to ensure the measures contained within are implemented and maintained throughout the developments lifecycle.

Consideration of Noise

An Acoustic Report, completed by Lloyd George Acoustics, was provided with the application in accordance with the BFC and City's Local Planning Policy 1.12 – Noise Attenuation (LPP 1.12) (**Attachment 8 –** Acoustic Report). The subject site, being vacant, is largely separated from existing commercial noise with the majority of external noise resulting from the commercial shopping centre on the northern side of Calypso Parade.

The impacts of noise upon and from the development have been relevantly considered by the acoustic report and the measures within the report are recommended to be imposed upon the determination. The report recommends a further acoustic report be provided at the detailed building stage which will specify the locations of infrastructure such as car park exhaust, air conditioning, bin store exhaust and fire pumps, the City supports this recommendation for a further acoustic report being provided. The City also recommends written confirmation, from the builder that the requirements from the acoustic reports have been implemented within the development plans prior to lodgement of the building permit application and prior to occupancy of the building. To satisfy these conditions the applicant is required to confirm via letter that the recommendations have been demonstrated on the building permit plans.

Consideration of Wind

The site is located within an area known for high wind exposure given its close proximity to the Indian Ocean. The BFC note this and require wind assessments to be provided for all development applications within the Marina Village. Subsequently, a Wind Assessment has been undertaken by SLR Consulting (see **Attachment 9 – Wind Assessment).**

The wind assessment noted the following

- The only location of non-compliance with the BFC wind provisions may occur during winter/early spring along the retail frontage to Calypso Parade, other development frontages comply with the specific wind provisions;
- The communal open space area is only subject to wind from the west and is not considered to be subject to any further wind mitigation.

In light of the recommendations from the Wind Assessment, a revised landscaping plan is recommended to provide detailed species selection along Calypso Parade to assist in mitigating potential wind impacts.

Consideration of Public Art

The City's Local Planning Policy 5.13 – Percent for Art is adopted pursuant to TPS 3 and details when an application is required to contribute towards the provision of public art. The application for Multiple Dwellings, with a value of more than $2 million will require a contribution of 1% the development value up to a maximum of $250,000.

The applicant has indicated the public art component will take place in the form of a mural upon the future laneway (Onyx Lane). The details and engagement of an artist has not occurred yet, however the City considers that this can be addressed through the imposition of a condition on the approval. Based upon the 1% estimated cost of development, the approximate cost of the public art provision is $80,000.

Other considerations

Development Contributions

The subject site falls within Development Contribution Area 13 (DCA 13), within which applications proposing residential density in addition to what already exists is required

to financially contribute towards community infrastructure such as roads, drainage, sporting, community and recreational facilities.

Part 5.3 – Development Contribution Areas (DCA) of TPS 3 details the provisions for DCA liabilities to arise and when the contribution shall be paid.

Clause 5.3.13.2 of TPS 3 states;

"*An owner's liability to pay the owner's cost contribution to the local government arises on the earlier of –*

i. The Western Australian Planning Commission endorsing its approval on deposited plan or survey strata plan of the subdivision of the owner's land within the development contribution area;

ii. ***The commencement of any development on the owner's land within the development contribution area****;* ***(emphasis added)***

iii. The approval of any strata plan by the local government or Western Australian Planning Commission on the owner's land within the development contribution area; or

iv. The approval of a change or extension of use by the local government on the owner's land within the development contribution area.

The liability arises only once upon the earliest of the above listed events.

The City notes the applicants request that the DCA 13 liability be conditioned to apply upon the creation of titles, due to the associated cost of development. The City recommends that the DCA liability be required prior to the issue of a building permit as this is procedurally the most appropriate time for the contribution to be collected.

<u>Development approval timeframe</u>
Clause 16A (2) of the Development Assessment Panel (Local Planning Scheme) Regulations 2011 states

2 If the development approval is granted by a DAP pursuant to a DAP application

a) The development must be substantially commenced within the period of 4 years beginning on the date on which the determination is made; and

b) The approval lapses if the development has not substantially commenced within that period.

The above clause was inserted into the *Planning and Development (Development Assessment Panel) Regulations 2015* only last year, and allowed an additional two (2) years timeframe for substantial commencement in light of the COVID-19 pandemic, amongst a raft of other changes to the planning framework. Considering the justification relating to COVID-19, the City recommends the standard 4 year timeframe remain on conditional approval. Should the development not have substantially commenced within 4 years then the applicant can seek a renewal under the planning framework at the time.

Conclusion:

The proposal for Mixed Use development consisting of 21 multiple dwellings and one retail tenancy of 133m^2 is considered to be generally compliant with the relevant planning framework and consistent with surrounding built form. The built form is considered to be of high amenity and will add value to the existing streetscape and future intent of the Port Coogee Marina Village. Future residents are provided with large, highly functional dwellings as well as communal areas in excess of the statutory requirements. The application is recommended for approval subject to conditions.

LEGEND

- TREE - EXISTING WHERE NOTED
- 8.00 — EXISTING CONTOUR LINES
- RL 8.345 — PROPOSED LEVELS
- RL : 0.00 — NEW FINISHED FLOOR LEVEL
- DENOTES EXTENT OF EXISTING LOT BOUNDARIES
- INDICATIVE SOAK WELLS

GENERAL NOTES

1. REFER TO CIVIL DRAWINGS FOR PROPOSED LEVELS AND FALLS TO CARPARKING.
2. REFER TO CIVIL & LANDSCAPE DRAWINGS FOR ADDITIONAL SITE INFORMATION.

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street,, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments

Port Coogee Marina Village - Lot 203

Orsino Boulevard

PROPOSED SITE PLAN

0m 2m 4m 6m 12m

SCALE 1:200 @A1 SHEET SIZE

DRAWN	DESIGNED	PRINCIPAL
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CHECKED	MODEL PATHNAME	
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2113		

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LEGEND

SYMBOLS

TREE - EXISTING WHERE NOTED

RL 8.345 — PROPOSED LEVELS

RL : 0.00 — NEW FINISHED FLOOR LEVEL IN AHD

DENOTES EXTENT OF EXISTING LOT BOUNDARIES

INDICATIVE SOAK WELLS

ABBREVIATIONS

AC.	AC UNIT
COL.	STRUCTURAL COLUMNS
CU.	CONDENSER UNIT
FH.	FIRE HYDRANT
FHR.	FIRE HOSE REEL
GM.	GAS METER
HR.	HANDRAIL
HWU.	HOT WATER UNIT
MW.	MAT WELL
NBN	NBN CUPBOARD/RISER
RWP.	RAINWATER PIPE
TOW.	TOP OF WALL

GENERAL NOTES

1. NOTE FLOOR LEVELS AT GROUND LEVEL REFER TO AHD LEVELS

APARTMENT LEGEND

1 x 1 BED

CIRCULATION

COMMUNAL AMENITY FOR RESIDENTIAL USE

PLANT

RETAIL

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

gresleyabas
architecture environment design

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ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

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Port Coogee Marina Village - Lot 203
Orsino Boulevard
GROUND FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

DRAWN	LW	DESIGNED	LM
PRINCIPAL	JL	CHECKED	DG
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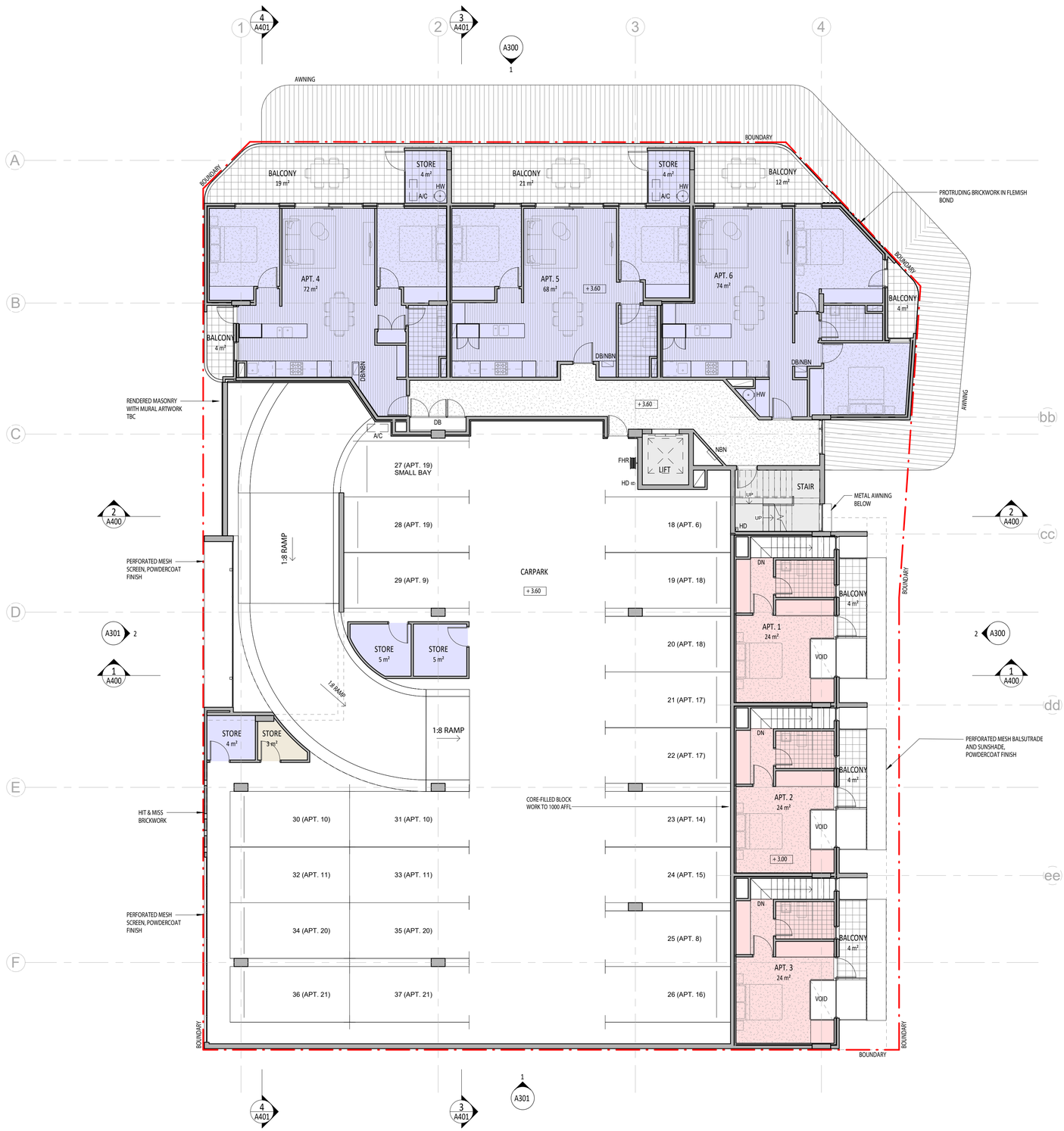

LEGEND

SYMBOLS

PROPOSED TREE

+ 0.00 — NEW FINISHED FLOOR RELATIVE TO GROUND (RL 5.2)

DENOTES EXTENT OF EXISTING LOT BOUNDARIES

ABBREVIATIONS

AC.	AC UNIT
BCJ.	BRICK OR BLOCK CONTROL JOINT
BWU.	BOILING WATER UNIT
COL.	STRUCTURAL COLUMNS
CU.	CONDENSER UNIT
FH.	FIRE HYDRANT
FHR.	FIRE HOSE REEL
GM.	GAS METER
HR.	HANDRAIL
HWU.	HOT WATER UNIT
MW.	MAT WELL
RWP.	RAINWATER PIPE
TOW.	TOP OF WALL

GENERAL NOTES

1. NOTE FLOOR LEVELS DENOTED WITH '+' SYMBOL REFER TO RELATIVE LEVEL ABOVE GROUND FLOOR - I.E. THE DISTANCE ABOVE. 5.20 AHD.

APARTMENT LEGEND

- 1 x 1 BED
- 2 x 1 BED
- CIRCULATION
- PLANT

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
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architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
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Port Catherine Developments

Port Coogee Marina Village - Lot 203

Orsino Boulevard

LEVEL 1 FLOOR PLAN

0m 1m 2m 3m 6m

SCALE 1:100 @A1 SHEET SIZE

DRAWN	DM
CHECKED	DG
SCALE @ A1	1 : 100
DESIGNED	LM
PRINCIPAL	JL
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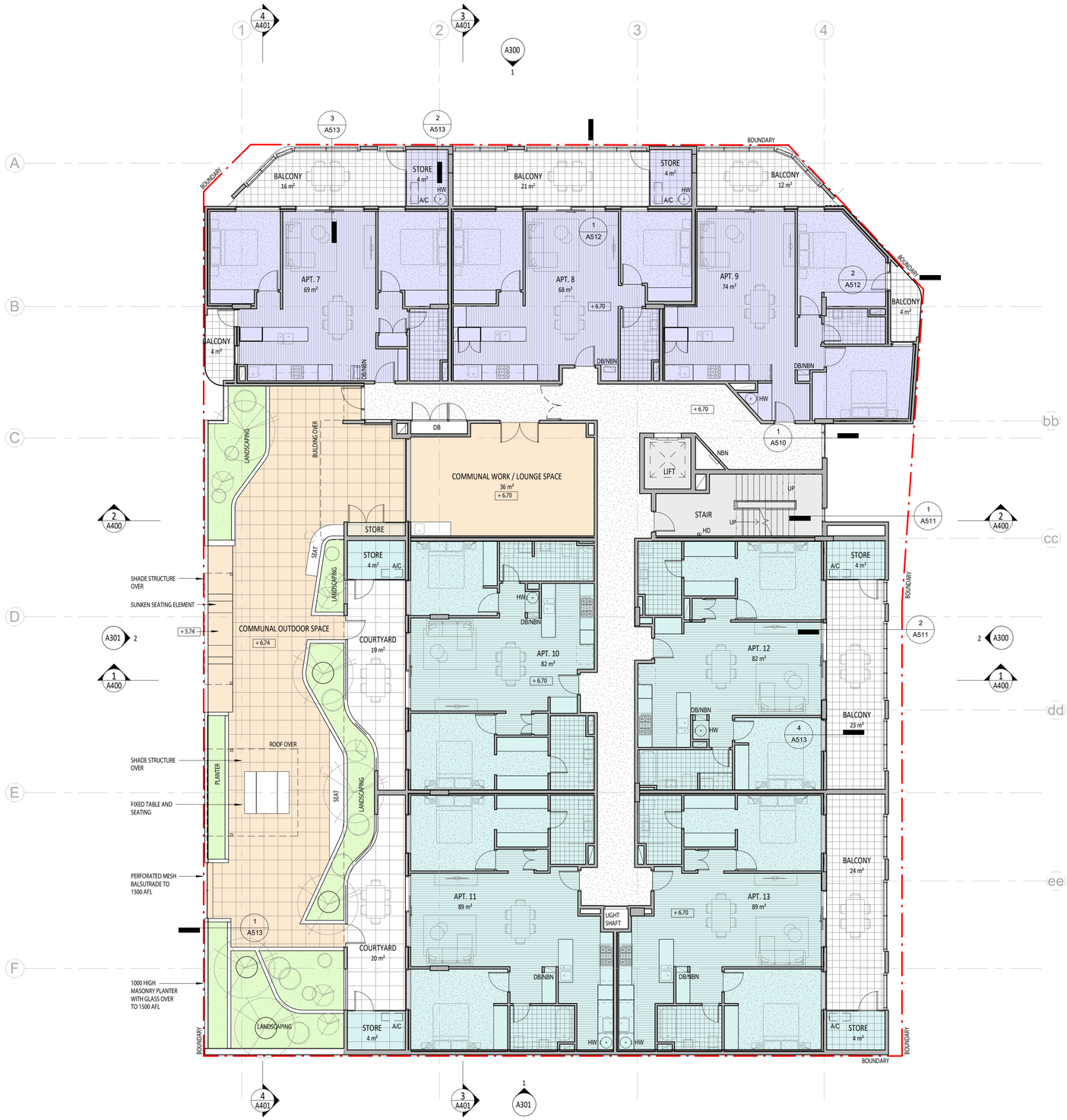

LEGEND

SYMBOLS

PROPOSED TREE

+ 0.00 — NEW FINISHED FLOOR RELATIVE TO GROUND (RL 5.2)

DENOTES EXTENT OF EXISTING LOT BOUNDARIES

ABBREVIATIONS

AC.	AC UNIT
BCJ.	BRICK OR BLOCK CONTROL JOINT
BWU.	BOILING WATER UNIT
COL.	STRUCTURAL COLUMNS
CU.	CONDENSER UNIT
FH.	FIRE HYDRANT
FHR.	FIRE HOSE REEL
GM.	GAS METER
HR.	HANDRAIL
HWU.	HOT WATER UNIT
MW.	MAT WELL
RWP.	RAINWATER PIPE
TOW.	TOP OF WALL

GENERAL NOTES

1. NOTE FLOOR LEVELS DENOTED WITH '+' SYMBOL REFER TO RELATIVE LEVEL ABOVE GROUND FLOOR - I.E. THE DISTANCE ABOVE. 5.20 AHD.

APARTMENT LEGEND

- 2 x 1 BED
- 2 x 2 BED
- CIRCULATION
- COMMUNAL AMENITY FOR RESIDENTIAL USE
- PLANT

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

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Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
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Port Catherine Developments
Port Coogee Marina Village - Lot 203
Orsino Boulevard
LEVEL 2 FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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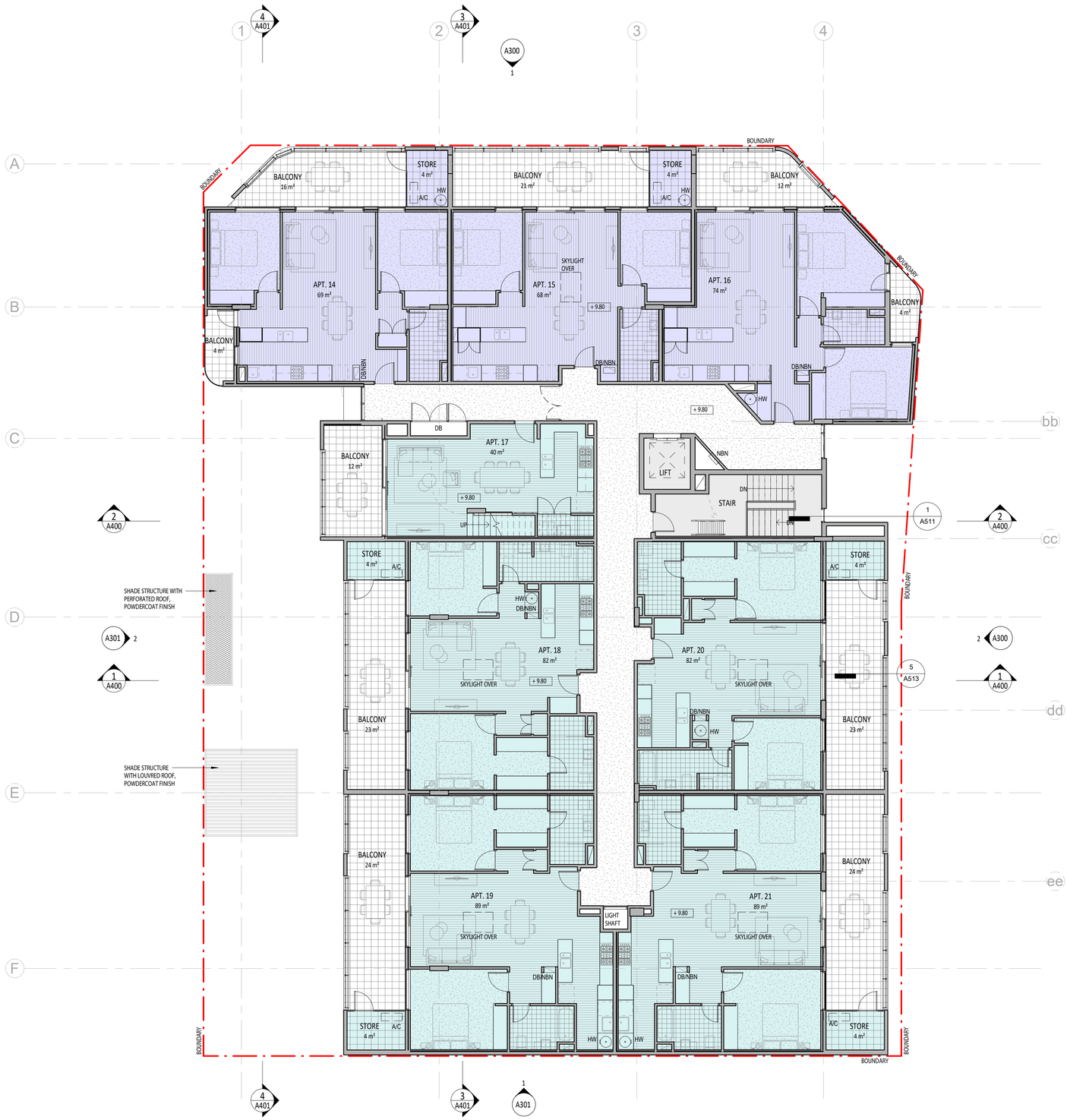

LEGEND

SYMBOLS

PROPOSED TREE

+ 0.00 — NEW FINISHED FLOOR RELATIVE TO GROUND (RL 5.2)

DENOTES EXTENT OF EXISTING LOT BOUNDARIES

ABBREVIATIONS

AC.	AC UNIT
BCJ.	BRICK OR BLOCK CONTROL JOINT
BWU.	BOILING WATER UNIT
COL.	STRUCTURAL COLUMNS
CU.	CONDENSER UNIT
FH.	FIRE HYDRANT
FHR.	FIRE HOSE REEL
GM.	GAS METER
HR.	HANDRAIL
HWU.	HOT WATER UNIT
MW.	MAT WELL
RWP.	RAINWATER PIPE
TOW.	TOP OF WALL

GENERAL NOTES

1. NOTE FLOOR LEVELS DENOTED WITH '+' SYMBOL REFER TO RELATIVE LEVEL ABOVE GROUND FLOOR - I.E. THE DISTANCE ABOVE. 5.20 AHD.

APARTMENT LEGEND

2 x 1 BED

2 x 2 BED

CIRCULATION

FOR DEVELOPMENT APPROVAL

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ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments

Port Coogee Marina Village - Lot 203

Orsino Boulevard

LEVEL 3 FLOOR PLAN

0m 1m 2m 3m 6m

SCALE 1:100 @A1 SHEET SIZE

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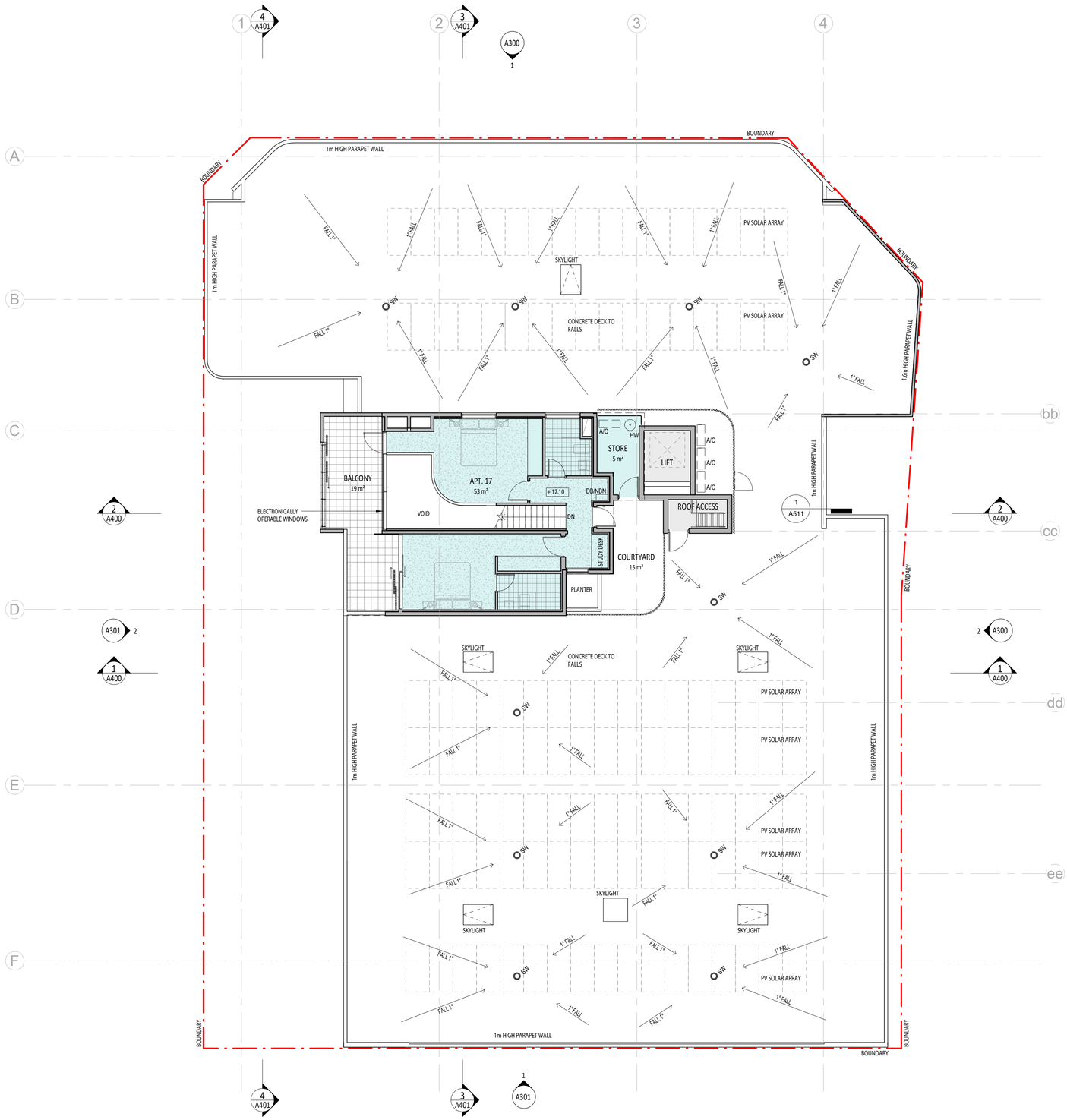

LEGEND

SYMBOLS

PROPOSED TREE

+ 0.00 — NEW FINISHED FLOOR RELATIVE TO GROUND (RL 5.2)

DENOTES EXTENT OF EXISTING LOT BOUNDARIES

ABBREVIATIONS

AC.	AC UNIT
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GM.	GAS METER
HR.	HANDRAIL
HWU.	HOT WATER UNIT
MW.	MAT WELL
RWP.	RAINWATER PIPE
TOW.	TOP OF WALL

GENERAL NOTES

1. NOTE FLOOR LEVELS DENOTED WITH '+' SYMBOL REFER TO RELATIVE LEVEL ABOVE GROUND FLOOR - I.E. THE DISTANCE ABOVE. 5.20 AHD.

APARTMENT LEGEND

2 x 2 BED

CIRCULATION

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ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments
Port Coogee Marina Village - Lot 203
Orsino Boulevard
LEVEL 4 FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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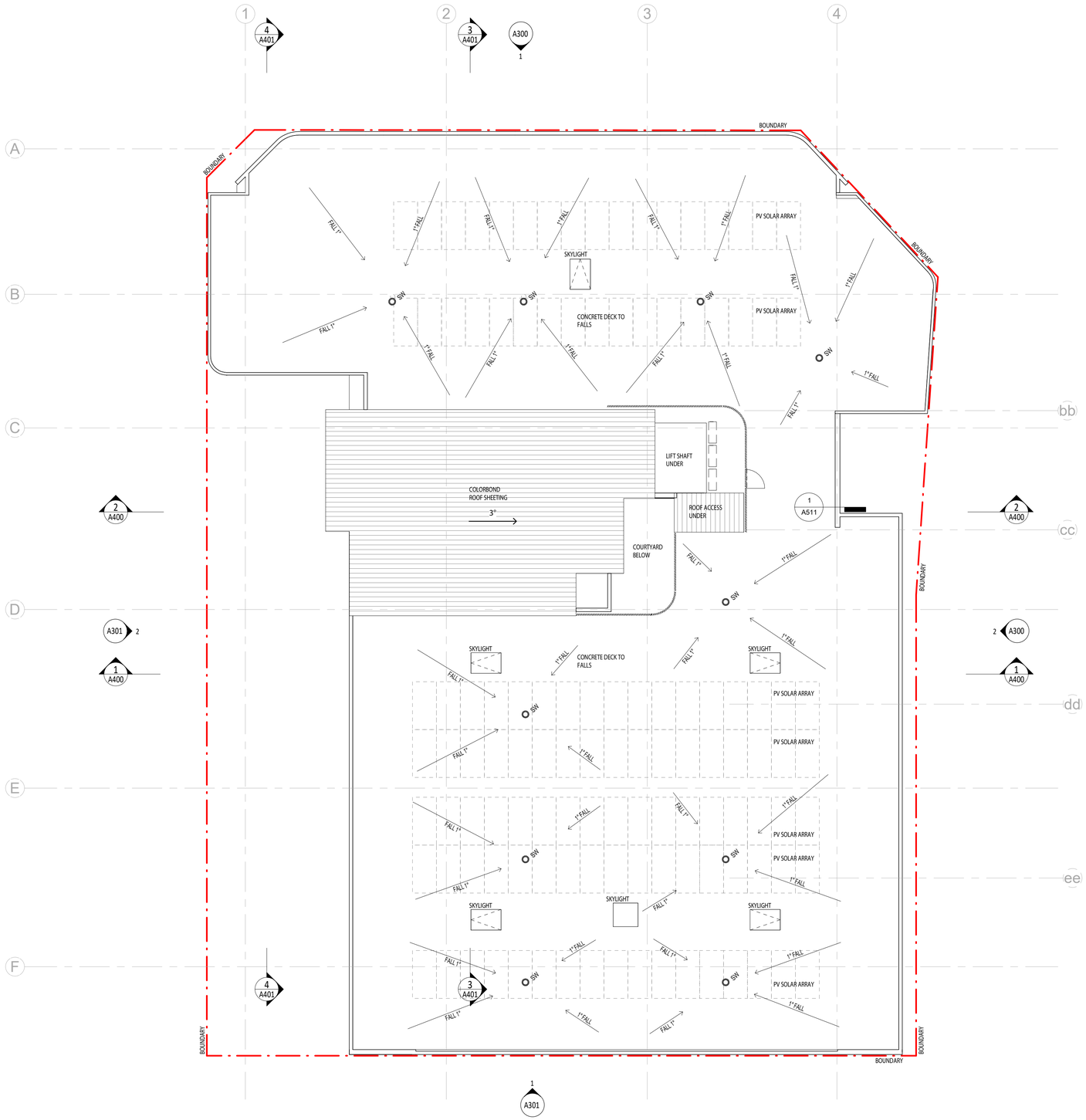

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REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

gresleyabas
architecture environment design

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ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
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Port Catherine Developments

Port Coogee Marina Village - Lot 203

Orsino Boulevard

ROOF PLAN

SCALE 1:100 @A1 SHEET SIZE

DRAWN: DM	DESIGNED: LM	PRINCIPAL: JL	
CHECKED: DG	MODEL PATHNAME: BIM 360://Port Coogee/2113 Lot 5 Orsino Blvd Port Coogee DO N.01.rvt		
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1 ELEVATION NORTH

1 : 100

2 ELEVATION EAST

1 : 100

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

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Melbourne/ 10 York Street, Richmond VIC 3121
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www.gresleyabas.com.au

Port Catherine Developments

Port Coogee Marina Village - Lot 203

Orsino Boulevard

ELEVATIONS SHEET 1

0m 1m 2m 3m 6m

SCALE 1:100 @A1 SHEET SIZE

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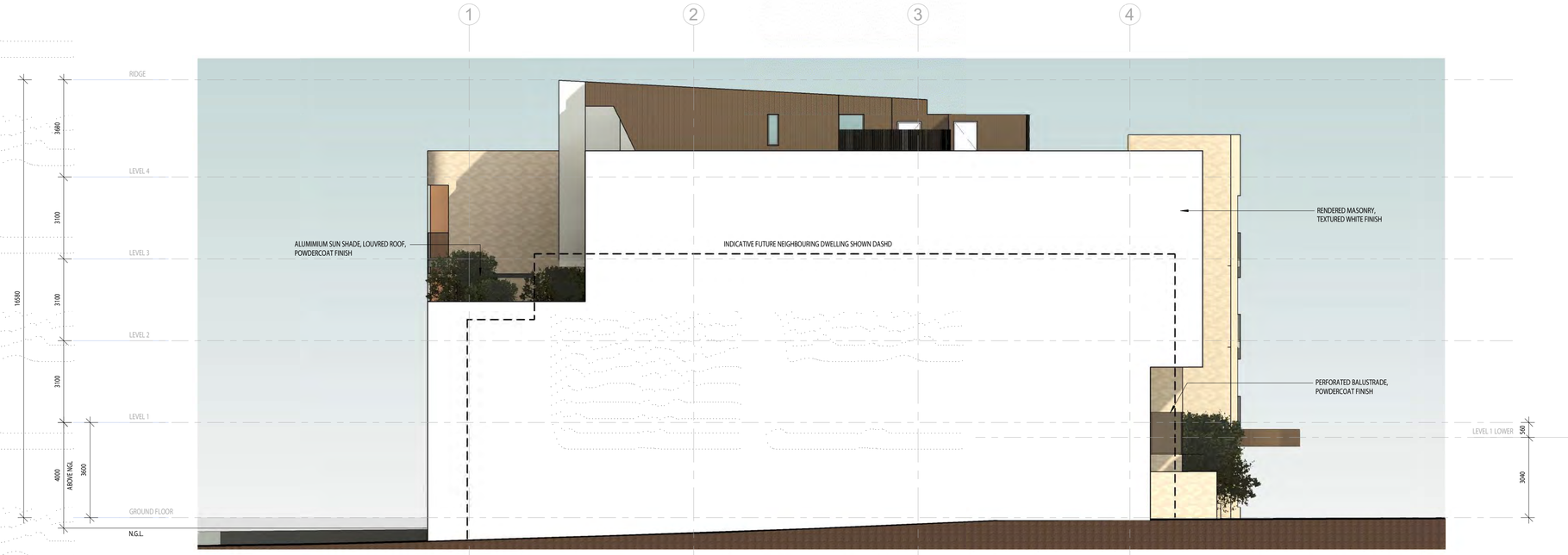

1 ELEVATION SOUTH
1 : 100

2 ELEVATION WEST
1 : 100

FOR DEVELOPMENT APPROVAL

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A	19.10.21	FOR DEVELOPMENT APPROVAL	

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Port Catherine Developments
Port Coogee Marina Village - Lot 203
Orsino Boulevard
ELEVATIONS SHEET 2

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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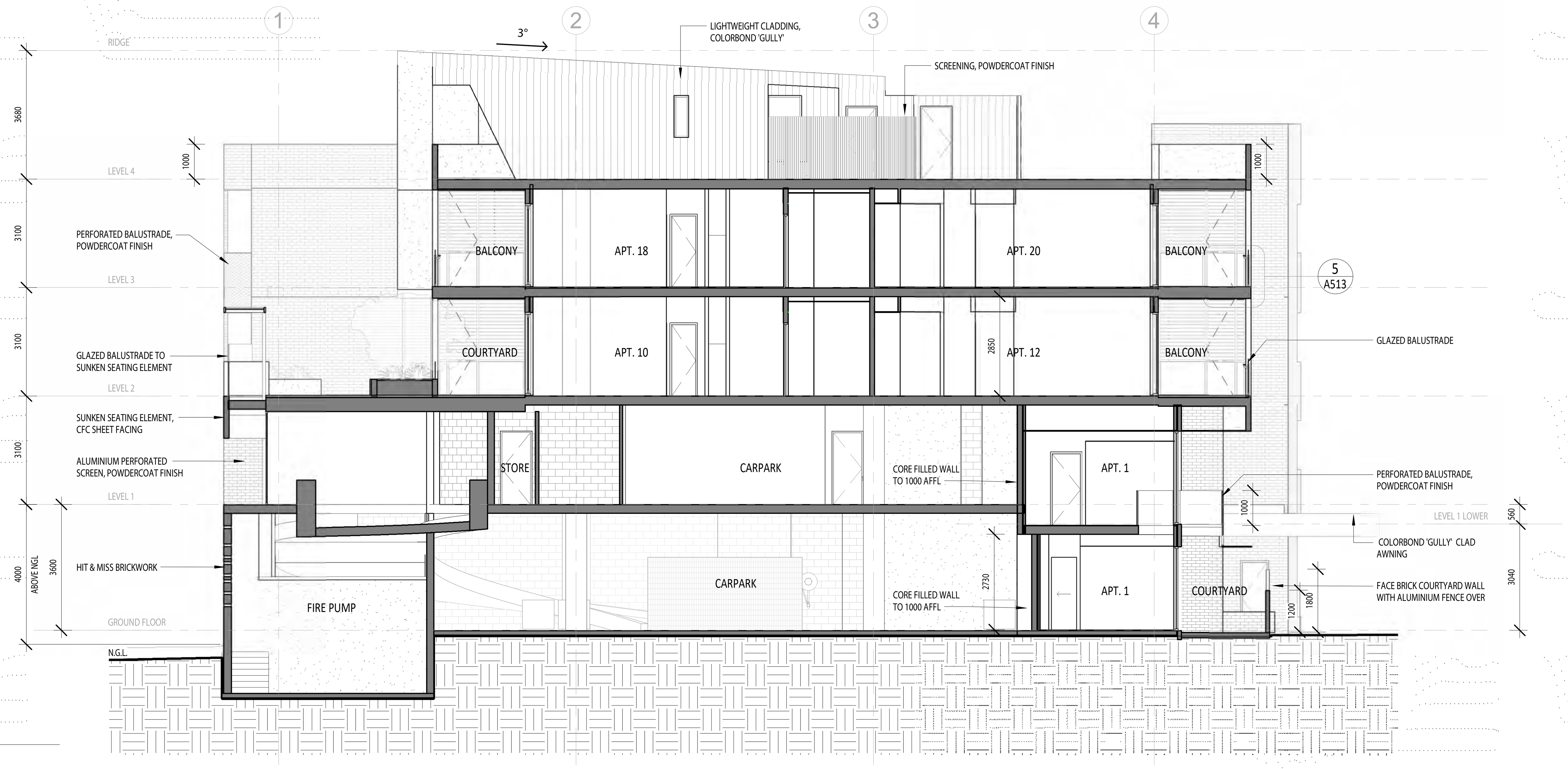

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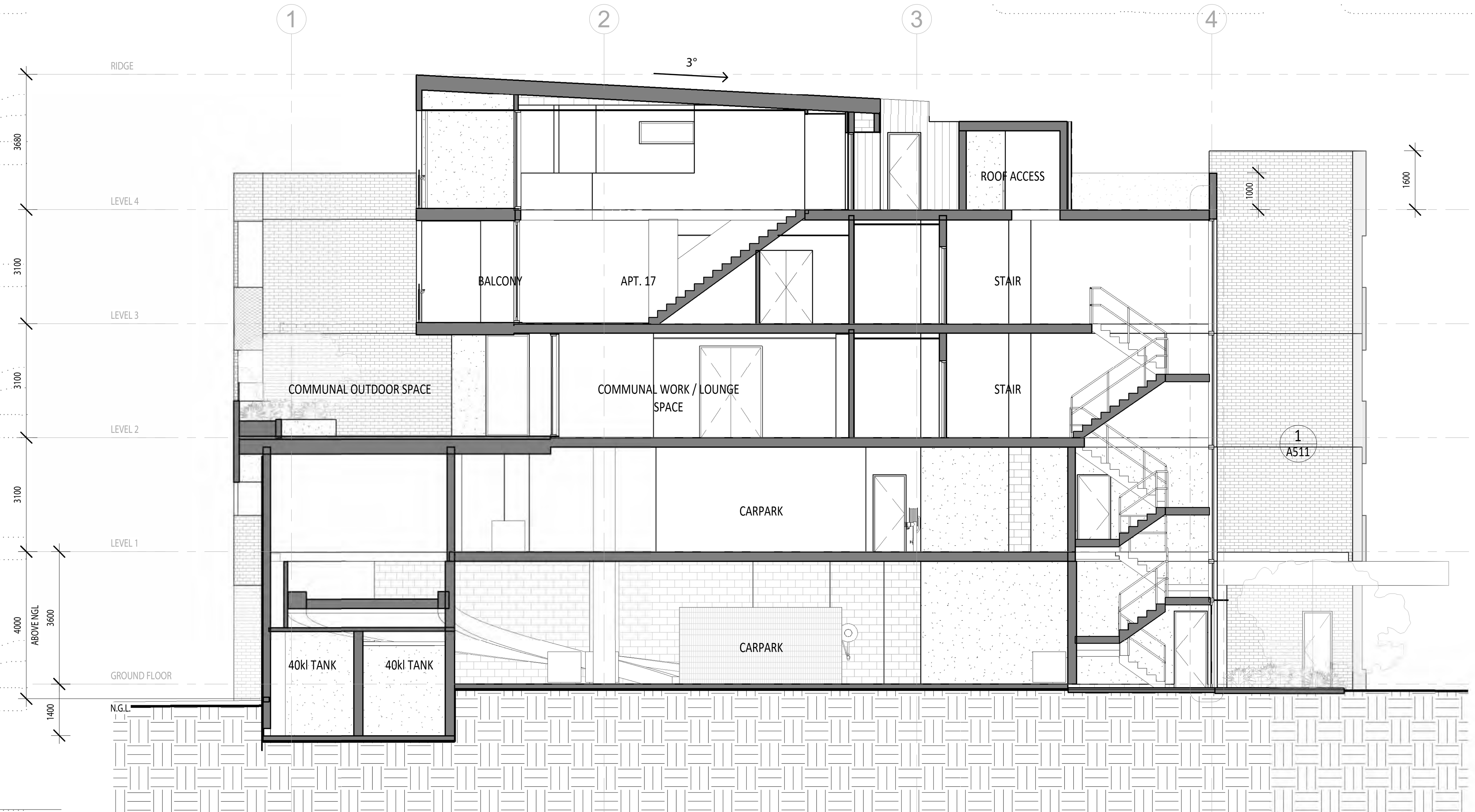

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FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

gresleyabas
architecture environment design

Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments
Port Coogee Marina Village - Lot 203
Orsino Boulevard
SECTIONS

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

DRAWN LW | DESIGNED LM | PRINCIPAL JL
CHECKED DG
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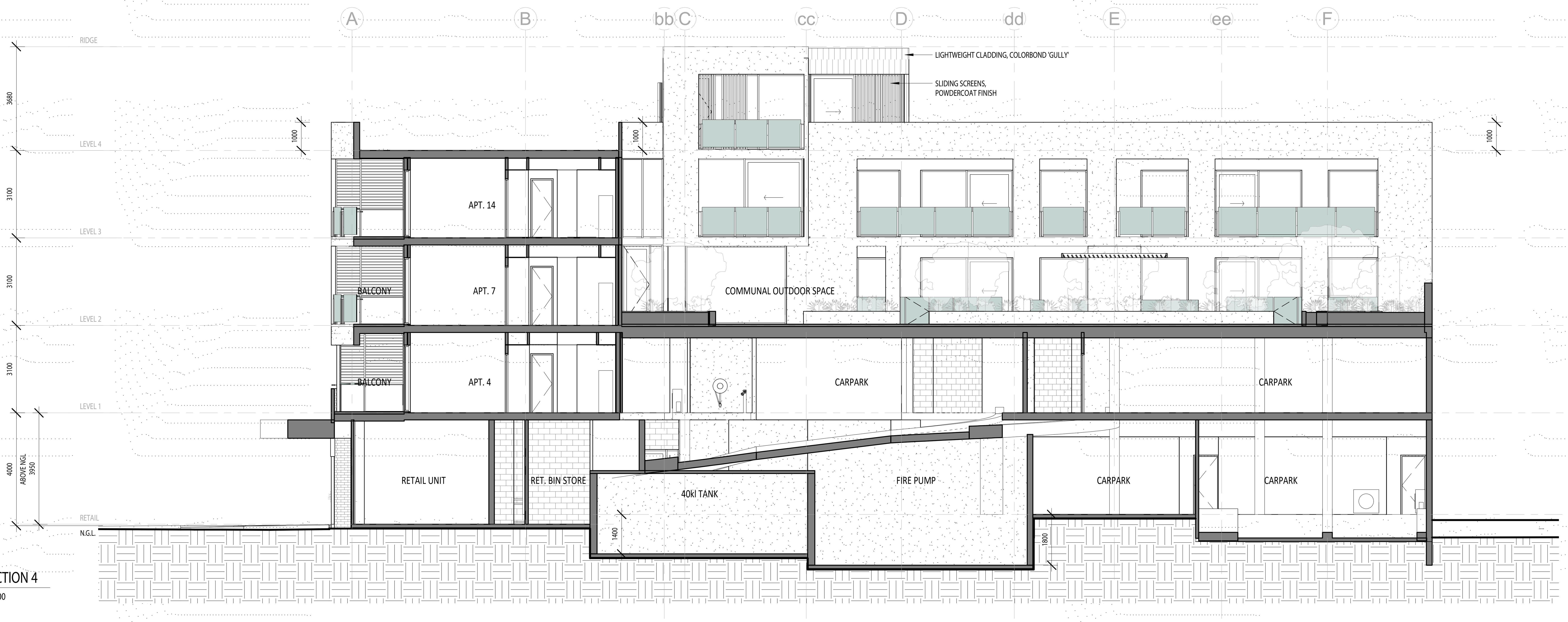

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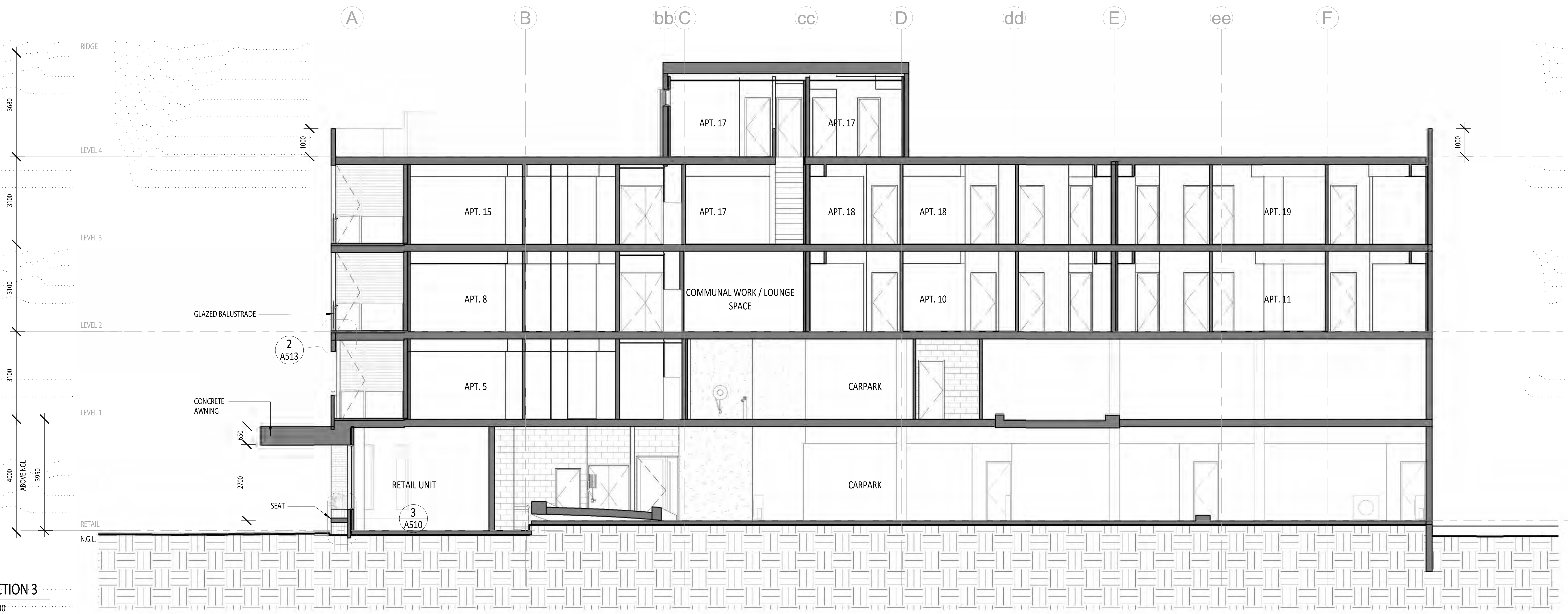

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FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY
A	19.10.21	FOR DEVELOPMENT APPROVAL	

gresleyabas
architecture environment design

Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments
Port Coogee Marina Village - Lot 203
Orsino Boulevard
SECTIONS

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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REV	DATE	AMENDMENT	BY

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architecture environment design

Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments
Port Coogee Marina Village - Lot 203

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

NORTH EASTERN PERSPECTIVE

DRAWN Author	DESIGNED Designer	PRINCIPAL Approver
CHECKED Checker	MODEL PATHNAME BIM 360://Port Coogee/2113 Lot 3 Orisno Blvd Port Coogee DD R-03.rvt	
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Version: 1, Version Date: 10/01/2022

FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design

Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments
Port Coogee Marina Village - Lot 203

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

SOUTH WESTERN PERSPECTIVE

DRAWN Author	DESIGNED Designer	PRINCIPAL Approver
CHECKED Checker	MODEL PATHNAME BIM 360://Port Coogee/2113 Lot 3 Orisno Blvd Port Coogee DD R-03.rvt	
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FOR DEVELOPMENT APPROVAL

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design

Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Port Catherine Developments

Port Coogee Marina Village - Lot 203

SCALE 1:100 @A1 SHEET SIZE (0m 1m 2m 3m 6m)

NORTH WESTERN PERSPECTIVE

DRAWN	DESIGNED	PRINCIPAL
Author	Designer	Approver

CHECKED	MODEL PATHNAME
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		A902	

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LEGEND

TOTAL APPLICATION AREA (7.8686ha)

REVISIONS TO ORIGINAL SUBDIVISION APPROVAL

SERVICES

WATER

PIPE

SEWER

CONNECTION

GRAVITY PIPE

ELECTRICAL

UNDERGROUND DISTRIBUTION LINE

LIGHT POLE/PILLAR

LOT SUMMARY

LOT YIELD			LOT AREA	
Size	No. Lots	% Total Lots	Average Size	% of Total Area
180m² - 234m²	14	60.87%	209m²	15.85%
235m² - 319m²	4	17.39%	309m²	6.70%
320m² - 449m²	2	8.70%	402m²	4.36%
1001m² - 1499m²	1	4.35%	1166m²	6.32%
5000m² - 9999m²	2	8.70%	6161m²	66.70%
Number of Lots	23			
Minimum Lot Size 180m² Maximum Lot Size 6449m²			Average Lot Size 802m² Total Lot Area 18459m²	
Balance Lot	1			
Total Number of Lots	24			

AREA SUBJECT TO FUTURE SUBDIVISION APPLICATION

EXISTING SUBDIVISION

PANTHEON AVENUE

CHIEFTAIN ESPLANADE (24m ROAD RESERVE)

ROAD 3 (ROAD RESERVE VARIES)

CALYPSO PARADE

ROAD 2 (18m ROAD RESERVE)

LANEWAY 1 (6m RESERVE)

LANE 2 (6m RES)

ROAD 1 (15m RESERVE)

NAPOLEON PARADE

ORSINO BOULEVARD

SOCRATES PARADE

795 6724m² 1 6449m²

2 5874m²

3 1166m²

3 1119m²

9153 7.1962ha Balance Lot 9153 5.1923ha

8024 8018 8039 8044 52877 797 796 786

Revised Plan of Subdivision - Freehold (WAPC Ref: 160542)

LOT 795 PANTHEON AVENUE & 9153 ORSINO BOULEVARD, COOGEE

A Frasers Property Australia Project

scale: 1:1500@A3 | 1:750@A1

0 15 30m

plan: 90/057/394

date: 22/06/2021

grid: PCG 94

designed: MB

checked: MB/KS

drawn: BR

Taylor Burrell Barnett Town Planning & Design
Level 7, 160 St Georges Terrace, Perth WA 6000
e: admin@tbbplanning.com.au
p: (08) 9226 4276

Taylor Burrell Barnett

City of Cockburn G.I.S Services Department	**Attachment 3**		SCALE = 1:2000	NORTH

Design Review Report

PROJECT NAME: DR 2
Multiple Dwellings (21) & One Retail tenancy
Lot 9153 Orsino Boulevard, North Coogee

For Referring Authority

September 2021

Design Review Report		
Subject	Multiple Dwellings (21) & One Retail tenancy– DR 2 Lot 9153 Orsino Boulevard, North Coogee	
Date	2021-09-29	
Time	2:00 PM – 2:45 PM	
Location	City of Cockburn	
Design Reviewers	Name Chris Melsom Lisa Shine Geoffrey London	 Panel Chair Panel Member Panel Member
Proponent	Tanya Trevison, Frasers	
Project Team	Tony Watson Gresley Abas	
Planning Authority	City of Cockburn	
Stakeholders		
Declarations	None	
Briefings		
Relevant Authorities Project Team		
Design Review Report endorsement		
Reviewers signature	 Chris Melsom	

Introductory Comments		
Design quality evaluation		
		Supported
		Pending further attention
		Not yet supported
		Yet to be addressed
Strengths of the Proposal		a. The proposal is a well considered mixed use development, with varied frontage, setback and articulation treatments. b. Changes to the plans and design have addressed a number of the queries previously raised. Removal of the 'community use' space from the previous proposal simplifies the development overall which provides a more appropriate mix of uses on the site. c. The scale of the development at four storeys is less than the allowable maximum, but appropriate for the intended uses in an important corner location. *d.* Ground floor retail fronting Calypso Parade provides the opportunity to activate the 'main street' as intended in the masterplan.
Principle 1 **Context and character**		*Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*
		a) The preparation of a contextual concept/master plan (separate item) was appreciated by the panel. b) The proponent noted the need to separate access to the development from the adjacent open space for security reasons. c) The scale, bulk, orientation and mix of uses is considered highly appropriate in the context of the site.
Recommendations		**1. Give further consideration to the design of the west elevation and parking levels to the proposed public open space and laneway.**
Principle 2 **Landscape quality**		*Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*
		a) The selection of trees and plant species will be an important component of the development. Clarification of the intended tree species is required and should be clearly marked on drawings.
Recommendations		**1. The landscape plan should specify plant species and associated treatments, particular the ground level tree species.** **2. Planting should be used to support the 'zoning' and use of the outdoor community space on level 2.**
Principle 3 **Built form and scale**		*Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*
		a) The scale of the development, site planning and general built form are considered to be appropriate for the site and its role as a gateway to the village high street. b) The addition of a 'loft' level to one of the units should provide an additional point of interest and amenity to the development.
Recommendations		**1. Further consideration should be given to the roof form, the potential activation of additional roof area and associated landscape treatments.**
Principle 4 **Functionality and build**		*Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*

quality		
		a) The panel queried the size and layout of the internal vehicle circulation and parking. b) The panel queried the adequacy of facilities and/or available space for the retail floorspace, particularly in relation to the ability to further divide this space two or more retail premises.
Recommendations		**1. Ensure car park internal circulation arrangements, including the ability for vehicles to pass by each other, clear visibility of oncoming and turning vehicles are formally addressed.** **2. Give consideration to removing internal corridor corner truncations around the lift/entry lobby to improve internal space efficiency.** **3. Review 'back-of-house' facilities and adequacy of available space to ensure that retail spaces are 'fit for purpose' and optimal end uses.**
Principle 5 **Sustainability**		*Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*
		a. The panels supports the intent for the development to achieve a high-level green star rating. b. General sustainability treatments including flow-through ventilation, access to sunlight and power were discussed by the applicant.
Recommendations		**1. The developer is encouraged to develop further detail in construction and operational sustainability initiatives.**
Principle 6 **Amenity**		*Good design optimises internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*
		a) The amenity to be provided by the surrounding precinct, adjacent POS and nearby waterfront are noted to be of benefit to this development. b) The relative convenience of collocated bicycle storage and waste bin locations was queried by the panel.
Recommendations		**1. Detailed consideration of end-of-trip facilities, storage room locations, opening direction of the storage room doors.**
Principle 7 **Legibility**		*Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*
		a. The orientation and form of the development combined with the location of the main entry is highly legible. b. Changes to the location of the main stair and lift entry provide additional legibility to the development. .
Recommendations		**1. Consider location of the doorway to the communal facility/amenity room on level 2 in relation to visibility from the access lobby area.** **2. Consider the provision of window glazing to provide natural light into the stairwell and to improve legibility.** **3. Consider design revisions to the linkage space between the communal facility/amenity room and adjacent outdoor open space area.**
Principle 8 **Safety**		*Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*
		a. Safety and functionality of the limited vehicle ramp width was queried by the panel. b. The proponent discussed not providing pedestrian access from the rear of the development to the laneway and adjacent open space for safety and security reasons.
Recommendations		**1. Provide clear consideration of safe vehicle and pedestrian movement within the car parking structure.** **2. Give consideration to ensuring visibility of the laneway and open space from within the development and particularly from the communal terrace on level 2 to facilitate public safety.**
Principle 9		*Good design responds to local community needs as well as the wider social context,*

Community		*providing environments that support a diverse range of people and facilitate social interaction.*
		a. The panel appreciates the role of the surrounding precinct in providing amenity to the proposed residences. The potential use and 'zoning' of the terrace, however, was not clear from the drawings. b. The positioning of seats, screen and gathering spaces on the communal terrace area should be considered in relation to views to the public open space and the visibility of activity on the terrace from the POS.
Recommendations		**1. Consider opportunities to provide outlook over and visibility from the adjacent POS from the communal open space terrace area.**
Principle 10 **Aesthetics**		*Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*
		a) Presentation of the development to the rear laneway appears to be fragmented. Consideration should be given to the massing and materials of this facade in the context of the laneway and adjacent open space. b) The treatment of stepped/varied setbacks reflecting different uses and orientation together with the varied material treatments provide a positive design response to the location. c) As a gateway site, the development provides a positive opportunity to transition from the main entry residential street into the activated high street environment. d) Curving of brickwork panels creates a positive opportunity to create aesthetic highlights. The selection and specification of brickwork details to the curved facades will be an important consideration
Recommendations		**1. Provide further details to curved face brickwork panels.** **2. Further consideration to elevational design and details to the Onyx lane.**

Concluding Remarks

The Panel acknowledge the positive design approach taken to the composition, layout, mix of uses and scale of development. The design will make an important contribution to the quality of built form and public realm in the location.

The panel also noted the beneficial impact of changes made since the first presentation and appreciated the presentation of contextual planning and design.

Further consideration of the relationship between the site and the adjacent laneway is encouraged in the context of ongoing review of the POS.

Although not discussed with the applicant, the panel queried the intended treatment of the exposed side (southern) faced of the development as this may remain exposed even after the adjacent site is developed. This should be considered by the proponent.

Design Review progress

	Supported
	Pending further attention
	Not yet supported
	Yet to be addressed

	DR1	*DR2*	*DR3*
Principle 1 - **Context and character**			
Principle 2 - **Landscape quality**			
Principle 3 - **Built form and scale**			
Principle 4 - **Functionality and build quality**			

Principle 5 - **Sustainability**			
Principle 6 - **Amenity**			
Principle 7 - **Legibility**			
Principle 8 - **Safety**			
Principle 9 - **Community**			
Principle 10 - **Aesthetics**			

Transport Impact Statement

Proposed Mixed-use Development - Lot 203 Orsino Boulevard, Port Coogee (For Development Application)

CW1178600

Prepared for

Port Catherine Developments Pty Ltd

21 October 2021

Cardno

Contact Information

Cardno (WA) Pty Ltd
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

www.cardno.com
Phone +61 8 9273 3888
Fax +61 8 9486 8664

Document Information

Prepared for	Port Catherine Developments Pty Ltd
Project Name	Proposed Mixed-use Development -Lot 203 Orsino Boulevard, Port Coogee (For Development Application)
File Reference	CW1178600-TR-RT-R001-B-TIS-Lot 203 Orsino Boulevard, Port Coogee
Job Reference	CW1178600
Date	21 October 2021
Version Number	B

Author(s):

Dana Romic
Transport Planner

Effective Date 21/10/2021

Approved By:

Ray Cook
Business Leader – Traffic & Transport Planning

Date Approved 21/10/2021

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
A	24 September 2021	For issue	DR	RJC
B	21 October 2021	Minor Updates	DR	RJC

Table of Contents

Appendices

Tables

Figures

1 Introduction

1.1 Background

Cardno was commissioned by Port Catherine Developments Pty Ltd ("the Client") to prepare a Transport Impact Statement (TIS) for proposed mixed-use development at Lot 203 Orsino Boulevard, Port Coogee ("the Site").

This TIS has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2006)* and the checklist is included in **Appendix A.**

1.2 Existing Site

The Site is located at Lot 203 Orsino Boulevard, Port Coogee as shown in **Figure 1-1.** The Site is currently vacant land.

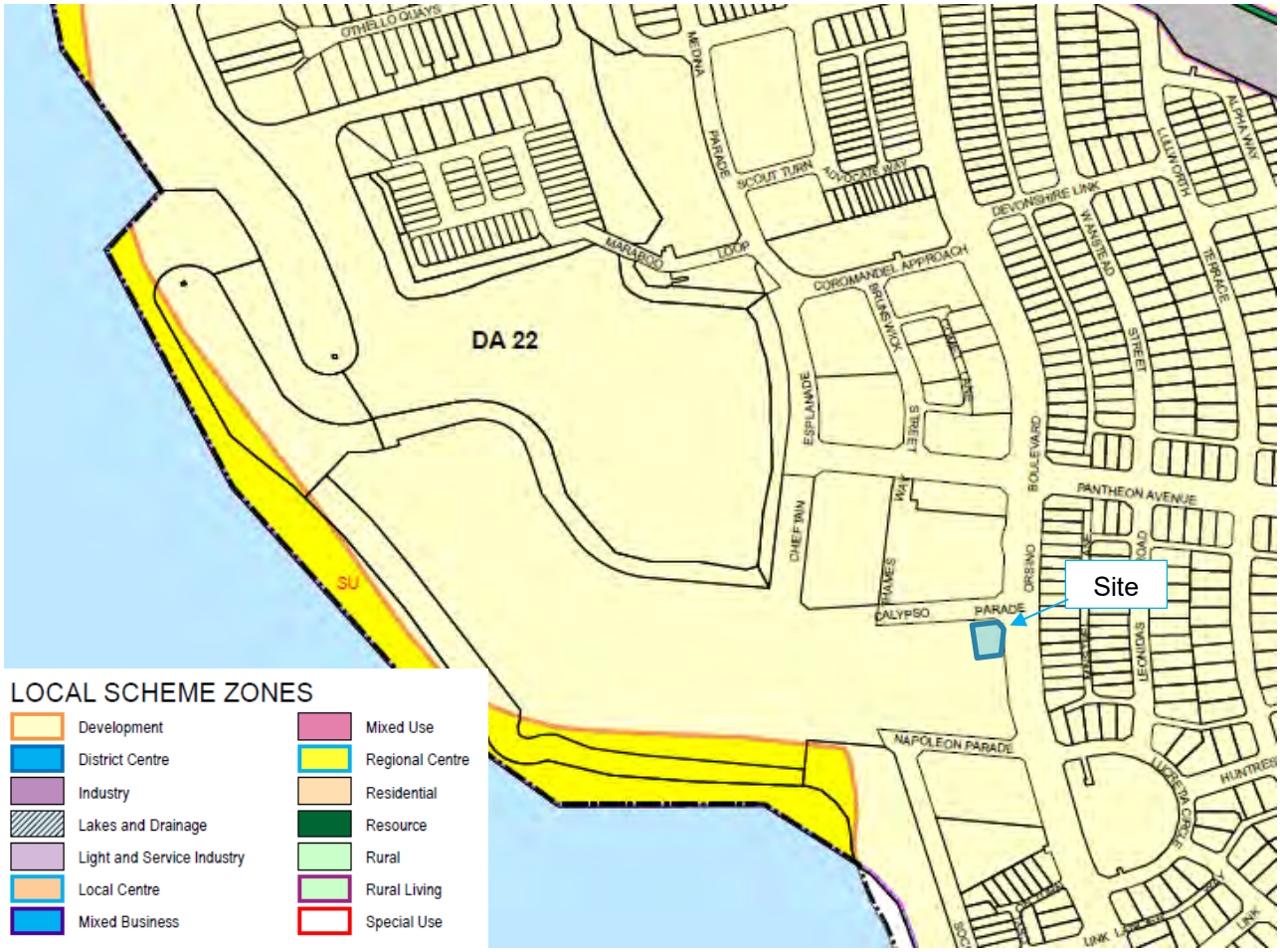
Figure 1-1 Aerial Image of Site

Source: MetroMap (2021)

1.3 Surrounding Land Uses

Pursuant to the provision of the *City of Cockburn Local Planning Scheme No. 3* (LPS3), the Site is zoned "*Development*" as shown in **Figure 1-2.** The Site is wholly surrounded by other Development zoned land uses.

Figure 1-2 Existing Zoning



Source: City of Cockburn Local Planning Scheme No. 3

1.4 Existing Road Network

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

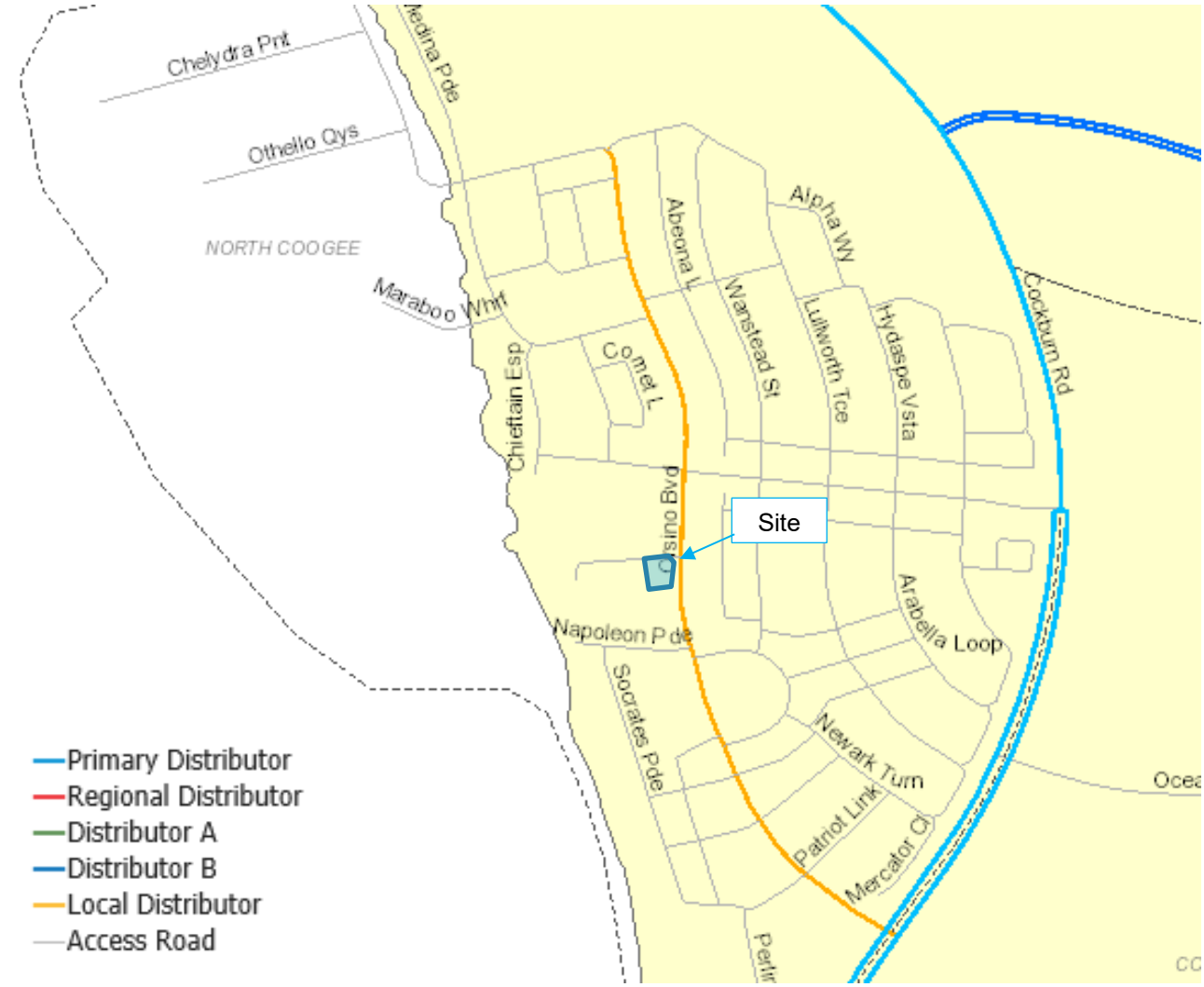
- **Primary Distributors (light blue):** Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State Roads WA.
- **Distributor B (dark blue):** preform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.
- **Local Distributors (orange):** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- **Access Roads (grey):** Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

The Site is bound by Calypso Parade to the north and Orsino Boulevard to the east. The surrounding road network is further described in **Table 1-1** and **Figure 1-3** shows the road hierarchy as per the Main Roads WA Road Information Mapping System.

Table 1-1 Road Network Classification

Street Names	Road Hierarchy		Road Network			
	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Width (m)	Posted Speed limit (km/h)
Calypso Parade	Access Road	Local Government	2	2	7m	50
Pantheon Avenue	Access Road	Local Government	2	2	24.5m road reserve 12.5m kerb-to-kerb (including median & cycle lanes)	50
Orsino Boulevard	Local Distributor	Local Government	2	2	27m road reserve 15m kerb-to-kerb (including median & cycle lanes)	50

Figure 1-3 MRWA Road Network Classification



Source: Main Roads WA Road Information Mapping System

1.5 Traffic Volumes

Existing daily traffic volume data was obtained from the City of Cockburn's Intramaps and shown below in **Table 1-2**.

Table 1-2 Existing Traffic Volume

Road Name	Date	Average Weekday Two-way Traffic Volume	HV%
Pantheon Avenue (east of Chieftain Esplanade)	2020	843	6.3%
Orsino Boulevard (south of Pantheon Avenue)	2017	2016	8.6%
Orsino Boulevard (north of Pantheon Avenue)	2021	2215	7.6%

1.6 Crash Assessment

A crash assessment for the surrounding road network of the Site has been completed using the Main Roads WA Reporting Centre, as shown in **Table 1-3**, **Table 1-3** and **Table 1-5**. The assessment covers all the recorded accidents for the 5-year period between 1 January and 31 December 2020.

Table 1-3 Total Crashes

TOTAL CRASHES						
Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	**Total Crashes**
Right Angle	-	-	-	2	-	**2**
Unspecified	-	-	-	-	1	**1**
Total	**-**	**-**	**-**	**2**	**1**	**3**

Table 1-4 Intersection Crashes

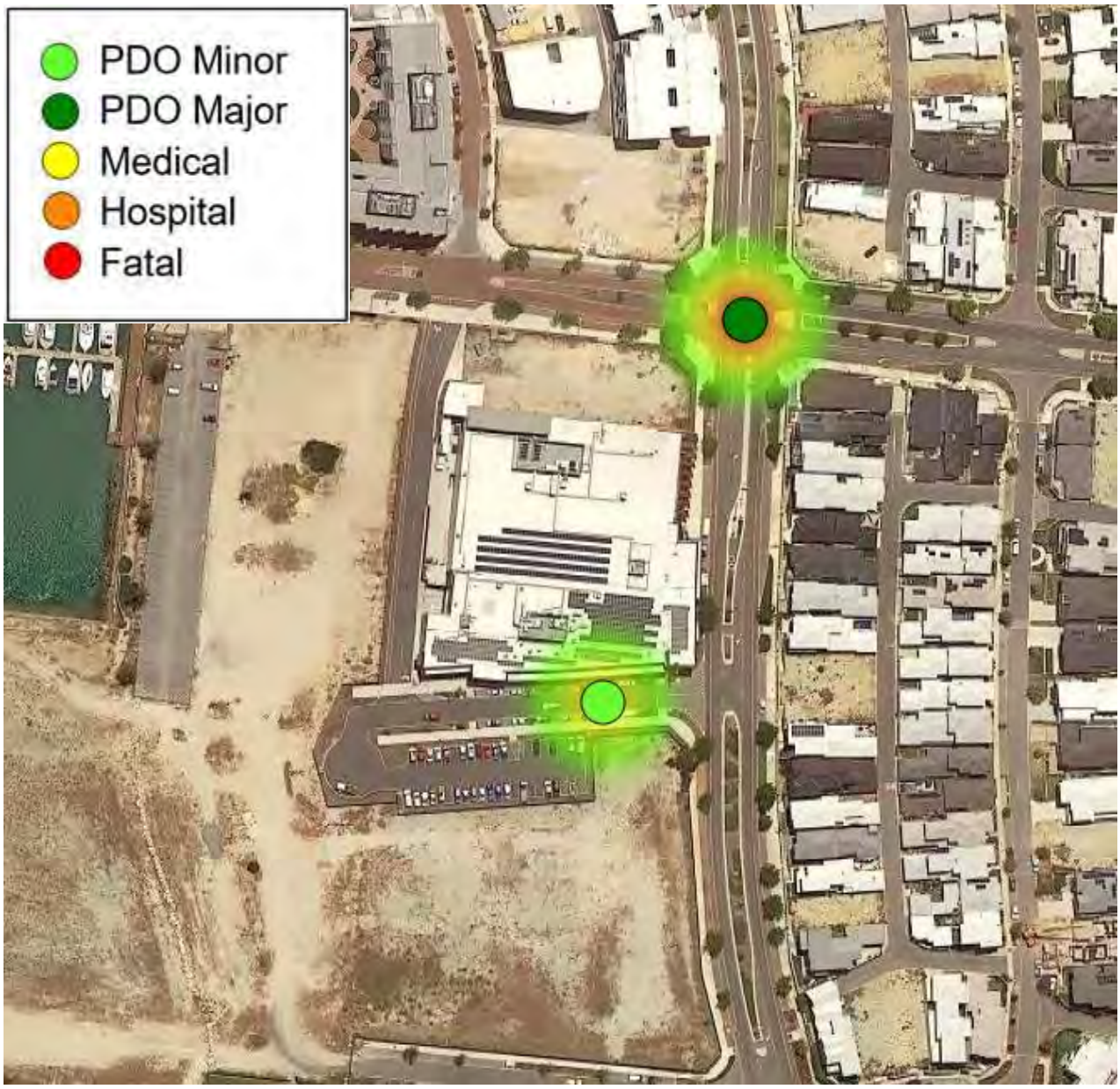
INTERSECTION CRASHES						
Intersection Name	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	**Total Crashes**
Orsino Bvd - Pantheon Av	-	-	-	2	-	**2**
Total	**-**	**-**	**-**	**2**	**-**	**2**

Table 1-5 Midblock Crashes

MIDBLOCK CRASHES						
Road Name	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	**Total Crashes**
Calypso Pde	-	-	-	-	1	**1**
Total	**-**	**-**	**-**	**-**	**1**	**1**

Figure 1-4 shows the crash locations and their intensity along Orsino Boulevard and Calypso Parade.

Figure 1-4 Crash Locations



A summary of the crash data is as follows:

- There were no fatal accidents or crashes that required hospitalisation/medical attention;
- The majority of crashes recorded resulted in major/minor property damage; and
- The majority of crashes recorded were at the intersection of Orsino Boulevard and Pantheon Avenue.

It is very unlikely that this development would have any material impact on road safety in the area due to its small scale.

2 Public Transport Facilities

2.1 Existing Public Transport Facilities

The Nearest bus stops to the Site are located approximately 50m away along Orsino Boulevard and are shown below in **Figure 2-1**. Pedestrian access to the bus stops is available via existing footpaths along Orsino Boulevard.

Bus route 548 operates from these stops as shown in **Figure 2-1**, and travels from Fremantle Station to Rockingham Station. **Table 2-1** summaries the bus frequency for the 548-bus route.

Figure 2-1 Nearest Bus Stop

Source: MetroMap (2021)

Figure 2-2 Existing Bus Routes

Source:Transperth Bus Network Map (2021)

Table 2-1 Bus Routes

Route No.	Route Description	Frequencies		
		Weekdays	Saturdays	Sundays and Public Holidays
548	Fremantle Station to Rockingham Station	30 minutes	60 minutes	60 minutes

2.2 Future Public Transport Facilities

Cardno contacted the Public Transport Authority and understand there are no proposed changes to the network in this area within the short term.

3 Pedestrian/Cycle Networks and Facilities

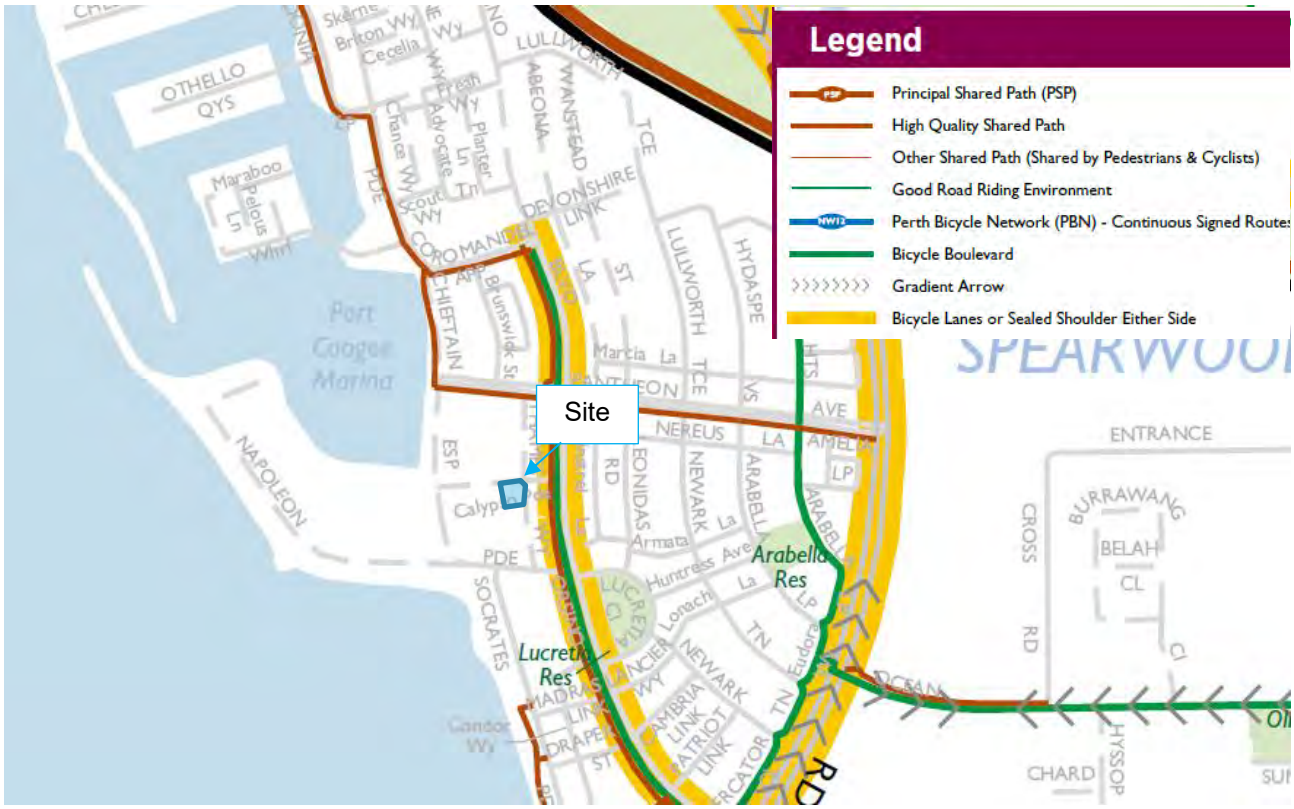
3.1 Existing Pedestrian/Cycle Network

Footpaths are provided on both sides of Orsino Boulevard and Calypso Parade, providing excellent local pedestrian connections.

Shared paths run along Chieftain Esplanade, Pantheon Avenue and Orsino Boulevard as shown below in **Figure 3-1**. Orsino Boulevard provides a “Good Riding Environment”, with sealed shoulders running along both sides.

Overall, access to the Site will be facilitated by excellent pedestrian/cycling networks.

Figure 3-1 Pedestrian and Cycle Network



Source: Department of Transport Cycling Maps

3.2 Future Pedestrian/Cycle Network

Cardno contacted the City of Cockburn and understand there are no proposed changes to the network within the short term.

4 Proposed Development

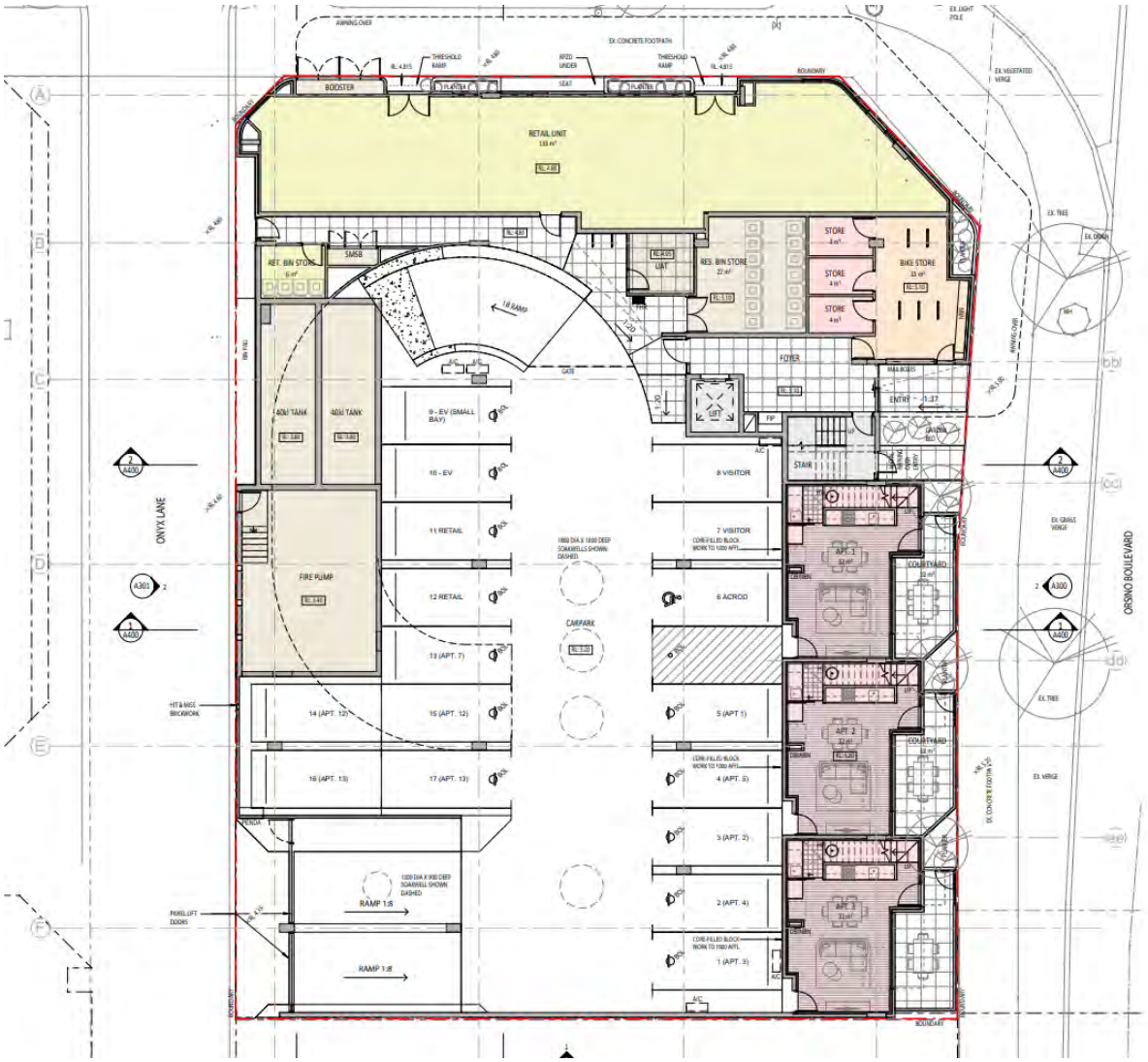
4.1 Proposed Development

The proposed mixed-use development comprises of the following site-specific design components:

- 21 apartments
  - 3 x 1 bedroom
  - 18 x 2 bedroom
- 133m^2 Retail
- 37 car parking bays

The layout of the proposed development at the Site is shown below in **Figure 4-1**. Please note, larger versions are included in **Appendix B.**

Figure 4-1 Ground-Floor Site Plan



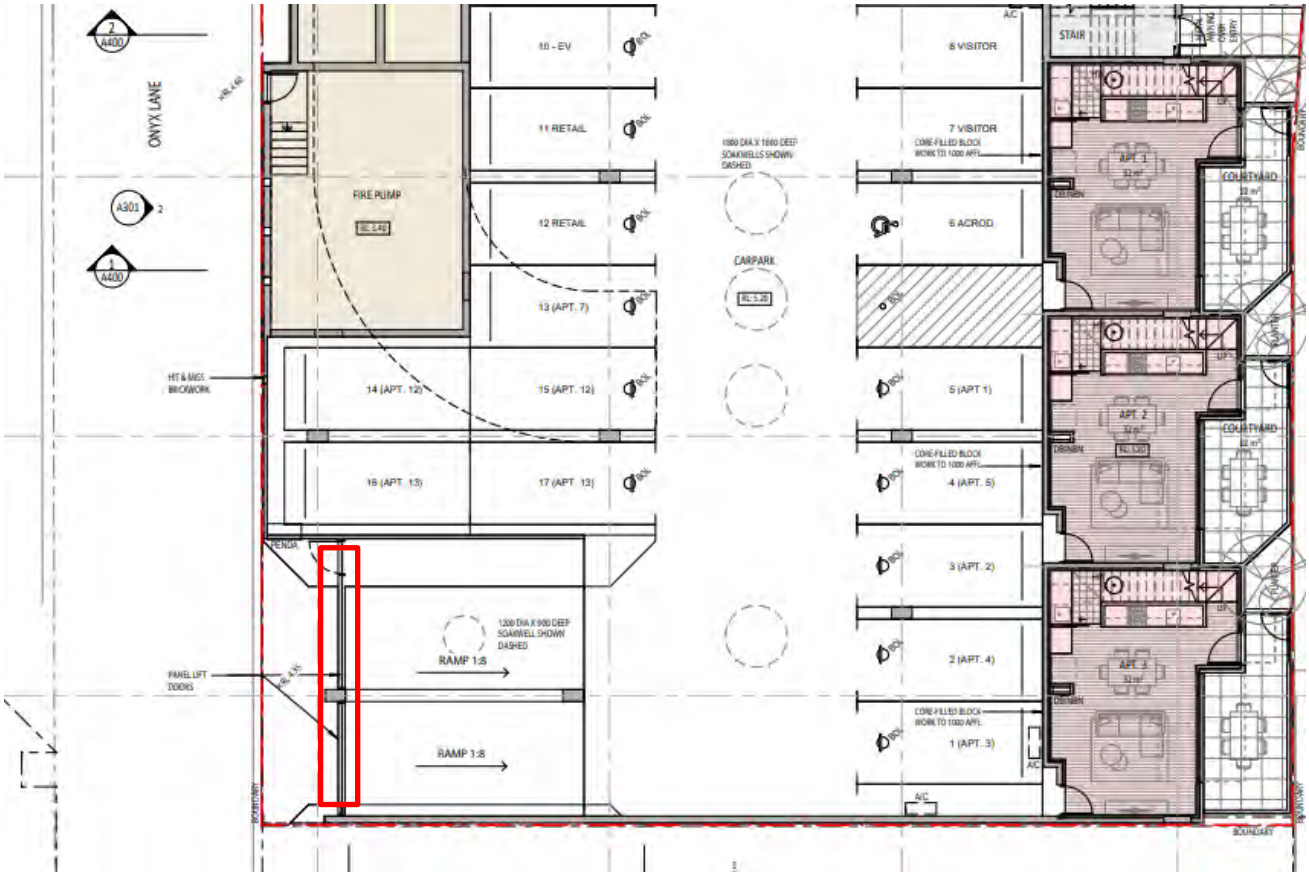
Source: Gresleyabas architecture (2021)

4.2 Access Arrangements and Management

4.2.1 Site Access

Two-way Site access is proposed via Onyx Lane, as shown in **Figure 4-2**.

Figure 4-2 Access Arrangements



Source: Gresleyabas architecture (2021)

4.2.2 Car Park Access Management

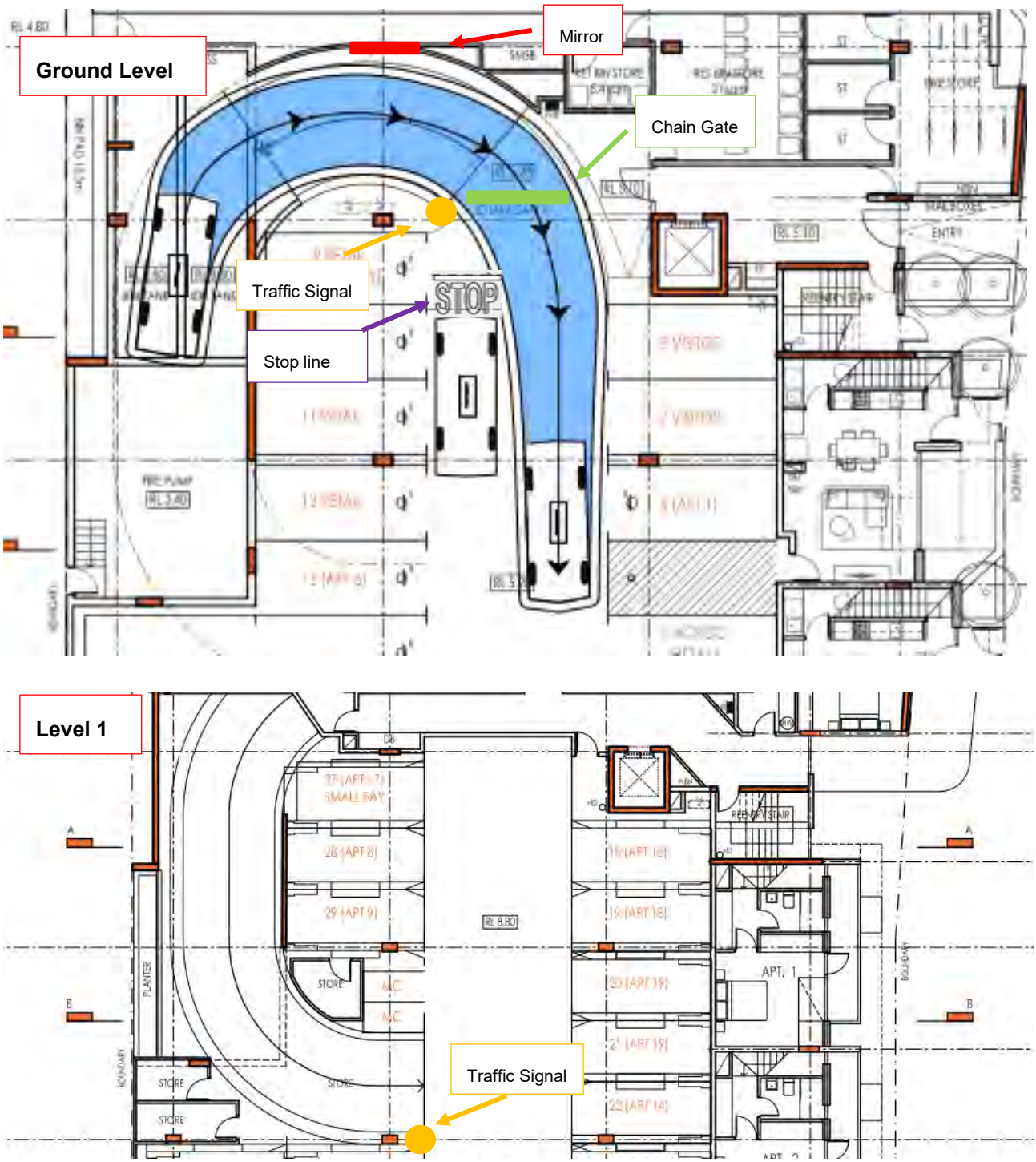
A 3.6m wide (wall to wall) curved ramp provides access to the Level 1 car park. As the ramp is only wide enough for on-way traffic, traffic flows will be managed by a signalling and detection system to provide safe access by residents. Mirrors may also be installed at the curve of the ramp to provide visibility.

A potential signal system arrangement is shown in **Figure 4-3**. A stop line on the ground floor will indicate where the vehicle must stop and appropriate signage will be displayed to warn vehicles of the signal. A chain gate installed on the ground level ramp entrance will assist in the management system, as described below.

- **Access from Ground Floor:** By default, the light will be red for cars entering the Site from ground level and red for cars exiting from Level 1. Drivers using the ramp will lower the chain gate using a remote, which will also trigger the signal system to hold the red light on Level 1 for 10 seconds. Entering vehicles then drive up the ramp and into their parking bay. The default red light for entering vehicles ensures that there would be no queuing at the driveway and the ground floor car park area.
- **Egress to Ground Floor:** For vehicles exiting from level 1, the light would be red by default and vehicles would need to trigger the signal using their remote and wait in their parking bay until the Level 1 light turns green. This will occur so long as no vehicles have been detected on the ground floor. The ground floor light will change to red and the chain gate will be dropped.

Appropriate speed reminder and courtesy signage would be provided at access and egress points to encourage low speed environment. Users of the ramp and signalising system will all be residents of the building and familiar with the arrangements. They will be supported by information in their welcome pack.

Figure 4-3 Potential Signal Arrangement



Source: Gresleyabas architecture (2021)

4.3 Traffic Generation

Trip generation has been calculated for the Site, utilising trip generation rates from the *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Ed.* **Table 4-1** shows the trip generation rates, **Table 4-2** shows the directional distribution and **Table 4-3** presents the resultant potential trip generation of the proposed development.

Table 4-1 Trip Generation Rate

Land Use	ITE Code/Source	AM Peak	PM Peak
Multifamily Housing (Low-Rise)	ITE 220	0.56 trips per dwelling	0.67 trips per dwelling
Shop (Non-Food)	RTA	1.25 per 100 sqm	4.00 per 100 sqm

Table 4-2 Directional Distribution

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Multifamily Housing (Low-Rise)	28%	72%	59%	41%
Shop (Non-food)	80%	20%	50%	50%

Table 4-3 Total Trip Generation of the Proposed Development

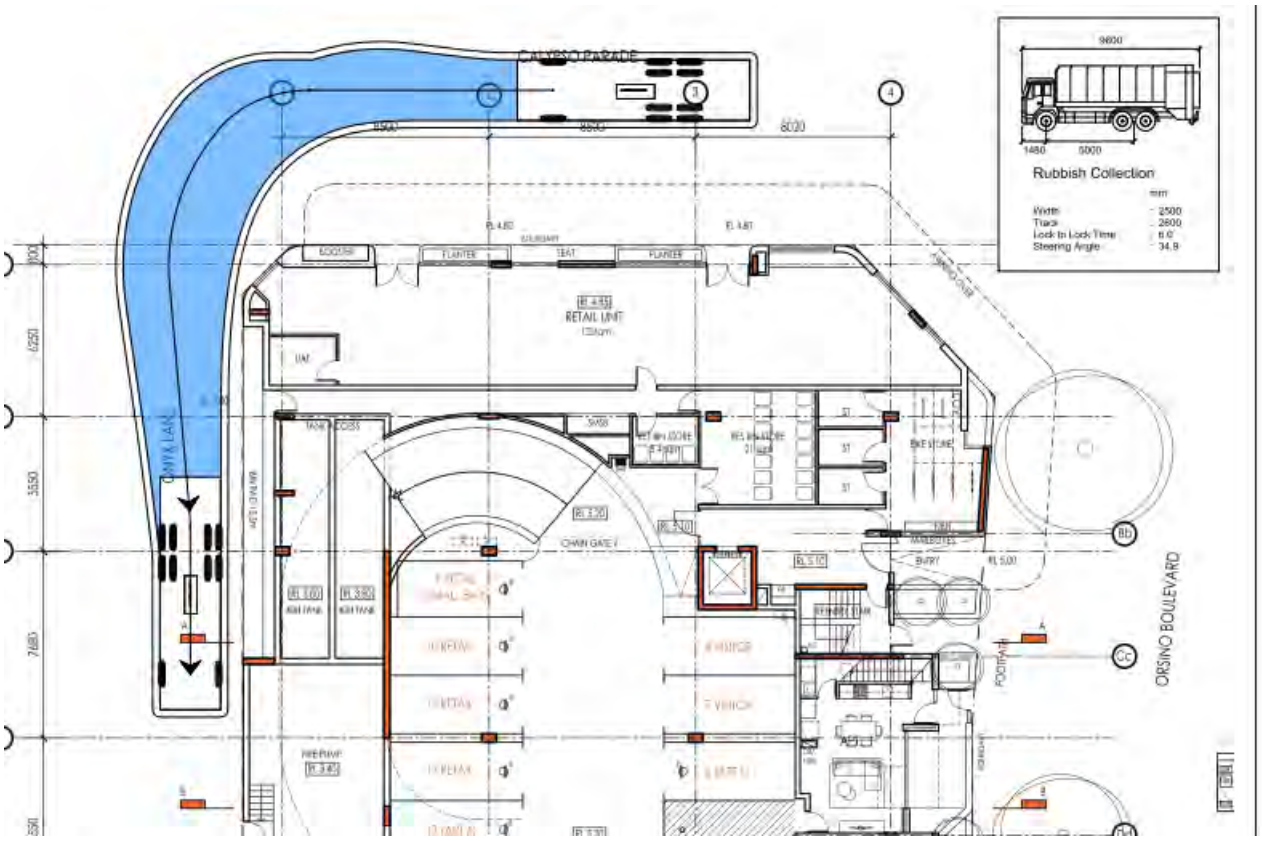
Land Use	AM Peak		PM Peak	
	In	Out	In	Out
Multifamily Housing (Low-Rise)	4	9	9	6
Shop (Non-Food)	2	1	3	3
Total	**16**		**21**	

The development will have a trip generation of approximately 16 trips during the AM Peak hour, 21 trips in the PM Peak.

4.4 Provision for Service Vehicles

Waste collection, using a 9.6m waste vehicle, is expected to occur along Onyx Lane, as shown in **Figure 4-4.** The waste vehicle will enter from Calypso Parade and park along the allocated bin pad area along Onyx Lane.

Figure 4-4 Swept Path 9.6m Waste Vehicle



5 Parking Supply

5.1 Parking Requirements

The Statutory parking requirements, in accordance with *State Planning Policy 7.3 Residential Design Codes Volume 2 – Apartments* and the *City of Cockburn Town Planning Scheme No. 3* (TPS3) and the *Port Coogee Marina Village Built Form Codes (BFC),* and have been considered in the context of the proposed development and are summarised below in **Table 5-1.**

For more information regarding car parking, please refer to the Development Application.

Table 5-1 Car Parking Provision and Requirements

Proposed Land Use	Requirements	Source	Yield	Parking Required	Parking Provided
Residential	1-bedroom dwelling (0.75 bay per dwelling) 2+ bedroom dwellings (1 bay per dwelling)	R-Codes Vol 2	3	3 bays	**30 bays**
		R-Codes Vol 2	18	18 bays	
Residential Visitor	1 bay per 4 dwellings 1 bay per eight dwellings for the 13th dwelling and above	R-Codes Vol 2		4 bays	2 bays
Retail	1 per 18.75m2 NLA	BFC	97.5m2	6 bays	5 bays (2 shared with visitors) plus 2 EV charging bays
Total				**31 bays**	**37 bays**

Two parking bays located at the Ground Floor would be available for both residential and commercial visitors. Given that the proposed land uses do not have coincident peak demands, they can be considered as part of both the retail and residential visitor supply.

However, visitors greatly prefer the use of this accessible and legible public supply over small numbers of parking bays within the building structure. This development location benefits from a significant supply of available public parking, located in the adjacent area. Cardno's *Port Coogee Marina Village Parking Management Plan* details the extent of this supply, and shows that there is more than sufficient capacity to accommodate both residential and commercial visitors in the public realm.

The proposed EV charging bays will be available for charging resident and tenant electric vehicles as required.

Given the above, it is considered that the proposed development parking is sufficient to accommodate the car parking requirements for the development.

5.2 Bicycle Parking Requirements

The Statutory requirements for bicycle parking for the proposed development at the Site, are defined in the *State Planning Policy 7.3 Residential Design Codes Volume 2 – Apartments,* and summarised below in **Table 5-2**.

Table 5-2 Bicycle Parking Requirements and Provision

Development Classification	Proposed Land Use	Requirements	Yield	Parking Required	Parking Provided
Residential Apartment	Apartments	0.5 space per dwelling	21 apartments	11 spaces	13 spaces
Residential Visitor		1 space per 10 dwellings		2 spaces	
Commercial	Retail/Shop	N/A			
Total				**13 spaces**	**13 spaces**

The proposed development will provide a total of 13 bicycle parking spaces, within a bike store proposed along Orsino Boulevard. Additionally, residential bike parking may be provided using the proposed storage spaces on-Site.

Given the above, the bicycle parking provision satisfies the relevant bicycle parking requirements set out in the *R-Codes Volume 2.*

5.3 Parking Compliance with Australian Standards

Cardno has undertaken a review of the proposed car park and has not identified any non-compliances with *Australian Standard AS2890.1:2004 – Part 1: Off Street Car Parking*.

6 Summary

This Transport Impact Assessment outlines the transport aspects of the proposed subdivision focusing on traffic operations, access, and car parking. Discussions regarding pedestrian, cycle and public transport considerations are also provided.

This TIS has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016).*

The following conclusions are evident:

- The proposal is for 21 multiple dwellings (residential apartments) and retail;
- The development is expected to have a total trip generation of approximately 16 trips during the AM peak hour and 21 trips in the PM peak hour;
- 37 car parking bays are proposed on-site; and
- The Site is located approximately 50m from bus stops that service route 548.

Overall, the Site is anticipated to have no material impact on the surrounding road network and no material impact on residential amenity.

Proposed Mixed-use Development - Lot 203 Orsino Boulevard, Port Coogee (For Development Application)

APPENDIX A

WAPC CHECKLIST

Item	Section	Comments/Proposals
Proposed Development		
proposed land use	Section 1, 3	
existing land uses	Section 1.2	
context with surrounds	Section 1.3	
Vehicular access and parking		
access arrangements	Section 4.2	
public, private, disabled parking set down / pick up	Section 4.2	
Service vehicles (non-residential subdivisions only)		
access arrangements	Section 4.4	
on/off-site loading facilities	Section 4.4	
Traffic volumes and vehicle types	Section 1.5	
rubbish collection and emergency vehicle access	Section 4.4	
Type of vehicles (e.g. cars, trucks)	Section 1.5	
Traffic management on frontage streets	N/A	
Public transport access		
nearest bus/train routes	Section 2	
nearest bus stops/train stations	Section 2	
pedestrian/cycle links to bus stops/train station	Section 2	
Pedestrian access/facilities		
existing pedestrian facilities within the development (if any)	Section 3	
proposed pedestrian facilities within development	N/A	
existing pedestrian facilities on surrounding roads	Section 3	
proposals to improve pedestrian access	N/A	
Cycle access/facilities		
existing cycle facilities within the development (if any)	Section 3	
proposed cycle facilities within the development	N/A	
existing cycle facilities on surrounding roads	Section 3	
proposals to improve cycle access	N/A	
Site specific issues	N/A	
Safety issues		
identify issues	N/A	No safety issues identified
remedial measures	N/A	None necessary

Port Coogee - Lot 203 Orsino Blvd - Apartment - Landscape DA Report

Client: Port Catherine Developments Pty Ltd
Issue: For Development Application (LD Total Rev I)
Date: 21.10.2120

FOR DEVELOPMENT APPLICATION

Vision / Concept

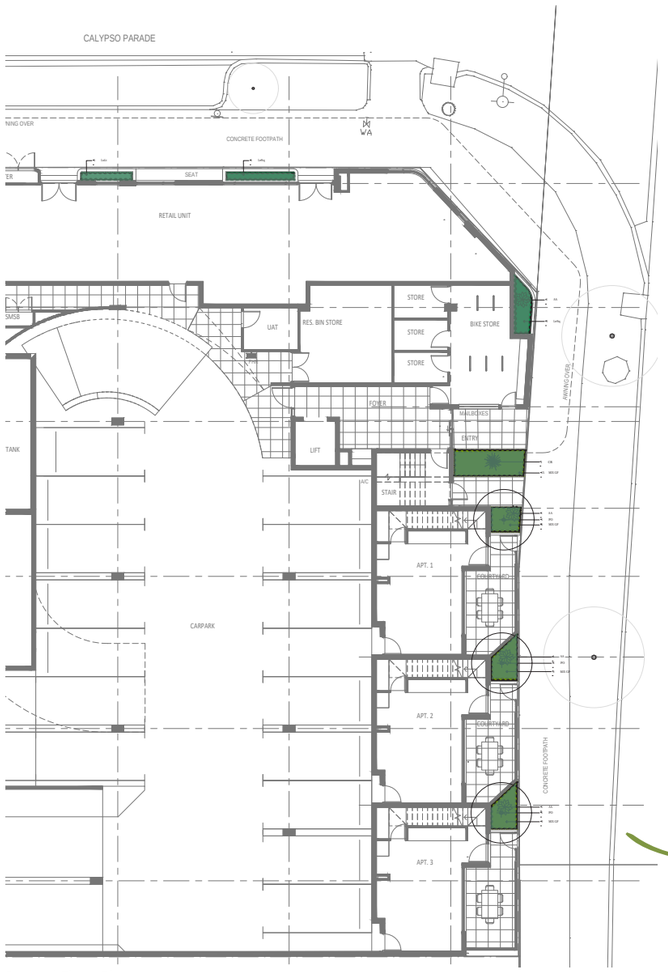
Ground Floor

SITE CONTEXT

- Coastal environment location with increased exposure to elements eg salt winds
- Active street appeal of corner lot within walking distance of the Port Coogee Marina Heart surrounded by retail & residential
- Public & private realm via street planting & personal courtyard planters

LANDSCAPE APPROACH

- Focus on coastal planting palette & robust species
- Enhance street appeal through greening
- Screening of private courtyards
- Allow permeability for retail opportunties
- Use vegetation to break linear forms, crossing boundaries, cascading elements
- Tone & Texture from green & silver planting



Ground Floor Plan

Street & private courtyard planters
Shopfront planting
Laneway greening
Verge & Street tree planting

Vision / Concept

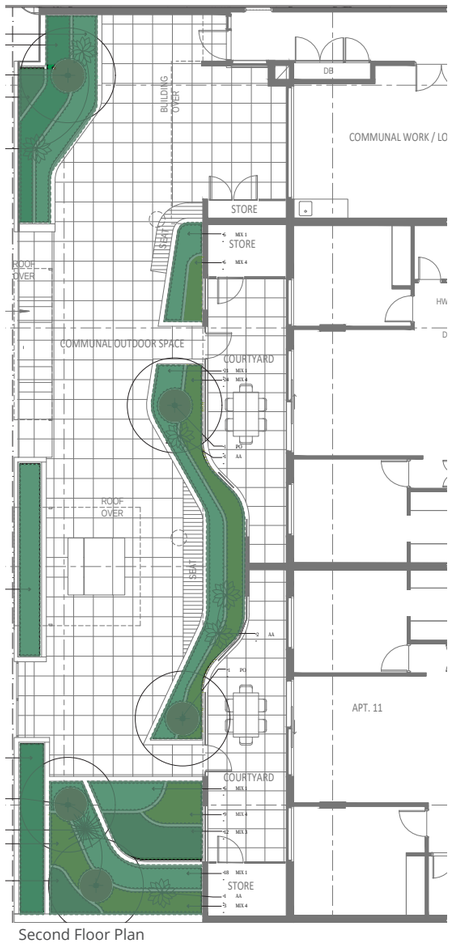
Second Floor

SITE CONTEXT

- Coastal environment location with increased exposure to elements eg salt winds
- Communal & private interface via private courtyards within communal terrace
- Podium landscaping via deep soil areas for tree planting, % of greening & canopy required for development

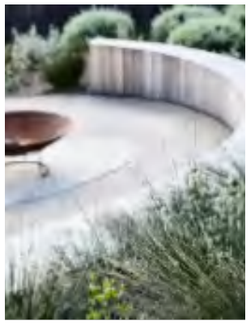
LANDSCAPE APPROACH

- Focus on coastal planting palette & robust species
- Communal space to provide a green oasis for residents, use planters & built form to create nooks for different groups to gather
- Key raised planters with deep soil areas to allow for tree planting
- Use vegetation to screen private courtyards from communal space
- Opportunities for cascading plants to enhance laneway appeal & compliment western facade treatment
- Opportunity for creeping & climbing plants eg on shade structure / arbor
- Use vegetation to break linear forms, crossing boundaries, cascading elements
- Tone & Texture from green & silver planting



Second Floor Plan

Communal outdoor space
Private courtyard screening
Cascading & Creeping plants
Screening from weather



Plant Palette

Ground & Second Floor


9


10


11


12

Tree options:

1. Plumeria obtusa (Frangipani)
2. Magnolia ‘Little Gem/Teddy Bear’
3. Prunus ‘Elvins’
4. Laurus nobilis ‘Baby Bay’
5. Olea ‘Swan Hill’
6. Agonis ‘Burgundy’
7. Hakea laurina
8. Melaleuca leucadendra
9. Eucalyptus foecunda
10. Corymbia eximia nana
11. Leptospermum brachyandrum
12. Cupaniopsis anacardiodes


1


2


3


4


5


6


7


8

Groundcovers:

1. Senecio serpens
2. Carpobrotus virescens
3. Myoporum parvifolium

4a. Scleranthus biflorus

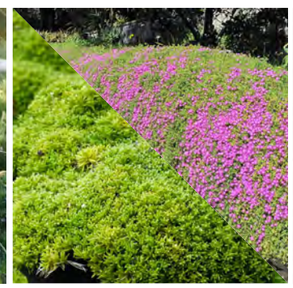
4b. Drosanthemum hispidum (Ice)

5. Marianthus paralius
6. Eremophila ‘Carramar Carpet’
7. Scaevola ‘Flat Fred’
8. Maireana ‘Silver Ghost’


1

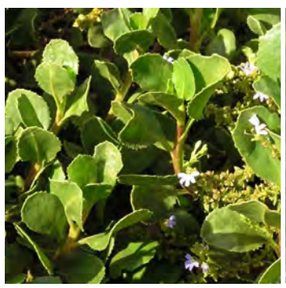

2


3


4b, 4b


5


6


7


8

Shrubs:

1. Conospermum stoechadis
2. Olearia ‘Ghost Town’
3. Leucophyta brownii
4. Conostylis candicans
5. Lomandra
6. Lepidosperma squamatum
7. Westringia ‘Low Horizon’
8. Hardenbergia ‘Meema Mini’


1


2


3


4


5


6


7


8

Special Use:

1. Bougainvillea (terracotta)
2. Agave attenuata
3. Casuarina ‘Cousin It’ (cascades)
4. Acacia ‘Green Mulch’ (cascades)
5. Tetragonia decumbens (cascades)
6. Kennedia nigricans (cascades)
7. Chysocephalum (buttons)
8. Cycas revoluta (in low bowl)


1


2


3


4


5


6


7


8

Soil Area Study - Indicative Only

Ground Floor & Second Floor

SOIL AREAS GENERAL NOTES

- Best practice for developments is to provide opportunities for "Deep Soil Areas" or DSA (unimpeded above & below allowing roots to go down deep & rainwater to fall on the Area) to support and sustain healthy tree growth & canopy. Shade producing canopies provide microclimate benefits along with improving apartment outlook & privacy. Based on a site area, a minimum 10% DSA is usually provided. In DSA, small trees require 9m2 Area per tree & min 1m soil depth to be provided, indicative size at installation to be used is usually minimum 100L.
- Here in coastal Port Coogee which already has 15% parks provided, based on the provision of Podium landscaping on the Second Floor, "Planting On Structure" is more appropriate, ie small trees may be proposed with indicative canopy of ~4m wide at maturity & nominal heights ~4m.

** For further information refer to State Planning Policy 7.3, Section 3.3 Tree Canopy & Deep Soil Areas*

Garden areas where “Ground Floor Planting” can occur & support small tree growth due to deeper soil

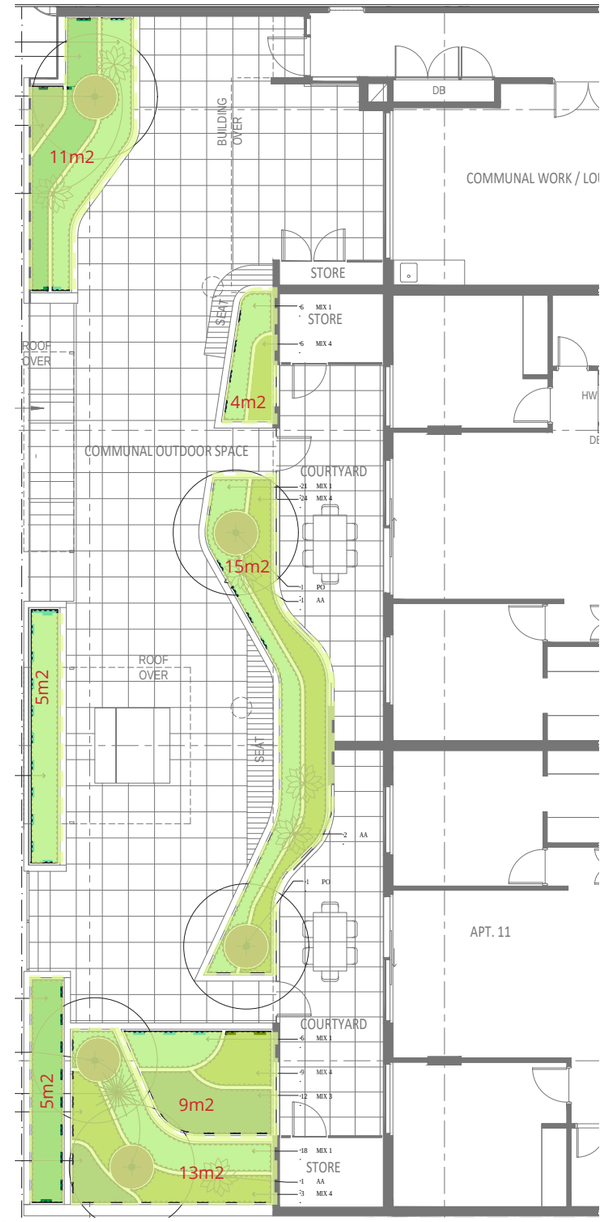
Garden areas ~600mm wide or less eg “Linear Planters” where soil volume is small but will support plant growth

Garden areas where “Planting On Stucture” can occur & support small tree growth

SOIL AREAS TABLE

• Ground Floor: deeper soil areas	13m2
• Ground Floor: linear planters	7m2
• Second Floor: planting on structure	62m2
TOTAL SOIL AREA	**82m2**

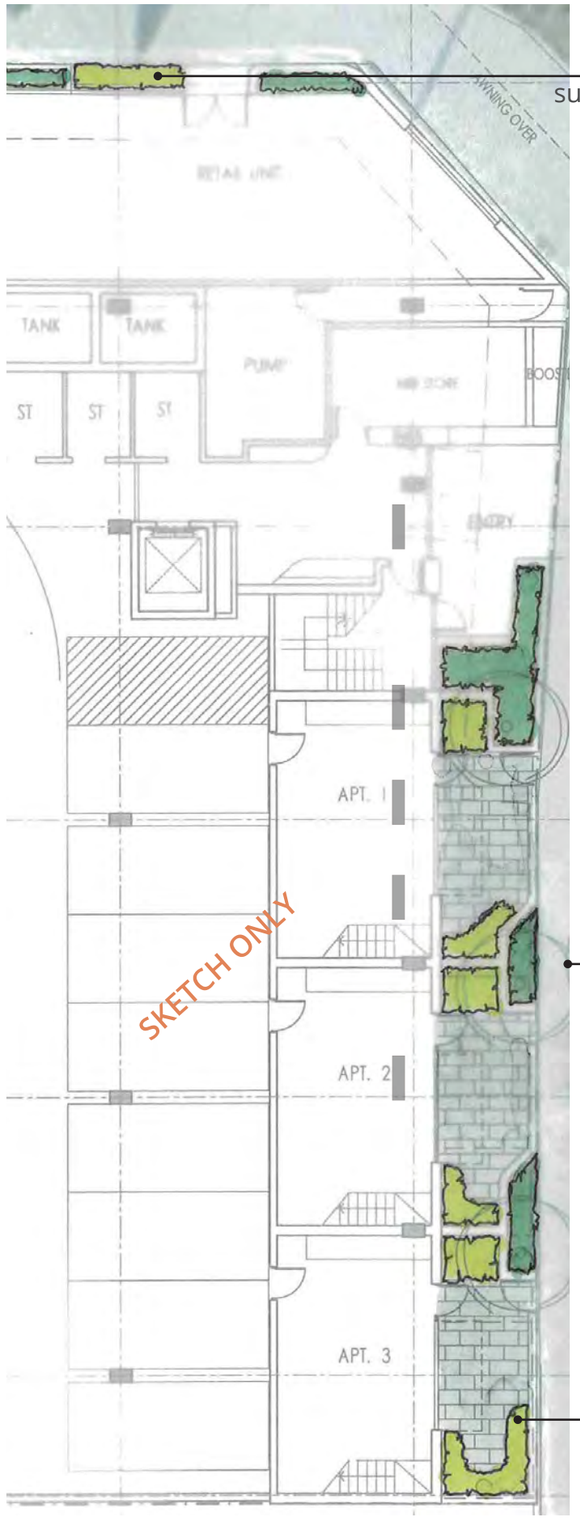
Ground Floor Plan



Second Floor Plan

Design Development:

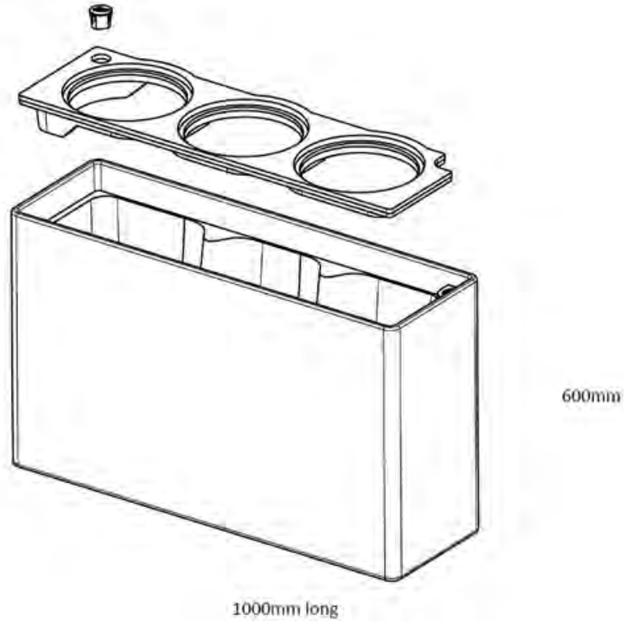
Ground Floor



Linear Planters

suggest Cottapot Urban 10 liner
inside wall/box by Builder

320mm wide

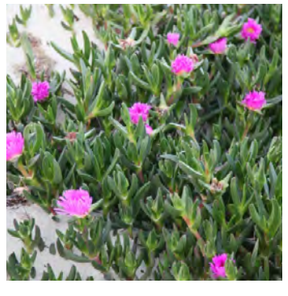


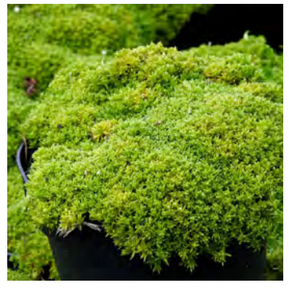
Small Trees

Plumeria obtusa

Planting Tone & Texture

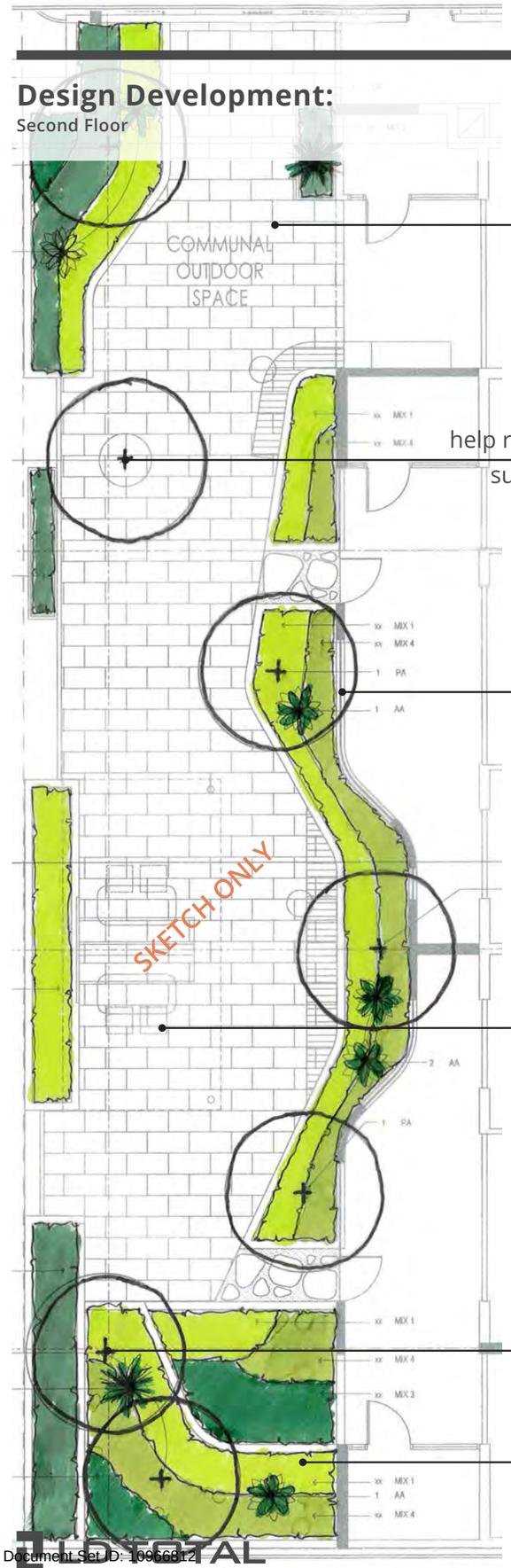
landscape scope = softscape



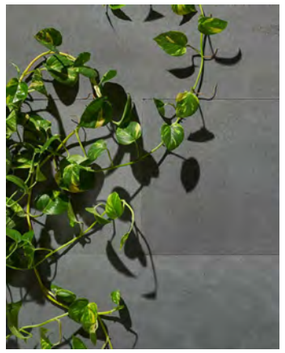


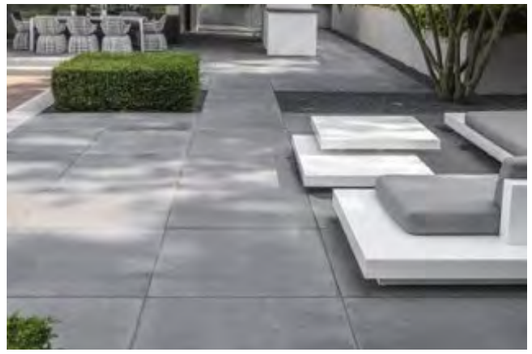
Design Development:

Second Floor



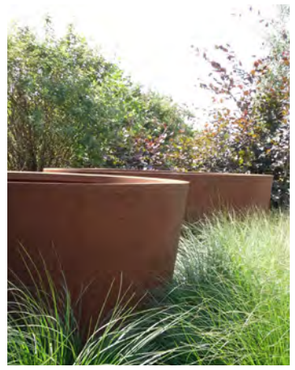
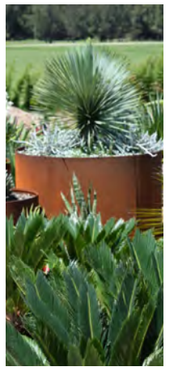
Tiling
by Builder






Lightweight Planters & Bowls
help raise soil where volume needed
suggest Litestone in ancient rust




Walls & Screens
by Builder





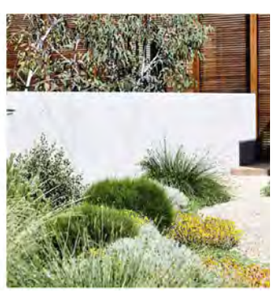
Shelter, Benches, Tables
by Builder




Small Trees
Plumeria obtusa

Planting Tone & Texture
landscape scope = softscape





Detailed Design

Ground Floor NTS @ A3

LEGEND

SOFTSCAPE

- PLANT 1: *Lomandra 'Lime Tuff'* REFER TO PLANT SCHEDULE
- PLANT 2: *Lepidosperma squamatum* REFER TO PLANT SCHEDULE
- PLANT MIX GF REFER TO PLANT SCHEDULE
- FEATURE PLANT REFER TO PLANT SCHEDULE
- TREE 100L REFER TO PLANT SCHEDULE
- RETAIN & PROTECT EXISTING STREET TREES

Port Coogee - Lot 203 Ground Floor RevD 15.10.2021

CODE	BOTANICAL NAME	INSTALL SIZE	* SPACING m2	NUMBER
TREES				
PO	*Plumeria obtusa*	100L	As Shown	3
			TOTAL	3
FEATURE PLANTS				
AA	*Agave attenuata*	12L	As Shown	4
CR	*Cycas revoluta*	12L	As Shown	1
			TOTAL	5
PLANTING				
LoLt	*Lomandra 'Lime Tuff'*	140mm	3/m2	6
LoSq	*Lepidosperma squamatum*	140mm	3/m2	15
MIX GF	*Carpobrotus virescens*	140mm	3/m2	8
	Lepidosperma squamatum	140mm	3/m2	8
	Lomandra 'Lime Tuff'	140mm	3/m2	8
	Scleranthus biflorus	140mm	3/m2	8
	Senecio serpens	140mm	3/m2	8
			TOTAL	61

STATUS

REV	DATE	DWN	DESCRIPTION
A	19.08.21	MH	ISSUE FOR COMMENT
B	31.08.21	MH	ISSUE FOR COMMENT
C	09.09.21	MH	ISSUE FOR COMMENT
D	15.10.21	MH	ISSUE FOR DA

LD TOTAL
SANPOINT PTY LTD
172 BURSWOOD ROAD, BURSWOOD WA 6100 AUSTRALIA
TEL +61 8 6436 1111 FAX +61 8 9367 2034
www.ldtotal.com.au

PROJECT:
PORT COOGEE - LOT 203 ORSINO BOULEVARD

CLIENT:
FRASERS PROPERTY

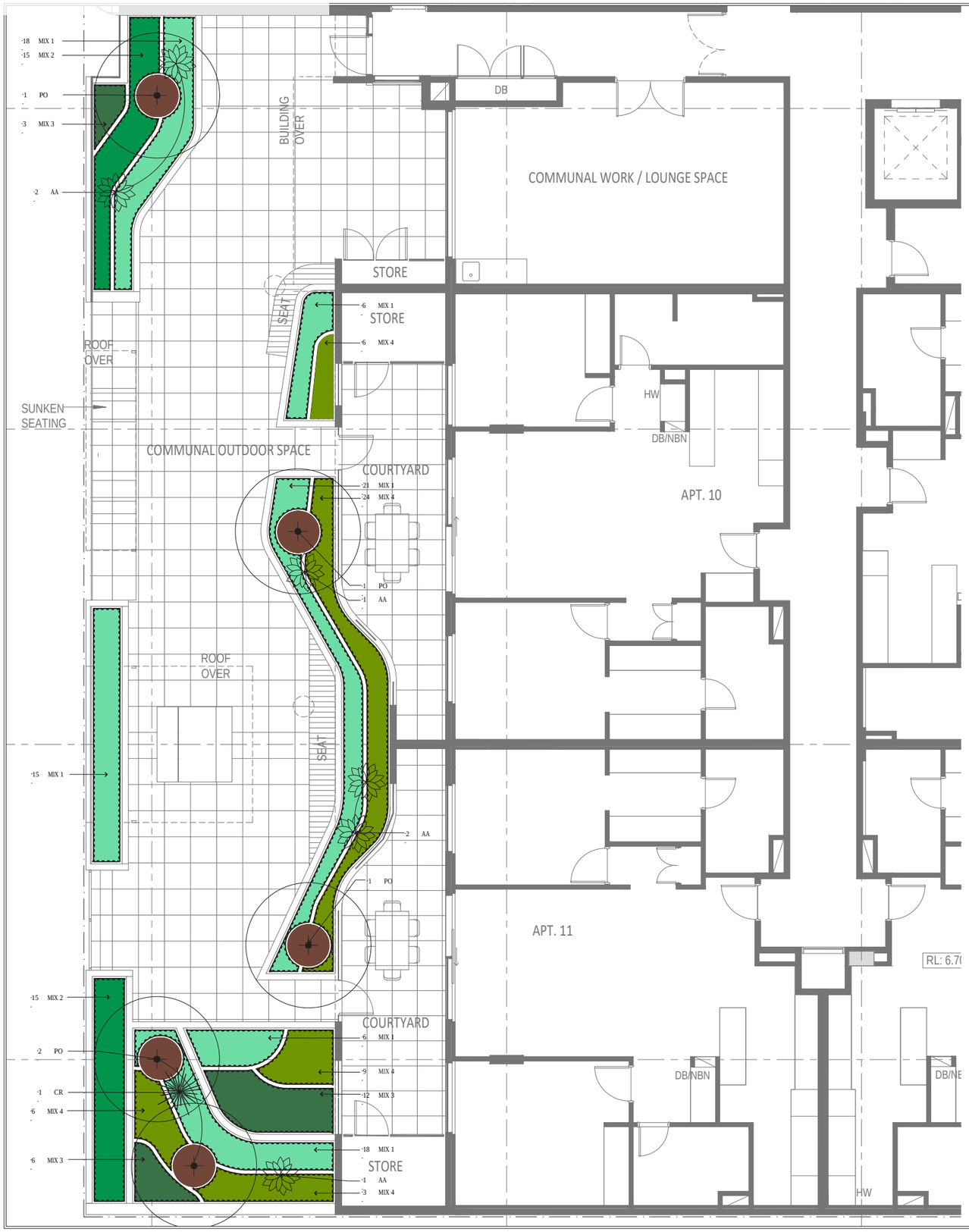
TITLE
SURFACE FINISHES - GROUND FLOOR

PROJECT NO	DRAWN BY	APPROVED BY	REV
10.7061	MH	EP	D
SCALE	SHEET NO	SHEET SIZE	
1:100	101	A1	

1m 0m 1m 2m 5m
SCALE: 1:100

Detailed Design

Second Floor NTS @ A3



Port Coogee - Lot 203 Second Floor — Rev E — 15.10.2021

CODE	BOTANICAL NAME	INSTALL SIZE	* SPACING m2	NUMBER
TREES				
PO	*Plumeria obtusa*	100L	As Shown	**5**
			TOTAL	**5**
FEATURE PLANTS				
AA	*Agave attenuata*	12L	As Shown	**6**
CR	*Cycas revoluta*	30L	As Shown	**1**
			TOTAL	**7**
PLANTING				
MIX ONE	*Casuarina 'Cousin It'*	140mm	3/m2	**14**
	Conostylis candicans	140mm	3/m2	**14**
	Lepidosperma squamatum	140mm	3/m2	**14**
	Myoporum parvifolium	140mm	3/m2	**14**
	Scleranthus biflorus	140mm	3/m2	**14**
	Tetragonia decumbens	140mm	3/m2	**14**
MIX TWO	*Carpobrotus virescens*	140mm	3/m2	**5**
	Eremophila glabra 'Carramar Carpet'	140mm	3/m2	**5**
	Lomandra 'Lime Tuff'	140mm	3/m2	**5**
	Marianthus parilius	140mm	3/m2	**5**
	Olearia 'Ghost Town'	140mm	3/m2	**5**
	Westringia 'Low Horizon'	140mm	3/m2	**5**
MIX THREE	*Conospermum stoechadis 'Smokebush'*	140mm	3/m2	**6**
	Maireana 'Silver Ghost'	140mm	3/m2	**6**
	Pimelia 'Bonnie Petite'	140mm	3/m2	**6**
	Scaevola 'Flat Fred'	140mm	3/m2	**6**
MIX FOUR	*Chysocephalum 'Buttons'*	140mm	3/m2	**9**
	Hardenbergia 'Meema Mini'	140mm	3/m2	**9**
	Kennedia nigricans	140mm	3/m2	**9**
	Leucophyta brownii	140mm	3/m2	**9**
	Melaleuca huegelii prostrate	140mm	3/m2	**9**
	Senecio serpens	140mm	3/m2	**9**
			TOTAL	**192**

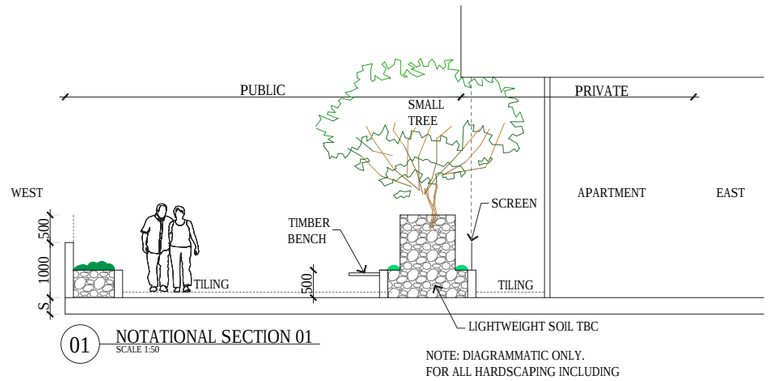
LEGEND

HARDSCAPE

- LARGE FORMAT PAVER — REFER TO ARCHITECTS DRAWINGS
- SCREEN AND GATES TO PRIVATE UNITS — REFER TO ARCHITECTS DRAWINGS
- PLANTER WALLS — REFER TO ARCHITECTS DRAWINGS
- BENCH TO WALLS — REFER TO ARCHITECTS DRAWINGS

SOFTSCAPE

- PLANT MIX 1 — REFER TO PLANT SCHEDULE
- PLANT MIX 2 — REFER TO PLANT SCHEDULE
- PLANT MIX 3: — REFER TO PLANT SCHEDULE
- PLANT MIX 4 — REFER TO PLANT SCHEDULE
- BOTTOMLESS COLLAR PLANTER — POWDER COATED METAL D=1m H=1m
- FEATURE PLANT — REFER TO PLANT SCHEDULE
- SMALL TREE 100L — REFER TO PLANT SCHEDULE



01 NOTATIONAL SECTION 01
SCALE 1:50

NOTE: DIAGRAMMATIC ONLY.
FOR ALL HARDSCAPING INCLUDING WALLS, PLANTERBOXES, BENCHES, FENCE AND TILING REFER TO ARCHITECTS DRAWINGS.

STATUS

REV	DATE	DWN	DESCRIPTION
A	19.08.21	MH	ISSUE FOR COMMENT
B	31.08.21	MH	ISSUE FOR COMMENT
C	09.09.21	MH	ISSUE FOR COMMENT
D	17.09.21	MH	ISSUE FOR COMMENT
E	21.09.21	MH	ISSUE FOR COMMENT
F	15.10.21	MH	ISSUE FOR DA

LD TOTAL
SANPOINT PTY LTD
172 BURSWOOD ROAD, BURSWOOD WA 6100 AUSTRALIA
TEL +61 8 6436 1111 FAX +61 8 9367 2034
www.ldtotal.com.au

PROJECT:
PORT COOGEE - LOT 203 ORSINO BOULEVARD
CLIENT:
FRASERS PROPERTY
TITLE
SURFACE FINISHES - SECOND FLOOR

PROJECT NO	DRAWN BY	APPROVED BY	REV
10.7061	MH	EP	F
SCALE	SHEET NO	SHEET SIZE	
1:50	102	A1	

500mm 0m 500mm 1m 2.5m
SCALE: 1:50

Waste Management Plan

Proposed Mixed-use Development - Lot 203 Orsino Blvd, North Coogee (For Development Application)

CW1186100

Prepared for

Port Catherine Developments Pty Ltd

21 October 2021

Cardno

Contact Information

Cardno (WA) Pty Ltd
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
PO Box 447

www.cardno.com
Phone +61 8 9273 3888
Fax +61 8 9486 8664

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Author(s):

Jireh Despabiladeras
Consultant

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Approved By:

Desmond Ho
Senior Consultant

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1 Introduction

Cardno has been commissioned by Port Catherine Developments Pty Ltd ("the Client") to prepare a Waste Management Plan (WMP) for the proposed mixed-use development (the Development) located at Lot 203 Orsino Boulevard, North Coogee within the City of Cockburn.

The scope of this WMP is limited to the estimation of general waste and recycling volumes generated by the Development and includes recommendations for the appropriate collection, storage, handling and transportation of waste and recycling, in accordance with the requirements outlined by the City of Cockburn and the WALGA's Multiple Dwelling, Commercial and Industrial Waste Management Plan Guidelines.

Estimations of generated volumes of liquid and bulk rubbish are not provided. However, two bulk waste and green waste collections per year are available to the residents.

Specialist contractors will need to be commissioned by the commercial tenants for the collection and disposal of liquid waste and bulk rubbish, as necessary.

1.1 Site Description

The proposed Development is located at Lot 203 Orsino Boulevard, North Coogee, City of Cockburn as illustrated in **Figure 1-1**.

Figure 1-1 Site Location

Source: Metromap (2021)

Plans for the proposed development outlines a three-storey mixed use building comprising residential apartments and a commercial tenancy. The anticipated usage generating waste from the proposed Development is tabulated in **Table 1-1**.

The proposed Development will front onto Orsino Boulevard on the eastern side and is surrounded by other residential apartments and commercial properties. The bin enclosure for the development is proposed to be located on the ground floor of the proposed site and is accessible from a proposed new laneway (Onyx Lane)

on the western side of the property. Architectural plans outlining the usage of floor space are provided in **Appendix A**.

Table 1-1 Proposed Development

Type of Premises	Quantity
1-bedroom	3 dwellings
2-bedroom	18 dwellings
Retail (Non-Food & Beverage)	133 sqm

1.2 Waste and Recycling Collection Services

The proposed development will initially use the waste collection service provided by the City of Cockburn for the collection of general and recycling waste from the proposed mix-use development as long as not more than 14 bins (maximum number of bins that can be presented in the bin pad to be provided) are presented on the day of collection. Consideration would be given to appointing a private contractor to collect the commercial waste should the number of residential and commercial bins to be collected exceed 14 bins.

In the event that a private contractor is appointed, it is proposed that the residential and commercial waste collection be undertaken on different days or different times during the same day given the limitation of the proposed bin pad as discussed in **Section 2.6.1**. It is proposed that waste collection frequency for the residential apartment units and retail tenancy be collected as summarised in **Table 2-3**.

The collection of general and recycling waste is to be arranged to occur during off-peak hours to minimise disruption to traffic operations as well as minimise any impacts to residents and tenants.

1.3 Refuse Storage Room

The Mobile Garbage Bin (MGB) storage for the Development will be in separate refuse rooms located on the ground floor.

1.3.1 Construction Considerations

The refuse rooms for the Development will be designed with the following considerations:

- The bin store area will have concrete slab floor with a graded floor to a waste drain that is connected to sewer. Floors to be even and flat for safe storage of bins;
- Access doors will be self-closing to prevent access to vermin;
- The City of Cockburn recommends double doors to the bin storage area be provided which should be wide enough for bins to fit through;
- Adequate aisle width for easy manoeuvring of bins;
- No double stacking of rows of bins;
- All wall joins will be sealed to a height of 150 mm for ease of washing;
- Walls are to be painted with washable paint;
- A hose cock will also be included to facilitate washout of bins and washout of the area. Washing facilities with hot and cold taps located at a minimum height of 1.5 m (and no higher than 1.7 m) for washing of bins, equipment and refuse room floors
- Drainage of waste water from washing facilities will drain to main sewers;
- All electrical outlets will be installed at a height of 1.6 m for ease of use and safety;
- Light switches for the refuse rooms must be installed at a height of 1.6 m to prevent obstruction by bins and equipment;
- Sufficient lighting of the refuse rooms should be provided by motion detected automatic artificial lighting in order to facilitate access to the refuse rooms;
- Adequate ventilation will be provided to the refuse rooms to ensure sufficient turnover of the air mass to prevent odour nuisance;

- Appropriate signage to be provided;
- To be designed to not permit stormwater to enter into the drain;
- Bins not to be visible from the property boundary or areas trafficable by the public;
- Any external bin store greater than 20m is to be roofed as per Water Authority requirement; and
- Bins are reasonably secured from theft and vandalism.

2 Waste Generation and Management

In order to ensure that the waste from the Development is properly managed, it was necessary to estimate the volume of waste that is likely to be generated on the premises. The City has advised that a waste management plan for a two-bin collection system i.e. general waste and recyclables is required. The City provided the waste generation rates for both the residential and commercial tenancy of the development.

Using these general and recycling generation rates, a broad estimation of daily waste to be generated by the Development has been calculated.

2.1 General Waste and Recycling Streams

Waste and recyclables will be sorted on-site and as close to source as possible. Sorting will rely on appropriate education of tenants and staff in addition to adequate signage for bins located in the refuse rooms. Waste and recycling will be based on the following streams:

- General Waste; and
- Co-mingled Recycling which includes clean aluminium foil and trays, glass bottles and jars, long-life milk and juice cartons, cardboard, plastic containers, tins and cans.

2.1.1 Other Streams

Storage, handling and collection of liquid wastes are not covered in this WMP. The Development operator will need to source and enter into an agreement with an appropriate registered and accredited waste collection contractor.

It should be noted that the City provides two scheduled bulk waste verge collection services for bulk goods such as mattress, steel and e-waste and bulk organics for residents.

Each resident also receives 6 trailer passes annually to dispose green waste at the Henderson Waste Recovery Park (HWRP). Batteries and other household hazardous waste can be delivered to the Henderson Waste Recovery Park (HWRP) for free provided that it is not accompanied with any other wastes.

2.2 Waste and Recycling Estimate

The waste generation of the residential component of the development was calculated based on the requirements indicated City *of Cockburn's Waste Management in Multi-Unit Developments LPP1.14*. The City requires 1 bin set (1 general waste and 1 recycling bin) for every three dwellings.

Table 2-1 City of Cockburn Waste Generation Estimate Requirement (Residential)

Waste Streams	Dwellings	Waste Generation Requirement
Bin Set Requirement	21	21 dwellings x 1 bin set per 3 dwellings per week

For the commercial tenancies, bin requirements have been calculated using the waste generation rates provided by the City. A summary of the estimated waste generation rates and weekly waste generated for each waste stream is provided in **Table 2-2.** Waste estimates were obtained by way of calculations outlined in **Appendix B.**

Table 2-2 Weekly Waste Generation Rates for the Development (Commercial)

Type of Premises	Source	Development Yield	General Waste Rate	Co-mingled Recycling Rate	Weekly General Waste (L)	Weekly Co-mingled Recycling (L)
Retail (Non-Food & Beverage)	City of Cockburn (Shop-non-food)	133 sqm	50L /100m^2/day	50L /100m^2/day	465.5	465.5

The waste volumes presented are estimates only and are representative of the design drawings of the Development provided in September 2021.

2.2.2 Bin Requirement

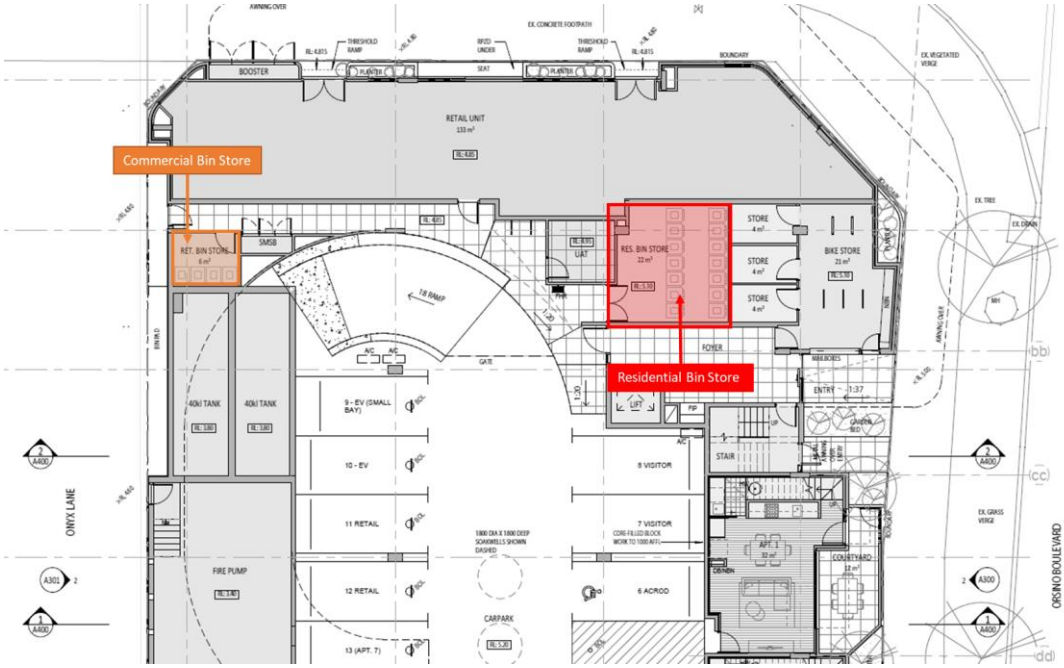
A breakdown of the anticipated MGB requirements for the residential and commercial tenancy and associated storage area minimum requirements are provided in **Table 2-3.** The City of Cockburn have advised that only 240L bins would be collected by the City.

Table 2-3 Bin Requirements for Enclosure of Proposed Site

	Residential				Retail (Non-Food & Beverage)			
	Size (L)	**Collection**	**No of Bins**	**Bin Footprint (sqm)**	**Size (L)**	**Collection**	**No of Bins**	**Bin Footprint (sqm)**
General Waste	240	weekly	7	2.98	240	weekly	2	0.85
Co-mingled Recycling	240	weekly	7	2.98	240	weekly	2	0.85
Total	**14 x240L Bins**			**5.97**	**4 x240L Bins**			**1.71**

A layout of the anticipated bin enclosure is illustrated in **Figure 2-1**. It should be noted that the City's local policy requires that the residential bin store must be at least 1m^2 per residential unit in size (i.e. 21 sqm) and the commercial bin store (retail) to be at least 2m^2/200m^2 GFA. The proposed residential bin enclosure is about 21m^2 and the commercial bin enclosure is about 5.4m^2 in size. The proposed bin enclosures are adequately sized for the storing and manoeuvring of the bins.

Figure 2-1 Bin Store



Source: gresleyabas Architecture Environment Design

2.3 Bin Enclosure Layout

MGBs will be stored in an allocated enclosure within the Ground Floor of the Development and will be easily and safely accessible from within the development. The waste bins will generally be stored directly abutting the walls of the enclosures.

2.4 Design Consideration

A number of problems can arise from inadequate consideration of waste management in developments. Some of these problems include noise, odour, hygiene issues, vermin, negative impacts on the health, safety, environment and security. To avoid these issues, it is vital to consider waste management in the design and planning of multiple dwelling developments.

2.4.1 Odour

The enclosure is located away from public areas which will prevent odour nuisance.

2.4.2 Noise

The bin enclosure is located away from public areas to limit noise that may otherwise disturb surrounding residents when materials are placed in the bins.

2.4.3 Vermin

The use of lidded MGBs will eliminate access by vermin. The use of bait stations will also be considered by the Development operator if required.

2.4.4 Washing of Bins and Enclosure

The Strata/Facility Manager will be responsible for the organisation of regular washing of bins and for maintenance of the storage area. The area will have graded floors that drain to sewer which will allow for the cleaning of the store and bins.

2.4.5 Aesthetics

The bin enclosure has been designed for the Development and as such will be consistent with the overall aesthetics, avoiding the placement of bins along the external faces of the building.

2.4.6 Protection from Vandalism

The bin enclosure will be closed off from public access and will use gates and/or doors to promote a sense of ownership and community in order to deter vandalism and anti-social behaviour. No bins will remain or be stored outside of the enclosure

2.5 Transfer of Waste and Recycling

2.5.1.1 Waste Transfer

Residents and tenants will transfer waste to the dedicated refuse stores located on the site as required. These wastes will be emptied into their respective bins within the associated bin stores.

2.5.1.2 Co-mingled Recycling Transfer

Residents and tenants will transfer waste to the dedicated refuse stores located on the site as required. These wastes will be emptied into their respective bins within the associated bin stores.

2.6 Collection of Waste and Recycling

2.6.1 Waste Collection

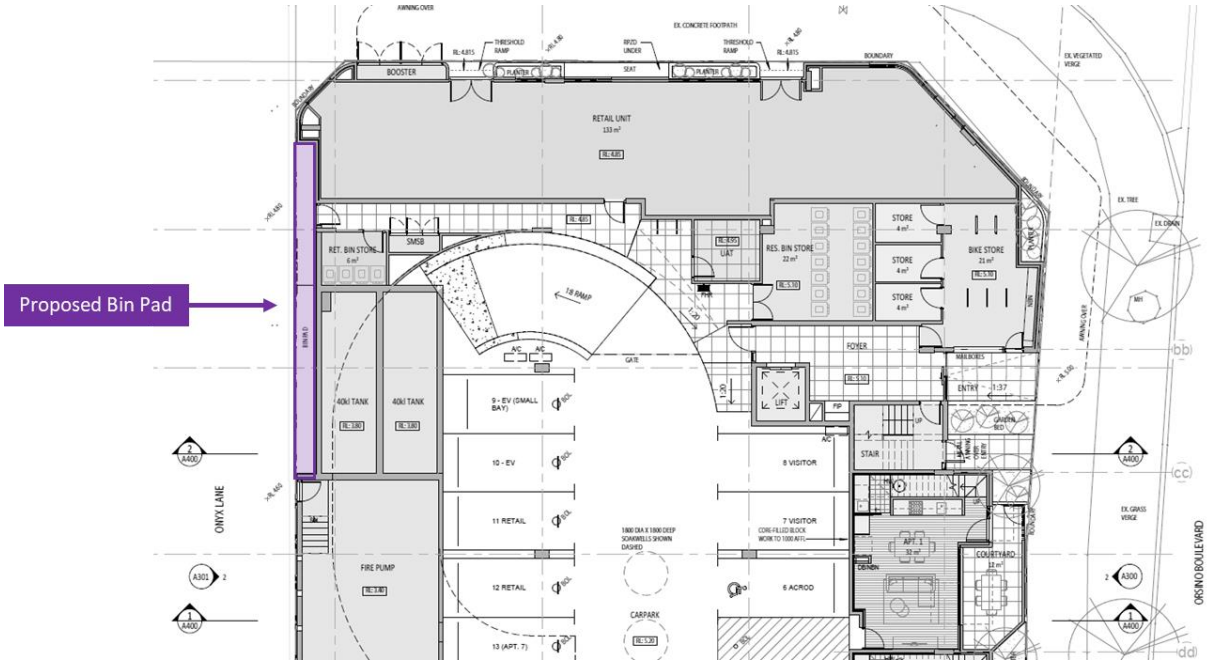
It is anticipated that the general and recycle waste will be initially collected by the City as per the collection frequencies indicated in **Table 2-3**.

Waste collection is proposed to be undertaken on-street at the dedicated bin presentation area located along Onyx Lane as illustrated in **Figure 2-2**. The proposed bin pad is about 13.5 metres in length. It should be noted the City's local policy requires a 1.8m length bin requirement for one set of bins for bin presentation on the verge (i.e. 12.6m in length for residential waste with a weekly collection and 5.4m in length for commercial waste with a weekly collection).

The proposed bin pad cannot accommodate all the residential and commercial bins for a once a week collection. However, given the actual waste for the proposed development is unknown at this stage, it is proposed that the City initially collect the residential and commercial bins once a week so long as not more than 14 bins are presented on the day of collection. Should the number of residential and commercial bins to be collected exceed 14 bins, consideration should be given to appointing a private contractor to collect the commercial waste on different days or different times during the same day.

The Strata/Facility Manager or staff will ferry the bins to the bin presentation area on the days of collection and return the bins to their respective bin enclosure once servicing is done.

Figure 2-2 Bin presentation Area

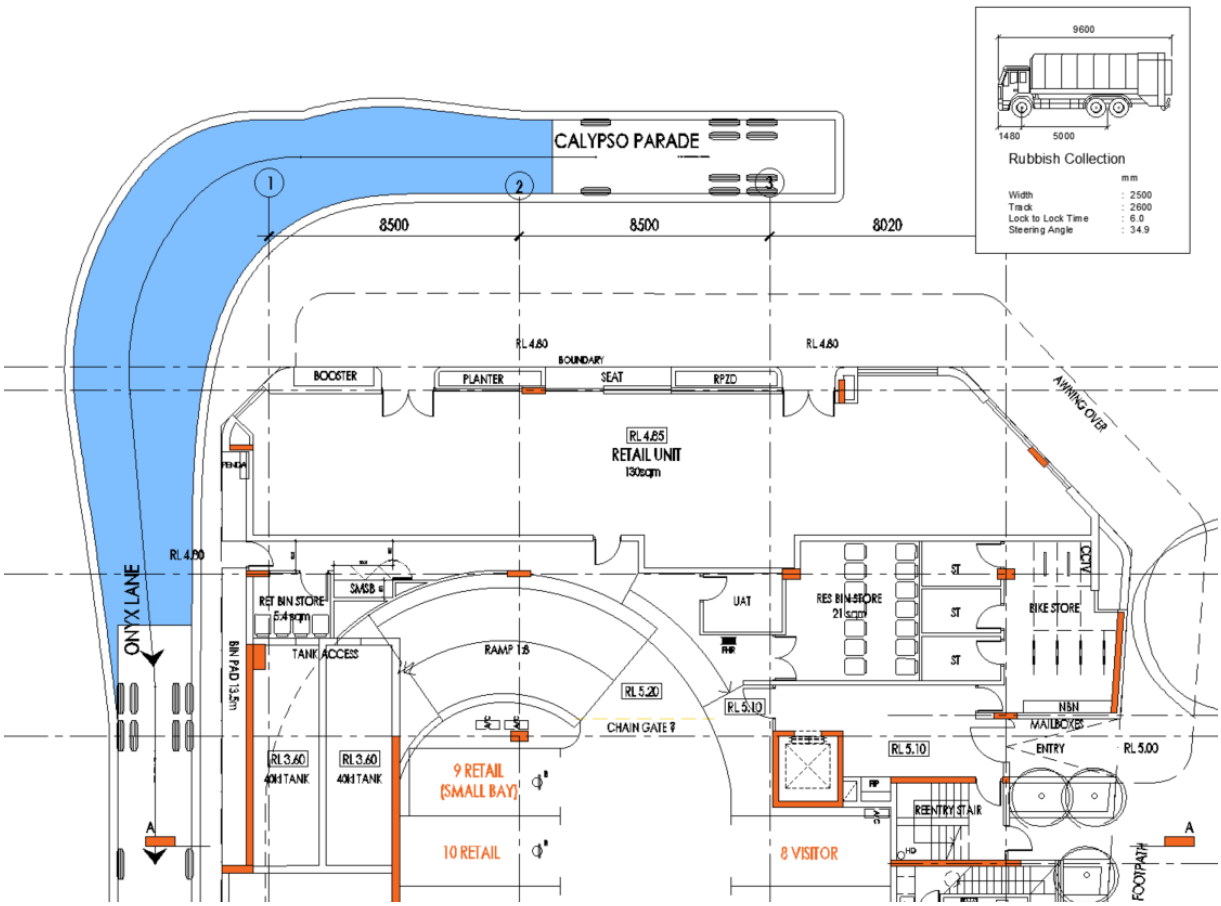


Source: gresleyabas Architecture Environment Design

2.6.2 Provision for Service Vehicles

A swept path analysis was undertaken using a 9.6m Side lift waste truck (based on specifications provided by the City) as illustrated in **Figure 2-3.** The waste truck is expected to be able to stop at the bin presentation area, collect the waste and exit in a forward direction.

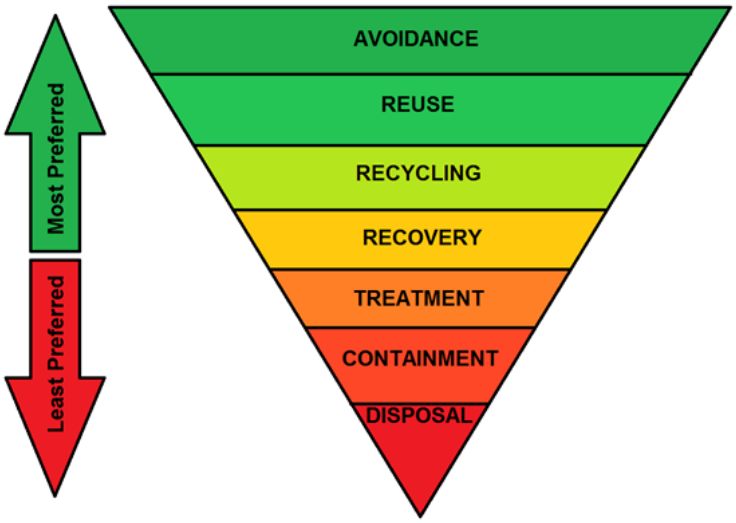
Figure 2-3 Waste Truck Swept Path



3 Waste Reduction and Management Strategy

This waste management plan has been developed with the strategic approach of reducing waste through best practices and education of residents, tenants and staff. Best practices for waste minimisation will optimise the Development's use of the waste minimisation hierarchy, which seeks to encourage sustainable options for waste. The waste hierarchy is demonstrated below.

Figure 3-1 Waste Hierarchy



3.1 Provision of Information

Information dissemination is essential in order to communicate well the best practices of waste management. Suitable types of information which can be provided includes:

- Online information;
- Marketing materials such as posters and leaflets demonstrating procedures of waste segregation and waste collection days; and
- Sufficient labelling of bins, signage of storage areas and equipment to reinforce waste separation.

However, information on its own is not enough and it must be paired with initiatives to be effective.

3.2 Engagement

A regular engagement between all the stakeholders of the development should take place in order to remind the residents, tenants and staff the proper and best practices of waste management. The engagement should include:

- Demonstration of waste management systems pertinent to an individual's role;
- Distribution of waste management strategy documents in relevant locations;
- An explanation of the benefits of waste separation and recycling; and
- Training on all pertinent equipment related to waste management.

It should also be noted that the City of Cockburn has a team of Community Waste Education Officers that can also attend/ visit to assist with improving correct bin use and waste management outcomes.

3.3 Monitoring and Review

The Strata/Facility Manager who will oversee the implementation of the Waste Management Plan, should continually monitor and review the waste management plan activities.

The Strata/Facility Manager will be responsible for the following:

- Monitoring and maintenance of bins to ensure one bin is full before the next one is used by the apartment occupiers;
- Monitor and maintenance of the Bin Storage Area;
- Monitor bulk wastes accumulation and coordinate with the City for scheduled bulk waste services;
- Manage the bins in the bin area to ensure one bin is full before the next one is used by the apartment occupiers. The caretaker will present the full bins to the allocated bin presentation pads on the verge on the collection day;
- Responsible for ensuring that the empty waste bins are promptly returned to the respective bin enclosures once servicing has been completed;
- Monitor residents and tenant's behaviour and identify requirements for further waste segregation and management education; and
- Engage with the local government to ensure efficient and effective waste service to the development.

In the event that waste generation rates for the Development change, a waste audit may be required by the City or other regulatory bodies. Similarly, should a change to the waste regulations be implemented by the City or other regulatory bodies, a waste audit may be required in addition to further waste stream separation.

4 Conclusion

This Waste Management Plan demonstrates that the proposed development provides a sufficiently sized Bin Storage Area for storage of general and recyclable waste based on the estimated waste generation and a suitable configuration of bins.

The collection of general, and recyclable waste is achieved using:

- 7x240L general waste for residential apartments, for collection once each week;
- 7x240L recycling for residential apartments, for weekly collection;
- 2x240L general waste for retail tenancy, for collection once a week; and
- 2x240L recycling for retail tenancy, for collection weekly.

The waste collection vehicle is anticipated to collect the general and recyclable waste at the dedicated bin presentation area along Onyx Lane. The Strata/Facility Manager or staff will ferry the bins to the presentation area for collection and return the empty MGBs back to the respective bin enclosures.

The proposed Strata Management Statement will form part of the Strata Title for this development. It will incorporate this Waste Management Plan and any changes to this plan must be approved by the City of Cockburn. Should the approved Waste Management Plan fail to deliver a safe, effective and efficient waste management service, the City will liaise with the owner to review, update and approve the Waste Management Plan.

.

5 References

WALGA (n.d.), Multiple Dwelling Waste Management Guidelines, Perth.

City of Cockburn's Waste Management in Multi-Unit Developments LPP1.14

Lloyd George Acoustics
PO Box 717
Hillarys WA 6923
T: 9401 7770
www.lgacoustics.com.au

DEVELOPMENT APPLICATION: ACOUSTICS

Lot 203 Orsino Boulevard, Port Coogee

Reference: 21086563-01_Rev3

Prepared for:

Port Catherine Developments Pty Ltd C/o- Frasers Property

Report: 21086563-01_Rev3

Lloyd George Acoustics Pty Ltd

ABN: 79 125 812 544

PO Box 717
Hillarys WA 6923

www.lgacoustics.com.au

Contacts	General	Daniel Lloyd	Terry George	Matt Moyle
E:	info@lgacoustics.com.au	daniel@lgacoustics.com.au	terry@lgacoustics.com.au	matt@lgacoustics.com.au
P:	9401 7770	0439 032 844	0400 414 197	0412 611 330
Contacts	**Ben Hillion**	**Rob Connolly**	**Daryl Thompson**	**Hao Tran**
E:	ben@lgacoustics.com.au	rob@lgacoustics.com.au	daryl@lgacoustics.com.au	hao@lgacoustics.com.au
P:	0457 095 555	0410 107 440	0420 364 650	0438 481 207

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REPORT ABSTRACT

Lloyd George Acoustics was appointed by Port Catherine Developments Pty Ltd C/o- Frasers Property Group to undertake acoustic design engineering assessment and consultancy regarding the proposed multi-storey multi-residential development with retail Ground Floor at Lot 203 Calypso Parade, in Port Coogee, Western Australia.

The project is located in the Port Coogee area of City of Cockburn; As such, three tiers of acoustic assessments are required under the City's *Noise Attenuation Policy LPP1.12*, and the "*Port Coogee Marina Village Built Form Codes"* which form part of the Local Structure Plan.

LPP 1.12 identifies acoustic and noise control criteria intended to ensure mixed-use and multi-residential development within the Local Structure Plan scheme are able to achieve compliance with the 3 primary components of acoustic design in multi-residential settings:

- **Noise Emissions to Environment** - Ensuring that all noise emissions are able to comply with the *WA Environmental Protection (Noise) Regulations 1997*

  This is early assessment of anticipated building services plant serving residential units, to ensure the eventual building services components are able to meet the applicable noise emission *Regulations* limits, assessed at nearest noise sensitive premises.

- **External Noise Ingress** - Demonstrating the building internal spaces are able to achieve internal design sound levels, in accordance with referenced standard *AS 2107:2016: Acoustics – Recommended design sound levels and reverberation times for building interiors*;

  This component assesses the existing external local noise environment via site-specific noise survey; Subsequent real-world environmental sound data is then used to calculate the most cost-effective building facade materials (e.g. glazing) to achieve compliance in the finished building; And,

- **Separation between Adjacent Residences** - Ensuring the proposed separating constructions (e.g. walls, floor/ceilings and the like) between adjacent individual dwellings are able to comply with Part F5 of the current edition of the National Construction Code (NCC, formerly the BCA);

This report therefore responds to each of the assessment criteria at DA stage.

NB: Regarding LPP1.12 reference to Western Australian Planning Commission (WAPC)'s State Planning Policy No. 5.4 Road and Rail Noise (*SPP 5.4*), planning assessment is required where noise sensitive developments are proposed near recognised State transport routes. The site at Lot 203 is outside of the trigger distances and therefore road and rail noise is not considered in this report.

EXECUTIVE SUMMARY

Lot 203 Calypso Parade, in Port Coogee, Western Australia is proposed to be developed into a 5-storey multi-residential building with integrated on -site car parking and retail Ground Floor unit.

The development must be assessed for noise emissions under City of Cockburn's *LPP1.12 Noise Attenuation Policy* which requires design compliance with the *WA Environmental Protection (Noise) Regulations 1997*; internal noise amenity from external noise (*AS2107:2016*); And *NCC VOL 1 Part F5* for separating constructions between individual Sole Occupancy Units (SOUs);

A summary of our findings is presented below:

ENVIRONMENTAL NOISE EMISSIONS

All noise emissions introduced by a new development must be shown to comply with the Assigned Noise Level (ANL) limits, as calculated using the Prescribed Methodology under the *Environmental Protection (Noise) Regulations 1997*.

ANL limits are calculated at 3 separate nearest Noise Sensitive Receiver (NSR) locations. Assigned Noise Level limits are calculated using an Influencing Factor of +2 dB and +3 dB (pending NSR location), resulting in limits of:

L_{A10} 47 - 48dB	7.00am – 7.00pm Monday - Saturday
L_{A10} 42 - 43dB	9.00am – 10.00pm Sundays/Public Holidays
	7.00pm – 10.00pm Monday – Saturday
L_{A10} 47 - 38dB	10.00pm – 7.00am Monday - Saturday
	10.00pm – 9.00am Sundays/Public Holidays

As the project is in its early stages, details of the mechanical plant are unknown. Typical projects of this type should anticipate the following building services noise sources:

- Car Park Exhaust System Supply and Exhaust Fans (pending system type and design);
- Commercial (retail unit) AC and ventilation Fans;
- Residential AC and ventilation Fans;
- Fire pump plant and exhaust systems;

To undertake realistic noise emissions assessment ahead of the Detailed Design stage, residential-grade AC condenser units (1 per apartment) located within vented enclosures on each individual apartment balcony have been modelled

Cumulative predicted night-time noise levels are predicted at the nearest (most-sensitive) Noise Receiving premises of 29dB(A) Sound Pressure Level against the night-time ANL limit of L_{A10} 37B.

During the night-time (resi AC only scenario), mechanical plant may become audibly *Tonal* against lower residual ambient (background) noise levels, therefore mechanical plant noise predicted levels have been adjusted by + 5 dB. The resulting level of 34dB(A) fully complies with the Regulations at the nearest sensitive receiver, NSR 1.

It is important to note that additional plant will become part of the design, including but not limited to the systems listed above. Noise control requirements will be developed in conjunction with design development, as more and better particulars of the building mechanical services systems requirements (e.g. location, specification, duty, intake/exhaust terminations) become known.

INTERNAL DESIGN SOUND LEVELS FROM EXTERNAL NOISE

The City of Cockburn Guidelines require noise sensitive developments to be designed to achieve 35 dB L_{Aeq} in bedrooms; and 40 dB L_{Aeq} in living areas. Daytime noise monitoring was undertaken in the vicinity of the site which revealed average values of 55 dB L_{Aeq} and 50 dB L_{A90} which are fairly low levels of external noise, typically attributable to incidental traffic, pedestrians, bird calls and wind noise only.

On most nights, the area is likely to be relatively quiet with daytime commercial uses and residential activity dissipating in the area after 10PM. The Australian Brewhouse is open until 11.00pm on some nights and it is understood there may also be some community events (food trucks, live music etc) during the summer, although these will occur further west of Lot 203.

In acknowledgement of the varying internal levels, the following preliminary glazing and façade specification are recommended:

- Bedroom glazing to achieve minimum $R_w + C_{tr} \geq 29$. To be confirmed by glazier however likely achievable with 6.5mm thick VLam Hush glass in fixed/awning window or sliding door, both with acoustic seals;
- Living glazing to achieve $R_w + C_{tr} \geq 27$. To be confirmed by glazier however likely achievable with 6mm thick glass in fixed/awning window or sliding door, both with acoustic seals;

External wall construction to be minimum $R_w + C_{tr} \geq 48$. Three types of wall construction are proposed which achieve this performance:

SEPARATING CONSTRUCTION PERFORMANCE BETWEEN RESIDENTIAL APARTMENTS

WALLS

Separating walls between adjacent Sole Occupancy Units wet area-to-wet area, or habitable-to-habitable rooms must be shown to comply with the minimum criteria of $R_w + C_{tr}$ 50 dB for airborne sound separation in all cases. Where a wet area (including a kitchen) is adjacent to a habitable area (including a kitchen) in an adjacent SOU, the minimum criteria of $R_w + C_{tr}$ 50 dB plus Discontinuous Construction (D.C.) is required.

For walls between SOUs and "*shared stairwells*", "*lift shafts" and "plant rooms*", minimum criteria is R_w 50dB plus D.C. applies; Where a wall separates an SOU from "*public corridors*" or *"areas of different classification"*, Rw 50dB only is applied.

Detailed notes are presented in *Section 4.2* regarding proposed wall types and their application, with corresponding mark ups presented in *Appendix B* which show where compliance criteria is applicable.

FLOOR/CEILING CONSTRUCTIONS

In terms of airborne sound separation between stacked SOUs, vertical (floor/ceiling) separation between residential units must achieve a minimum airborne sound insulation rating of $R_w + C_{tr}$ 50 dB. *Deemed-To-Satisfy* provisions are presented for suspended concrete slab options in this design and are considered the minimum recommended for end-user amenity purposes. Base specification build-up for carpeted flooring on foam underlay as follows:

i. 200mm thick concrete slab
ii. Carpet on foam underlay

The above floor build-up detail will meet/exceed the minimum airborne sound performance criteria of $R_w + C_{tr} \geq 50$ dB, hence fully complies with NCC requirements.

This floor build up will also meet/exceed the NCC impact sound isolation criteria (e.g. footfall and furniture movement noise) providing a reasonable degree of end-user amenity. To meet/exceed the impact sound criteria in non-carpeted floor covering areas, a resilient matting product is required to be installed between any hard floor surface covering (e.g. timber flooring or tiles) and concrete slab substrate, typically supplemented by a suspended ceiling below the slab.

Acknowledging the project preference to use skim coat ceilings below areas of hard floor covering. It s recommended to provide a higher-than-minimum impact sound insulation rating for separating floors. Early design integration has been developed during DA stage to determine an acceptable floor isolation construction build-up able, to approach the recommended minimum performance of 55dB $L_{nT,w}$

- Engineered timber floor covering (est 12-18mm thickness)
- Regupol Sonus Curve 10-S to manufacturer installation details – see below
- 250mm thick reinforced concrete slab
- Skim coat ceiling below

Manufacture installation details is included in Appendix C – NB: it is critical that the room perimeter edge detailing is observed to avoid transfer of footfall and furniture movement noise into walls and adjoining structure.

CONCEALED SERVICE DUCT WALLS

Formal advice is given for *Shared Building Services* duct and concealment/isolation able to comply with the minimum services duct wall provisions of the NCC as applicable to residential apartments. Minimum construction types and advice is set out in *Section 4.4.4* and 4.4.5, applicable to all *Shared Building Services*.

All penetrations through rated walls must be acoustically sealed – general detailing specification is provided, to be integrated with services specifications as final penetration locations are resolved during construction.

BUILDING SERVICES CRITERIA

HYDRAULIC SERVICES

In association with minimum constructions for services duct walls, hydraulic services pipe work in service ducts adjacent to residential apartment space(s) must be wrapped in a suitable loaded vinyl. NCC compliant details are provided for concealing hydraulic pipework within rated separating walls. In addition, all circulating pump equipment connections to hydraulic pipework must have flexible couplings.

ELECTRICAL SERVICES

Electrical services outlets must be installed with appropriate offsets when back-to-back in separating walls to comply with NCC minimum criteria for electrical services. Utilising a cavity masonry party wall construction, the appropriate offset is 100mm; Utilising a lightweight framed wall, offset must be 300mm. Offsets may be vertical or horizontal.

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1 INTRODUCTION

1.1 General Appreciation

It is proposed to construct a multi-storey residential development at Lot 203 Orsino Boulevard, Port Coogee – refer *Figure 1.1*. The development includes:

- Ground floor - car parking, retail and lower floor of apartments 1 to 3;
- First floor – car parking, upper floor of apartments 1 to 3 and apartments 4 to 6;
- Second floor – Apartments 7 to 13 and residents co-working lounge;
- Third floor – Apartments 14 to 21.
- Fourth Floor – Apartment 17 upper storey

Figure 1-1 Project Locality

1.2 Overview of Assessment Criteria

It is understood the project seeks DA approval submission to City of Cockburn. As part of the approvals process, the development must be assessed under the City's *LPP1.12 Noise Attenuation* Policy, and the design criteria reference in the Port Coogee Marina Village Built-Form Codes, which form part of the Local Structure Plan.

1.2.1 Port Coogee Marina Village Built-Form Codes

Port Coogee Marina Built-Form Codes represents the governing overview and Local Structure Plan (LSP) for the Marina Village area. The following extract sets out the general design approach regarding acoustic design:

ACOUSTIC PRIVACY

Design Intent

It is likely and should be generally accepted that some noise will be experienced in association with the active mixed use Marina Village. However, is important to ensure a reasonable level of acoustic privacy between apartments and external and internal spaces to provide a high level of amenity within a development. Designing for acoustic privacy is driven by the location and separation of buildings within a site and how the internal spaces are arranged within apartments.

Objectives

→ To provide a high level of amenity for residential dwellings by protecting the acoustic privacy of dwellings from noise-generating non-residential uses. It is acknowledged that given the mixed use nature of the Village centre, some noise from after-hours activities may be anticipated;

→ Noise generating uses should be in tenancies suitably designed and built, with the use managed to limit noise and disturbance to residential occupants in the same, or an adjoining, development.

Must Haves

→ An acoustic report (including a noise management plan) for any noise generating use shall be submitted with development plans at the Development Application stage to demonstrate noise will comply with accepted/relevant standards.

1.2.2 City of Cockburn LPP1.12 Noise Attenuation Policy

With specific regard to *"relevant standards"*, City of Cockburn require adherence to their Noise Attenuation Guidelines (*LPP 1.12*, last reviewed December 2017). Documents referenced within this Guideline are:

- *Environmental Protection (Noise) Regulations 1997* relating to noise emissions from this project to neighbouring developments;
- *State Planning Policy No. 5.4 Road and Rail Noise* for areas within the trigger distances of this Policy;
- *Australian Standard 2106:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors*. This Standard provides internal design sound levels (and reverberation times) to provide a comfortable acoustic environment; and
- *National Construction Code – Building Code of Australia*. The Code provides the minimum standards for noise transfer between apartments.

Each of the above are discussed within this report, noting that any recommendations will be further developed as the project progresses into detailed design.

Floor plans of the proposed development are provided in *Appendix A.*
Appendix C contains a description of some of the terminology used throughout this report.

2 ENVIRONMENTAL NOISE LIMITS

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 retail unit, residential components and Shared Building components (e.g. car park) of the development are to comply with regulations 7, 8 & 9 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 2.1.10*.

2.1.1 Regulations 7, 8 & 9

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.

2.1.2 Calculation of Applicable Limits

The Assigned Noise Level (ANL) limits are calculated using the *Prescribed Methodology* as set out in *the Regulations.* An ANL is calculated for each Noise Sensitive Receiver (NSR) using a base level of acoustic amenity, appropriately modified by combination of environmental and transport factors local to the receiver, referred as the Influencing Factor (IF).

To calculate the Influencing Factor (IF), concentric circles are drawn around the nearest Noise-Sensitive Reception (NSR) point at 450m (Outer) radius and 100m (Inner) radius. Percentage area land use (e.g. Industrial or Commercial use) within the circles is calculated.

Traffic volume is also taken into account in order to reach the calculated ANL, or allowable noise level, appropriate at the nearest noise-sensitive receiving building, referred as the NSR:

- A “Major” road is defined as having Annual Average Weekday Traffic (AAWT) flow in excess of 15,000 vehicle movements per day. Where present in the Inner calculation radius, a “Major” road adds +6 to the Transport Factor; Where in the Outer radius, a Major road adds +2.
- A “Secondary” road is defined as having Annual Average Weekday Traffic (AAWT) flows in excess of 6,000 vehicle movements per day. Where present in the Inner calculation radius, a “Secondary” road adds +2 to the Transport Factor only;

2.1.3 Identification of Surrounding Land Use

The project site is located 15m South of the existing Port Coogee Marina Village centre shopping mall entry on Calypso Parade. Immediately surrounding Lots are made up of land cleared and prepared for development – as such the nearest noise sensitive receiving premises are FUTURE residences as identified using the Local Structure Plan (LSP) zoning and planning maps.

Figure 2-1 below presents an extract from the LSP – callout image shows overlay of proposed subdivision of FUTURE Lots overlaid upon existing aerial photography, Courtesy Google Earth Pro:

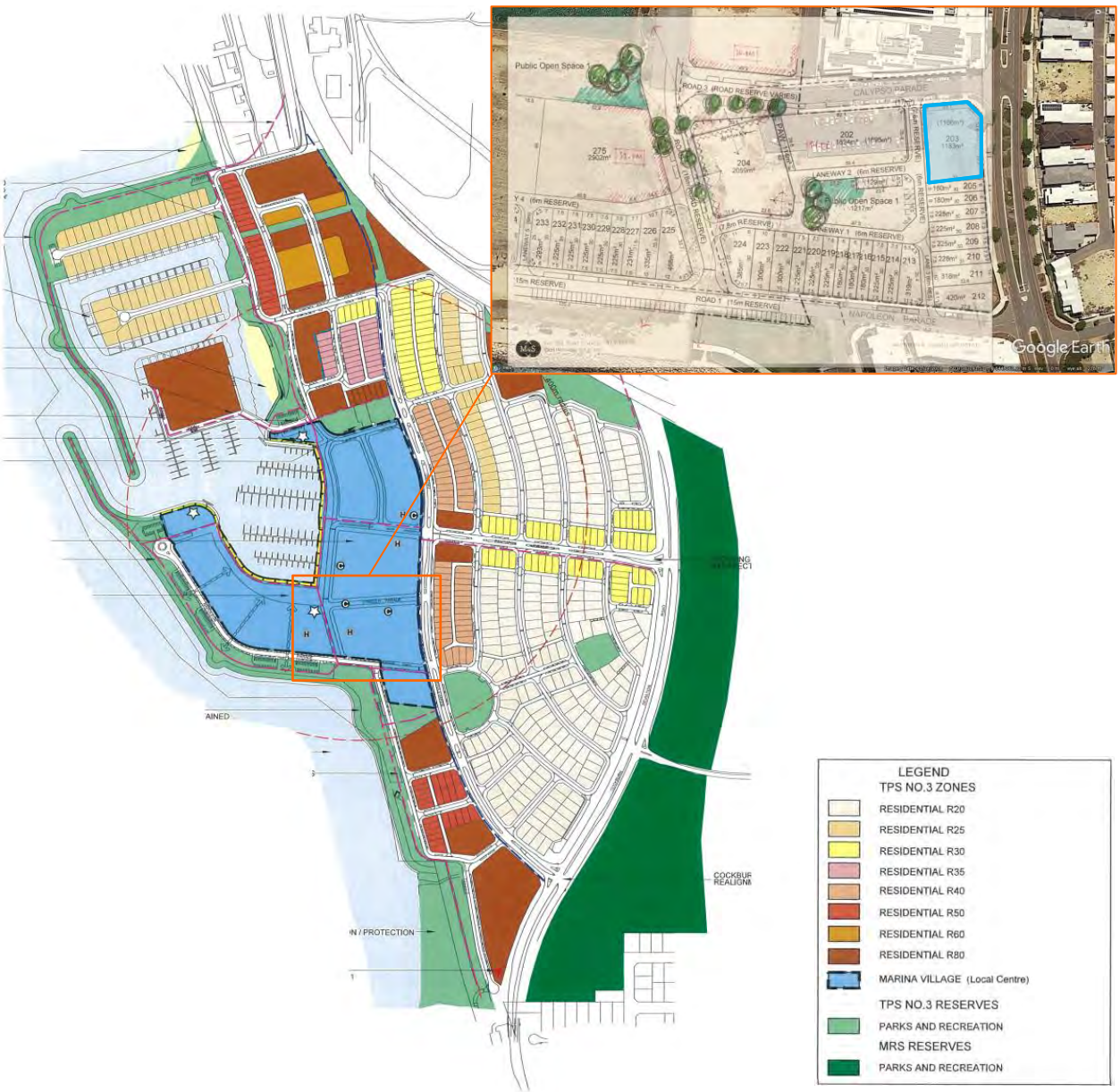


Figure 2-1 Extract from Port Coogee Local Structure Plan Report

Under the LSP land use designations, three main streets are further identified under Marina Village Built-Form codes in terms of proposed uses, as follows:

→ Chieftain Esplanade and the southern groyne promenade (Calypso Walk) will be developed as the cosmopolitan lifestyle hub of Port Coogee, adjacent to the Marina and water's edge.

→ Pantheon Avenue will be developed as the more formal, commercial and community focus of the village.

→ Calypso Parade will provide the convenience retail shopping experience, a main street experience.

It is intended the Marina Village will be a genuine coastal 'jewel' for Cockburn – a facility for local people and for visitors from beyond to relax, socialise, wine, dine, shop, browse and enjoy the marina and coastal environment in an engaging village setting.

As such the predominantly lifestyle and commercial use mixed with residential are determined to be commercial use. Referencing the project Lot division map (shown) smaller Lots are identified as individual residential Lots.

2.1.4 Identification of NSRs

ANL limits are calculated at 3 separate nearest Noise Sensitive Receiver (NSR) locations. *Figure 2-2* below identifies the nearest NSRs listed as follows:

- NSR 1 FUTURE 1st Floor Lot 202 Calypso Parade, approx. 8m West of Lot 203 boundary;
- NSR 2 FUTURE residential Lot 205, with zero boundary to the South of Lot 203;

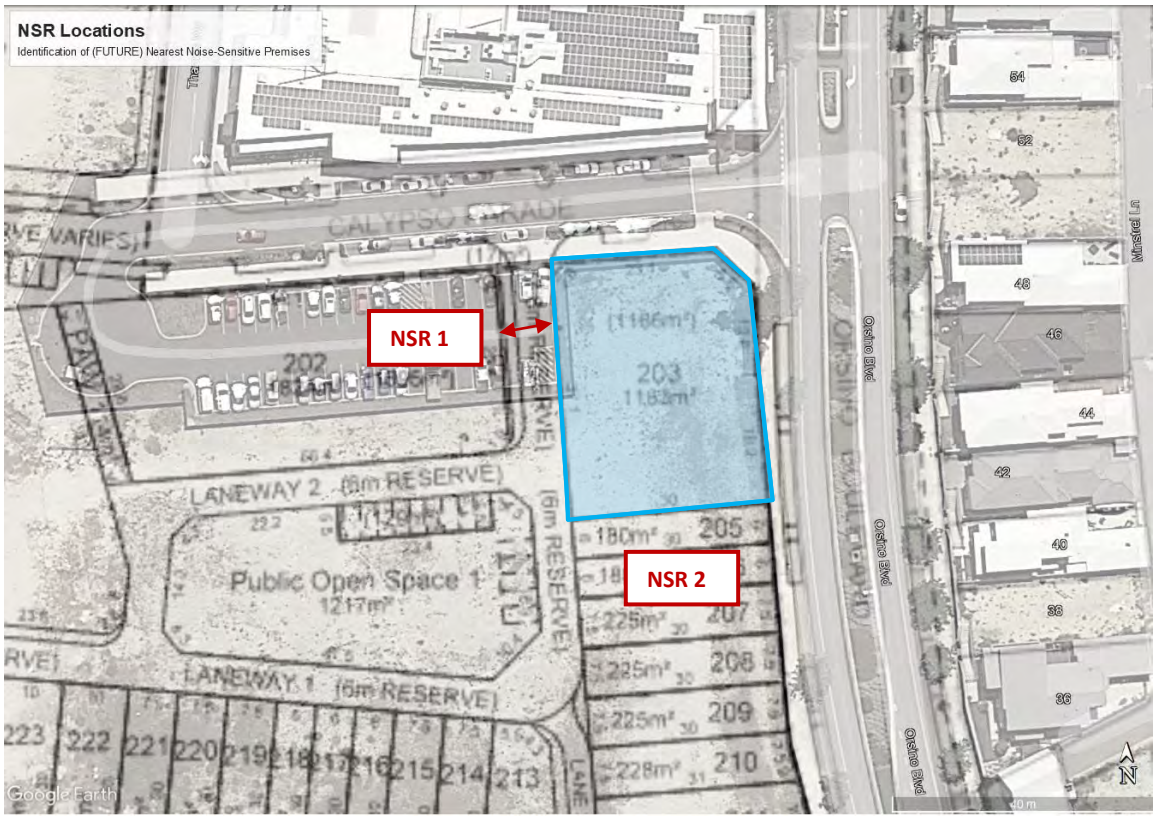


Figure 2-2 NSR 1 – Identification of nearest NSRs

Example Land Use Calculation map for NSR 1 is shown in *Figure 2-3*.

Figure 2-3 NSR 1 - Surrounding Land Use in Inner and Outer Calculation Radii

2.1.5 Traffic Data

Traffic data was obtained from https://trafficmap.mainroads.wa.gov.au/map for the surrounding roads – in terms of road traffic volumes, no "Major" or "Secondary" roads are identified in the Inner or Outer calculation radius::

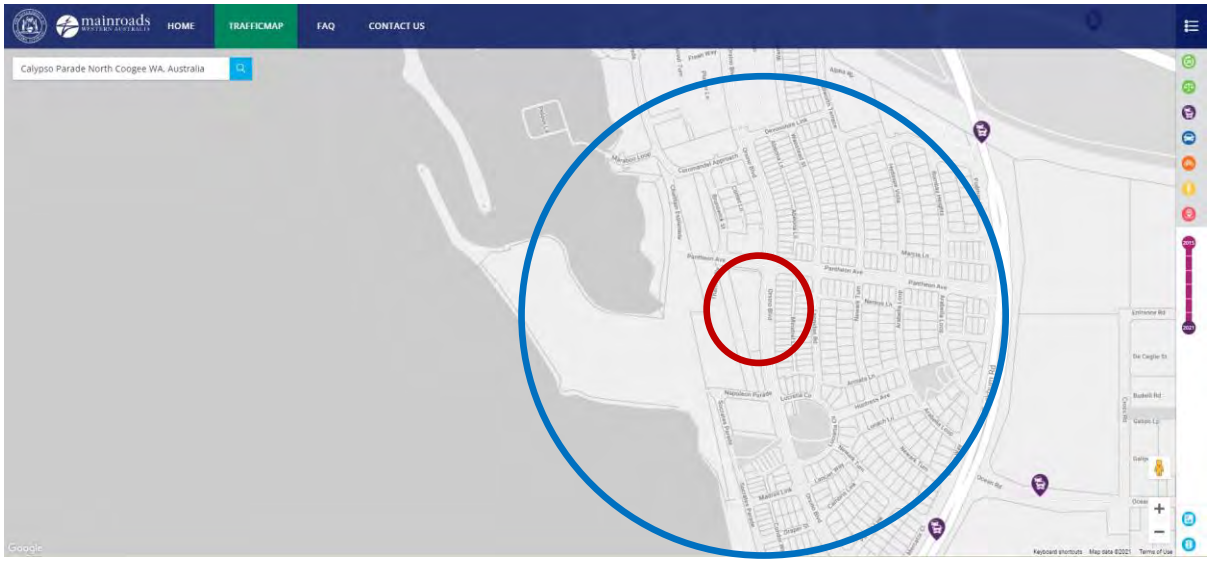


Figure 2-4 MRWA – Existing Traffic Volume

2.1.6 Calculation of Influencing Factor (IF)

The Influencing Factor (IF) is then calculated using the following equation:

Influencing Factor (IF) = I + C + TF

Where;

"I" = (% of industrial land usage within 100m + %industrial land usage within 450m) x 1/10

"C" = (% of commercial land usage within 100m + %commercial land usage within 450m) x 1/20

"TF" = +6 if there is a major road within 100m of the development
+2 if there is a major road within 450 m of the development
+ 2 if there is a secondary road within 100m of the development

Note :The maximum value the transport factor (TF) can reach is 6.

The percentage of Commercial Land Use varies slightly between NSRs 1 – 5 based on the slight changes in each 100m and 450m calculation radius - however the Influencing Factor in all cases is dominated by the proximity of Stirling Highway, identified as a "Major Road" under *the Regulations Prescribed Methodology*.

Corresponding IFs for NSRs 1-3 have been calculated as shown in *Table 2-3.*

Table 2-3 Influencing Factor Calculations – Nearest NSRs

Description	NSR	Within 100m Radius	Within 450m Radius	Total
Industrial Land Use	NSR 1	0%	0%	**+0**
	NSR 2	0%	0%	**+0**
Commercial Land Use	NSR 1	44%	7%	**+2.37**
	NSR 2	40%	7%	**+3.55**
Major Road	NSR 1	Not Present	Not Present	**+0**
	NSR 2	Not Present	Not Present	**+0**
Secondary Road	NSR 1	Not Present	Not Present	**+0**
	NSR 2	Not Present	Not Present	**+0**
Influencing Factor (IF)			**NSR 1**	**+2dB**
			NSR 2	**+3dB**

2.1.7 Calculated Assigned Noise Level (ANL) limits

Table 2-4 shows the relevant calculated Assigned Noise Level limits. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to "steady-state" noise sources such as mechanical plant. The L_{A1} is for short-term noise sources deemed to be present for less than 10% of the time and more than 1%, and L_{Amax} level is applicable to incidental noise sources, such as car door closing noise (present for less than 1% of the time).

Table 2-4 Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
NSR 1 FUTURE 1st Flr Lot 202	0700 to 1900 hours Monday to Saturday (Day)	47	57	67
	0900 to 1900 hours Sunday and public holidays	42	52	67
	1900 to 2200 hours all days (Evening)	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	37	52	57
NSR 2 FUTURE Lot 205	0700 to 1900 hours Monday to Saturday (Day)	48	58	68
	0900 to 1900 hours Sunday and public holidays	41	51	68
	1900 to 2200 hours all days (Evening)	41	51	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	38	51	58
Commercial	All Hours	60	75	80
Industrial	All Hours	65	80	90

2.1.8 Representative Assessment Period(s)

It is noted the Assigned Noise Level limits are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as *a period of time of not less than 15 minutes, and not exceeding 4 hours*, which is 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.

An *inspector* or *authorised person* is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Environment Regulation. Acoustic consultants or other environmental consultants are not appointed as an *inspector* or *authorised person*. Therefore, whilst this assessment is based on a 4 hours RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.1.9 Regulation 3

Under regulation 3, nothing in the Regulations applies to the following noise emissions –

(a) *noise emissions from the propulsion and braking systems of motor vehicles operating on a road.*

On-site retail and resident parking bays are open to residents and visitors - in terms of *the Regulations* this is considered a road and therefore the propulsion and braking system are not assessed, however car door closing noise may need to be assessed.

2.1.10 Regulation 14A

Regulation 14A provides requirements for such activities as the collection of waste, landscaped area maintenance and car park cleaning. Such activities, referred as *"specified works"* can 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.

2.1.11 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

It was reasonably necessary for the construction work to be carried out at that time.

2.2 Early Assessment Methodology

2.2.1 Anticipated Building Services Noise Sources

Typical to projects of this type, the following building services noise sources are anticipated:

- Car Park Exhaust System Supply and Exhaust Fans;
- Retail unit AC and ventilation Fans;
- Residential AC and ventilation Fans;
- Fire pump plant and exhaust systems;

For early assessment purposes, the locations of residential AC units are identified on DA drawings located adjacent to each residence – either in car park areas, or in vented enclosures on balconies or within the residential store, pending floor level layouts.

The car parking levels may be required to be ventilated, subject to mechanical and air quality requirements – these will need to be examined in detail once more and better particulars become known.

2.2.2 Example Source Sound Levels

To undertake realistic noise emissions assessment ahead of the Detailed Design stage, the following plant items have been modelled and assessed on the basis of the identified layouts at this early assessment stage:

- Residential grade AC condenser units (1 per apartment) located within vented enclosures on each individual apartment balcony, typical for this size of apartment;

Residential grade AC Condenser units are assumed to have sound levels equivalent to the 'Typical Residential' units shown in *Table 2-6:*

Table 2-5 Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Typical Apartment AC (CURZ60TKR)	66	63	63	60	57	53	48	40	**62**

All AC units were modelled as point sources with an acoustic centre of 1 metre above the relevant floor level.

2.2.3 Noise Emission Scenarios

Review of the known parameters indicates the adjacent mixed use multi-residential townhouse development with commercial retail Ground Floor will be most sensitive to residential AC noise – on the basis that the Adjacent NSR 2 (Lot 205 single residence) will be screened by a zero Lot concrete boundary wall to the nearest ACs

Ahead of more and better particulars anticipated during the Detailed Design phase, a basic "worst-case" operating scenario is assessed which considers residential AC CUs operating after 10PM;

2.3 Early Assessment Noise Modelling Results

Noting that the sound levels in *Table 2-5* are assumed to be located within vented enclosures, cumulative predicted night-time noise levels are predicted at NSR 1 of 29dB(A) Sound Pressure Level against the night-time ANL limit of L_{A10} 37B.

During the night-time (resi AC only scenario), mechanical plant may become audibly *Tonal* against lower residual ambient (background) noise levels, therefore mechanical plant noise predicted levels have been adjusted by + 5 dB. The resulting level of 34dB(A) fully complies with the Regulations at the nearest sensitive receiver, NSR 1.

Expectation is that compliance elsewhere will be assured on the basis of more significant screening (e.g. to NSR 2 via concrete Lot boundary wall), or via increased noise propagation distance (e.g. to existing residences on the eastern side of Orsino Boulevard.

2.4 Future Noise Sources

As the project is in its early stages, details of the mechanical plant are unknown. In saying this, the following is noted:

- Car park exhaust fan shall be designed and located to minimise noise emissions and will likely require the inclusion of both intake and exhaust attenuators. Such plant shall be adequately vibration isolated and only operate on a needs basis (CO_2 system). A variable speed drive shall be incorporated to allow the fan(s) to run at slow speed where practicable;
- Exhaust fans (e.g. bin store etc) shall also be selected with noise as a consideration, with an allowance for attenuators, particularly on the discharge side;
- Other mechanical plant (e.g. air-conditioning) shall also be adequately vibration isolated and selected considering noise levels. Units shall have a 'night/quiet' mode option allowing them to operate at lower noise levels during the more sensitive night period.
- Testing of the fire pump shall meet required standards, however should only be tested during daytime hours to minimise noise intrusion.

The specifics of each system (and any future sources required to be introduced post-DA) will be assessed during Detailed Design once the plant and equipment have been selected. A further acoustic report shall then be undertaken for submission with Building Permit approval documentation to the City of Cockburn if required.

3 EXTERNAL NOISE INGRESS

3.1 Noise Intrusion Criteria

The City of Cockburn Guidelines require noise sensitive developments to be designed to achieve the following sound levels:

- 35 dB L_{Aeq} in bedrooms; and
- 40 dB L_{Aeq} in living areas.

For other developments, noise intrusion is to be controlled to achieve the indoor design sound levels of *Australian Standard 2107 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors*. For this project, this is relevant to the ground floor retail with the criteria provided in *Table 2-4*.

Table 3-1 AS2107 Indoor Design Sound Levels

Type of Occupancy/Activity	Design Sound Level Range, dB L_{Aeq}
Small Retail Stores (General)	≤ 50

3.2 Ambient Noise Assessment Methodology

3.2.1 Site Measurements

Noise monitoring was undertaken in the vicinity of the site using a Rion NA-28 sound level meter, with the recorded levels shown in *Figure 4-1*. The meter complies with the instrumentation requirements of relevant standards. The meter was field calibrated before and after the measurement session and found to be accurate to within +/- 1 dB. Lloyd George Acoustics also holds current laboratory calibration certificate for the meter.

Due to negligible noise levels on Lot 203, the meter was set-up on the lot south of Pantheon Avenue, west of the Woolworths loading dock. Minor construction noise was audible, as well as some limited traffic movement and noise from within the Marina area. The sharp peaks are a result of bird calling with some of the longer duration higher noise level a result of noise from the Woolworths loading dock. Note that the locality of the loading dock is well shielded from Lot 203.

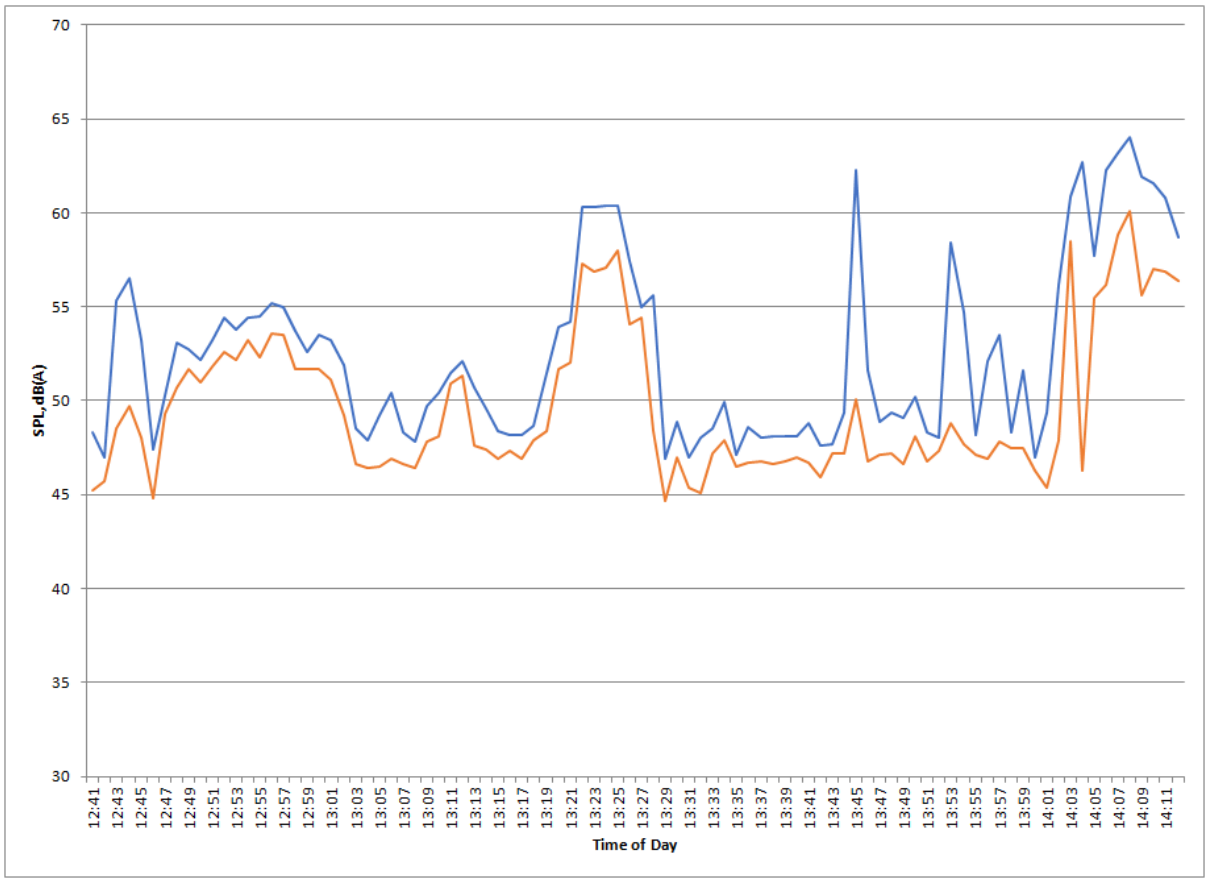


Figure 3-1 Recorded Noise Levels

The average values are 55 dB L_{Aeq} and 50 dB L_{A90}. To put this into context, with regard to road traffic and SPP 5.4, where the external noise level during the day is 55 dB L_{Aeq}, no further mitigation is required. On most nights, the area is likely to be relatively quiet with daytime commercial uses and residential in the area. The Australian Brewhouse is open until 11.00pm on some nights and it is understood there may also be some community events (food trucks, live music etc) during the summer, although these will occur further west of Lot 203.

3.3 Future Potential Noise

The area is under development and this is to be addressed as described in the Cockburn Guidelines as follows:

"For noise sensitive land uses, mixed use or multi-storey residential developments within intense mixed use community areas such as Cockburn Coast, Port Coogee, Muriel Court, Cockburn Central Town Centre and Cockburn Central West, … where potential sources of breakout noise are not yet present, the applicant is to liaise with the City for Guidance on determining potential noise sources, potential street and break out noise levels…"

City of Cockburn Environmental Health Officer was contacted and advised guidance should be taken from a Lloyd George Acoustics Study[1].

Lot 203 is located within the Marina Village part of the Structure Plan, although is at the eastern edge of this. In this scenario, the recommended facade construction is:

[1] *Development in Mixed-Use Areas – Noise Impacts, City of Cockburn Redevelopment*; Reference 15053197-01, 23 September 2015

- Bedroom glazing to achieve minimum $R_w + C_{tr} \geq 29$. To be confirmed by glazier however likely achievable with 6.5mm thick VLam Hush glass in fixed/awning window or sliding door, both with acoustic seals;
- Living glazing to achieve $R_w + C_{tr} \geq 27$. To be confirmed by glazier however likely achievable with 6mm thick glass in fixed/awning window or sliding door, both with acoustic seals;
- External wall construction to be minimum $R_w + C_{tr} \geq 48$. There are three proposed wall constructions being:
    - **WT1** - 140mm thick unfilled blockwork (180 kg/m^2), furring channels with 30mm thick, 14kg/m^3 polyester and 2 x 13mm thick SoundShield. This is equivalent to Knauf KMW29-8C having a manufacturer's performance of $R_w + C_{tr}$ 49 and therefore compliant; and
    - **WT3** - 110mm thick brick, 20mm cavity, 76mm stud with 75mm thick, 14kg/m^3 R2.5 fibrous insulation and 13mm plasterboard. This has a calculated performance of $R_w + C_{tr}$ 50-52, where the range provided is because of Sheetrock HD to Standard Plasterboard, with the latter being denser and therefore better performing. In any case, both plasterboard types would be compliant; and
    - **WT5** – 2 x 13mm fire-rated plasterboard to one side of 92mm Acoustic Stud with 75mm thick, 14kg/m^3 fibrous insulation. Other side to be 13mm fire-rated plasterboard and minimum 6mm fibre cement sheet. This is equivalent to Knauf KSW551 having a manufacturer's performance of $R_w + C_{tr}$ 50 and therefore compliant.
- Where a roof is located above an apartment, this shall be either concrete or metal deck with *Anticon* insulation on top of roof purlins, 13mm thick plasterboard and minimum R2.5 fibrous insulation above;

4 BCA PART F5

4.1 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 4-1 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)	$R_w + C_{tr} \geq 50$	$D_{nT,w} + C_{tr} \geq 45$
Separating SOU's (Habitable to bathroom, sanitary compartment, laundry or kitchen)	$R_w + C_{tr} \geq 50$ & D.C.	$D_{nT,w} + C_{tr} \geq 45$
Separating SOU to Plant room or lift shaft	$R_w \geq 50$ & D.C.	$D_{nT,w} \geq 45$
Separating SOU to Stairway, public corridor, public lobby, or parts of a different classification	$R_w \geq 50$	$D_{nT,w} \geq 45$
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)	$R_w + C_{tr} \geq 40$	N/A
SOU (Non-Habitable) to duct, soil, waste, water supply or storm water (not associated with the SOU)	$R_w + C_{tr} \geq 25$	N/A

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

4.1.1 Application of Discontinuous Construction (D.C.) to Separating Walls

The application of *"Discontinuous Construction"* (D.C.) in addition to the minimum $R_w + C_{tr}$ rating of 50 dB is a requirement of the NCC which seeks to provide adequate resistance to impact-generated sound transmission. This is typically where non-habitable (wet) areas (e.g. bathrooms, kitchens, WC, laundry and the like) are adjacent to habitable areas (e.g. sleeping and living areas) in adjacent apartment units, OR where plant rooms or lift shafts are adjacent to any part of an apartment unit.

At this stage of the project, design details are still being established and therefore information provided below is indicative only and subject to change.

4.1.2 Discontinuous Construction Type Options

Options for D.C. for each potential separating l construction "type" as follows:

i. Using lightweight framed construction, twin stud frames are required to achieve the minimum airborne sound insulation performance required for party walls. Using a minimum clear air gap of 20mm between frames, ensuring no mechanical connection except at the periphery boundaries (i.e. floor slab, perpendicular walls and underside of soffit), twin timber framed construction complies with Discontinuous Construction requirements where applicable;

ii. To achieve Discontinuous Construction in single leaf blockwork or concrete walls, a minimum clear air gap of 20mm is required between concrete wall leaf and a secondary framed wall leaf, ensuring no mechanical connection except at the periphery boundaries (i.e. floor slab, perpendicular walls and underside of soffit);

4.2 Early Wall Construction Review

Appendix B presents DA Floor plans marked with their minimum required acoustic ratings for walls - these ratings and recommended minimum construction build-ups relevant to the project are discussed below.

4.2.1 Walls Separating Sole Occupancy Units

Where an SOU adjoins another SOU, the BCA requires $R_w + C_{tr}$ 50 (orange line) and in addition, discontinuous construction is mandatory (blue line) between habitable rooms and wet areas (including kitchens). The requirement for discontinuous construction is also applied where internal stairs of one SOU adjoin another. In this project, the wall system is as described in *Table 5-1*.

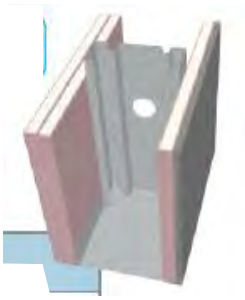
Table 4-2 Potential Party Wall Blockwork Systems

Wall	Image	Description
WT2 (Orange/Blue) – Blockwork System (Knauf KMW28-4C) $R_w + C_{tr} \geq 50$ Discontinuous Construction 237mm Wide		• 13mm MastaShield • 140mm Unfilled Concrete Block (180kg/m²) • 20mm gap • 51mm Steel stud with 50mm thick, 11kg/m³ R1.5 polyester insulation • 13mm Soundshield

4.2.2 Walls Separating Sole Occupancy Unit to Public Corridor

Where an SOU adjoins a public corridor, the BCA requires R_w 50 (pink line). The potential wall system is shown in *Table 5-2*.

Table 4-3 Potential Lightweight Public Wall

Wall	Image	Description
WT5 (Pink Only) – Lightweight System (Knauf KSW551) $R_w \geq 50$ 137mm Wide		• 1 x 13mm FireShield + 1 x 6mm Villaboard • 92mm Acoustic Steel Stud with 75mm, 14kg/m³ R2.5 polyester insulation • 2 x 13mm FireShield

4.2.3 Walls Separating Sole Occupancy Unit to Public Stairs

Where an SOU adjoins public stairs, the BCA requires R_w 50. To provide some impact isolation, discontinuous construction is also required to these walls. As such WT2 (*Table 5-1*) will be used in these instances.

4.2.4 Walls Separating Sole Occupancy Unit to L02 Residential Lounge/Workspace

Where an SOU adjoins a the Level 02 communal workspace, the BCA requires R_w 50. To improve the sound insulation to the adjacent residence (Apartment 10) in the event of a function or residents using the space with amplified music, a discontinuous construction is recommended to these walls.

4.2.5 Walls Separating Sole Occupancy Unit to Car Park

Where an SOU adjoins the car park, the BCA requires R_w 50. To provide some impact isolation, discontinuous construction is also required to these walls. As such WT2 (*Table 5-1*) will be used in these instances.

4.2.6 Perimeter Perpendicular Junctions to Building Envelope Wall

All perpendicular party wall junctions to building envelope (external) walls must be sealed air-tight with sufficient mass equivalent to abutting separating wall construction to avoid introduction of flanking sound transmission paths which would otherwise negate the airborne sound insulation performance of the installed party wall.

Detailing junction to ALL minimum rated wall junctions with building envelope/facade wall, for example where window sub-frame meets building aperture, MUST be addressed during construction to ensure adequate seal and control of flanking sound transmission.

4.2.7 Internal Apartment Walls

There is no Code requirement for internal walls unless the wall is a service riser – refer *Section 5*. The only time where wall construction becomes critical is where a wall is also contributing to the attenuation of hydraulic pipe noise. For instance, where bathrooms are stacked, the walls in the lower bathroom are attenuating noise from pipes in the ceiling space to adjoining bedrooms or the like.

In these cases, the walls are to continue from slab to slab. If these walls do not extend full height and another person's pipework is present, pipes are to be treated as if they adjoin a habitable space – refer *Section 4.4*. Where such a wall separates two wet areas within the same apartment, there is no requirement for the walls to continue full height.

4.2.8 Construction *"Deemed-to-Satisfy"* for Separating Wall Elements

Part F5 of the referenced *BCA* states:

> *"Where masonry walls require wall ties, but are also required to be of **discontinuous construction**, the wall ties must be of resilient type".*

Regarding masonry and concrete slabs, *BCA Specification F5.2, Clause 2(a) Masonry* and *Clause 2(b) Concrete Slabs* states:

> *"(a) **Masonry** – Units are to be laid with all joints filled solid, including those between the masonry and any adjoining construction*
> *b) **Concrete slabs** – Joints between concrete slabs or panels and any adjoining construction must be filled solid"*

Regarding sheeting materials, *BCA Specification F5.2, Clause 2(c) Sheeting materials* states:

> *"(c) **Sheeting materials** –*
> *(i) if one layer is **required** on both sides of a wall, it must be fastened to the studs with joints staggered on opposite sides; and*
> *(ii) if two layers are **required**, the second layer must be fastened over the first layer so that the joints do not coincide with those of the first layer; and*
> *(iii) joints between sheets or between sheets and any adjoining construction must be taped and filled solid. "*

Regarding timber or steel-framed construction, *BCA Specification F5.2, Clause 2(d) Timber or steel-framed construction* states:

> *"(d) **Timber or steel-framed construction** – Perimeter framing members must be securely fixed to the adjoining structure and-*
> *(i) bedded in resilient compound*
> *(ii) the joints must be caulked so that there are no voids between the framing*

4.2.9 Full Height Walls to Underside of Roof Construction

Clause F5.5 (f)(i) Part F5 of the NCC states:

> *"Where a wall that is required to have a min. sound insulation performance has a floor or roof above, the wall must continue to the underside of the floor or roof or a ceiling that has the same sound insulation as the wall".*

In the case of Ground Floor loadbearing walls, any acoustically rated separating wall constructions are inherently full height and sealed to the underside of the supported slab over, hence complies. In the case of non-loadbearing walls:

- First Floor party and apartment boundary (acoustically rated) walls, these walls are to be sealed to underside of lightweight roof sheeting over, in order to comply.
- Where a full height or above-ceiling infill wall detail is not practicable (e.g. due to complex roof frame geometry or similar obstruction), ceilings on both sides of the non-full height party wall must be upgraded to 2 x 16mm FR Plasterboard, with 100mm fibrous insulation layer laid over full extents and sealed to bounding wall construction.

4.3 Separating Floor Construction – NCC Minimum Requirements

Clause FP5.1 Part F5 of the NCC requires that separating floor constructions be designed to provide resistance to both airborne and impact sound transmission between residential apartments:

Airborne Sound Transmission

The minimum NCC airborne sound insulation performance of $R_w + C_{tr} \geq 50$ dB is required to be achieved between vertically adjacent residential apartments – typical residential airborne sound source can be categorised as TV, Hi-Fi, raised voices and the like;

Impact Sound Insulation

The minimum NCC impact sound isolation performance of $L_{n,w} \leq 62$ dB is required to be achieved between vertically adjacent residential apartments. Impact sound isolation describes the transfer of footfall, furniture movement and impact generated sound, and in multi-residential settings, impact sound isolation performance is directly linked to perception so quality and privacy.

Integral to achieving impact sound ratings and resultant amenity are the combination of floor construction and choice of floor coverings:

i. Use of carpet on foam underlay, over a 200 mm thick structural slab provides exceptional degree of impact sound isolation performance, typically rated at ~45dB $L_{n,w}$, which is significantly below the NCC minimum;

ii. Modern aesthetics and market expectation may imply use of hard floor coverings (such as timber flooring, tiles and the like) - where hard floor coverings are applied, additional treatments to the floor substrate are required to achieve the minimum NCC impact sound isolation performance, (for compliance) - further improvements are often required to provide satisfactory amenity;

4.3.1 Expectations of Privacy/Quality from Impact Sound

It should be noted that the NCC minimum impact rating criteria of $L_{n,w}$ 62 dB represents a relatively low level of performance, and the transmission of impact generated sound typically represents one of the major complaints in multi-residential buildings. Our experience over a number of years/projects demonstrates impact sound performance to be one of the primary indicators used to judge the subjective impression of the "acoustics" of an apartment.

Further, general (subjective) perception in finished buildings which have been specified to achieve the base NCC minimum compliance criteria, $L_{n,w}$ 62dB only for impact sound isolation indicates this performance can be considered inadequate in terms of modern marketplace expectation of quality, thus presenting the risk of high likelihood of dissatisfied purchasers and subsequent complaint.

A more appropriate minimum standard is considered to be $L_{n,w}$ 55, which exceeds (i.e. improves upon) the NCC minima, to align with potential expectations of quality representing "3 Star" performance when considered under the *AAAC Guideline for Apartment and Townhouse Ratings*. For higher end apartments, a better than 3 star performance should be the design goal, depending on budget and the like, noting that this can generally only be achieved by installing a suspended insulated ceiling throughout.

It should also be noted that the more area of hard floor finishes throughout an apartment, the more effect of impact sound from footfall/furniture movement noise there will be. For instance, if only the kitchen and bathrooms are tiled, with all other finishes being carpet, impact noise is unlikely to create significant disturbance. If the living areas are also hard floor finish, then a better-than-minimum standard should be achieved to minimise the additional impact. Incorporating hard floor finishes to bedrooms as well, or having hard floors above bedrooms (particularly master bedroom) is not recommended.

Consequently, it is recommended the integration of floor finishes should be considered as early as possible in the project design development, to ensure the desired end-performance for impact sound isolation amenity is able to be achieved with the preferred underlying structure and architecture, and preferred interior finishes.

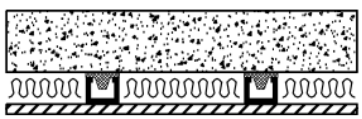
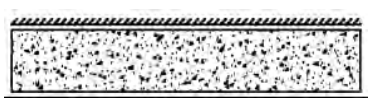
4.3.2 Flanking Transmission

Within the NCC criteria and this report, each element is discussed separately. There are circumstances where the construction of one element can limit the performance of another element and these are referred to as flanking paths. As well as flanking paths that need to be considered in achieving the desired acoustic quality, so too do penetrations and these are discussed within this report.

4.3.3 Separating Floors - Deemed-To-Satisfy Minimum Construction Build-Up

The Code provides acceptable forms of construction. For suspended concrete slab systems, two alternative *Deemed-To-Satisfy* (*DTS*) *Provisions* are provided which are recommended as the minimum specification, shown in *Table 4-3*. *DTS* ratings in the Building Code are shown adjacent to those calculated by the computer software *Insul* v9.

Table 4-4 NCC Class 2/3 Acceptable Forms of Floor Construction

Description	Construction	NCC Rating	Insul* Rating
Concrete			
150mm thick concrete slab with – - 28mm metal furring channels and isolation mounts fixed to underside of slab, at 600mm centres; and - 65 thick polyester insulation with a density of 8kg/m³, positioned between furring channels; and - one layer of 13mm plasterboard fixed to furring channels.		$R_w + C_{tr} \geq 50$ $L_{n,w} \leq 62$	$R_w + C_{tr} \geq 51$ $L_{n,w} = 62$
200mm thick concrete slab with carpet on underlay.		$R_w + C_{tr} \geq 50$ $L_{n,w} \leq 62$	$R_w + C_{tr} \geq 51$ $L_{n,w} = 48$

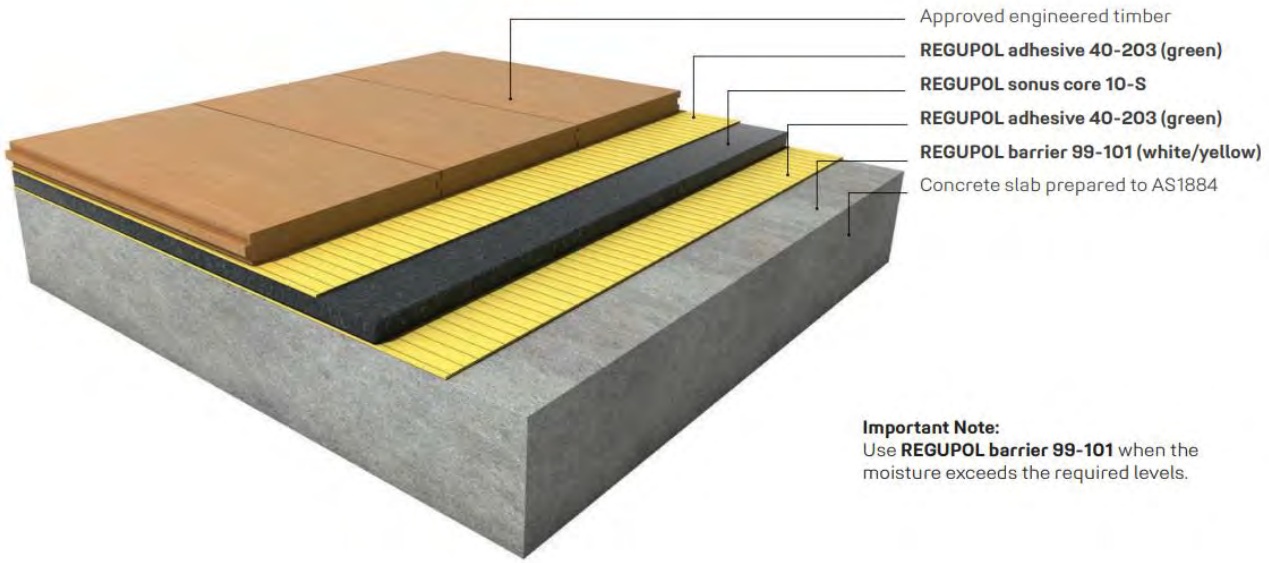
* Insul (v9.0.17) is a computer software package used to estimate acoustic performance via calculation.

4.3.4 Recommended Minimum Floor Build Up w/Skim Coat Ceilings

Acknowledging the project preference to use skim coat ceilings below areas of hard floor covering. It s recommended to provide a higher-than-minimum impact sound insulation rating for separating floors. Early design integration has been developed during DA stage to determine an acceptable floor isolation construction build-up able, to approach the recommended minimum performance of 55dB $L_{nT,w}$

- Engineered timber floor covering (est 12-18mm thickness)
- Regupol Sonus Curve 10-S to manufacturer installation details – see below
- 250mm thick reinforced concrete slab
- Skim coat ceiling below

The schematic illustration below shows general installation detail;
An extract from the Manufacture installation details is included in Appendix C – NB: it is critical that the room perimeter edge detailing is observed to avoid transfer of footfall and furniture movement noise into walls and adjoining structure.



4.3.5 Vertically Adjacent Balcony Floors

In the case of vertically stacked apartment balconies, a common interpretation of the Code by Building Certifiers is understood to be that where vertically stacked balconies are entirely EXTERNAL of internal building space(s) and do not share a floor with the apartment below, that vertically stacked balconies are not strictly assessed against the Code and as such, no impact isolation would be mandatory.

Practically speaking, the nature of impact noise is such that transfer occurs horizontally and diagonally down through connected structural elements, therefore in these cases impact isolation treatment is still recommended.

4.4 NCC Minimum Requirements for Building Services

4.4.1 Overview of Requirements

NCC requires *"shared building services"* to be acoustically separated from separate SOUs sufficient to meet minimum performance ratings criteria in the form of acoustic "$R_w + C_{tr}$" ratings for the concealment of pipe work, service ducts and the like.

The following section advises on applicable criteria and minimum provisions to meet NCC requirements – it is envisaged the project will be assessed at completion of detailed design stage, prior to application for Building Permit at the appropriate time.

4.4.2 Applicable Criteria

As summarised in *Table 4-1:*

a) If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole occupancy unit, the duct or pipe must be separated from the rooms of any sole occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than –

i. 40 if the adjacent room is a habitable room ([including] … a kitchen); or

ii. 25 if the adjacent room is a … non-habitable room.

b) If a stormwater pipe passes through a sole occupancy unit it must be separated in accordance with (a)(i) and (ii).

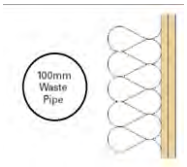
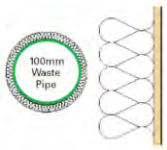
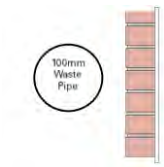
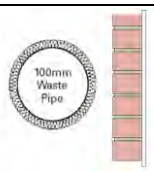
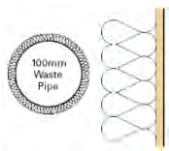
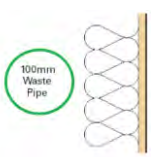
To clarify the above, the Code is only concerned with noise from a pipe, which is not associated with the apartment it adjoins. Therefore, water supply pipes only serving the apartment it is within, do not require any treatment for acoustic purposes. Also note that pipes includes stormwater as well as soil, waste and water supply.

4.4.3 Service Duct Walls - Rated Minimum Constructions in Residential Areas

The following table(s) present minimum rated services concealment constructions to meet the minimum standards – the table has been updated to reflect use of rated "laminated pipe wall" hydraulic pipework, (shown green), the applications of suitable pipe wrapping, and combinations thereof which are able to practically achieve the NCC services requirements, and hence can be shown to comply;

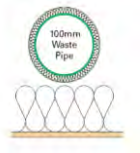
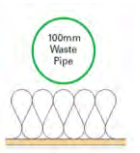
4.4.4 Services Concealed in Vertical Ducts

Table 4-5 NCC Class 2/3 Acceptable Forms of Vertical Service Duct Build-up

Application	Specification	Schematic	Est. Rating (R_w+C_{tr})	NCC Compliant
Concealment of shared services riser/duct wall, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms, etc)	Unlagged Standard PVC Pipe, mounted on rubber isolation pipe clips behind 2 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		40dB	COMPLIES
Concealment of shared services riser/duct wall, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms, etc)	Laminated wall (rated) pipe, wrapped with Pyrotek Soundlag 4525C or equivalent performing pipe lagging material, mounted on anti-vibration pipe clips behind 1 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		43dB	COMPLIES
Concealment of shared services, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms, etc)	Alternative masonry solution - Unlagged Standard PVC Pipe, mounted on rubber isolation pipe clips behind 1 x 90mm brickwork leaf with render/plaster set over		40dB	COMPLIES
Concealment of shared services, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms, etc)	Upgraded masonry solution - Standard PVC Pipe, wrapped with Pyrotek Soundlag 4525C or equivalent performing pipe lagging material, mounted on rubber isolation pipe clips behind 1 x 90mm brickwork leaf with render/plaster set over		>45dB	COMPLIES
Concealment of shared services riser/duct wall, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **NON-HABITABLE AREAS** (wet areas etc)	Standard PVC pipe lagged with Soundlag 4525C or equivalent performing pipe lagging material, mounted on anti-vibration pipe clips behind 1 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		25dB	COMPLIES
Concealment of shared services riser/duct wall, or services to/from an adjacent apartment which are routed next to an adjoining apartment's **NON-HABITABLE AREAS** (wet areas etc)	Laminated wall (rated) pipe, mounted on anti-vibration pipe clips behind 1 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		25dB	COMPLIES

4.4.5 Services Concealed in Horizontal (Ceiling Space) Ducts

Table 4-6 NCC Class 2/3 Acceptable Forms of Horizontal Service Duct Build-up

Application	Specification	Schematic	Est. Rating (Rw+Ctr)	NCC Compliant
Concealment of shared services, or services to/from an adjacent apartment which are routed over an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms etc) *Typically over habitable area ceiling spaces*	Standard PVC pipe lagged with Soundlag 4525C or equivalent performing pipe lagging material, mounted on rubber isolation pipe clips behind 2 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		43dB	COMPLIES
Concealment of shared services, or services to/from an adjacent apartment which are routed over an adjoining apartment's **HABITABLE AREAS** (living rooms, bedrooms etc) *Typically over habitable area ceiling spaces*	Laminated wall (rated) pipe, wrapped with Pyrotek Soundlag 4525C or equivalent performing pipe lagging material, mounted on anti-vibration pipe clips behind 1 x 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		43dB	COMPLIES
Concealment of shared services, or services to/from an adjacent apartment which are routed over an adjoining apartment's **NON-HABITABLE AREAS** (bathrooms, laundry, WC etc) *Typically over wet area ceiling spaces*	Standard PVC pipe lagged with Soundlag 4525C or equivalent performing pipe lagging material, mounted on rubber isolation pipe clips behind 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		25dB	COMPLIES
Concealment of shared services, or services to/from an adjacent apartment which are routed over an adjoining apartment's **NON-HABITABLE AREAS** (bathrooms, laundry, WC etc) *Typically over wet area ceiling spaces*	Laminated wall (rated) pipe, mounted on rubber isolation pipe clips behind 13mm plasterboard sheet, with 50mm cavity insulation (min density 11kgm^{-3})		25dB	COMPLIES

Coordination of minimum concealed services ducts/suspended ceilings is critical in achieving compliance with the minimum requirements of the NCC.

4.4.6 Ancillary Construction Requirements for Concealed Services Duct Walls

The *NCC* makes provision of additional criteria specific to the placement and function of mechanical building services. Specification F5.2 makes the following *'Deemed-To-Satisfy'* provisions under Clause 2:

> ***2. Construction deemed to satisfy***
>
> *(e) Services*
>
> *(i) Services must not be chased into concrete or masonry elements*
>
> *(ii) A door or access panel required to have a certain Rw+Ctr that provides access to a duct, pipe or other service must –*
>
> *(A) not open into any **habitable** room (other than a kitchen); and*
>
> *(B) be firmly fixed such that the rebate or frame is overlapped by the access panel by not less than 10mm, be fitted with a sealing gasket along all edges and be constructed of-*
>
> *(aa) wood, particleboard or block board >33mm thick*
> *(bb) compressed fibre reinforced cement sheeting >9mm thick*
> *(cc) Other suitable material with mass per unit area >24.4 kgm-2*
>
> *(iii) A water supply pipe must –*
>
> *(A) Only be installed in the cavity of a discontinuous construction; and*
>
> *(B) In the case of a pipe that serves only one sole-occupancy unit, not be fixed to the wall leaf on the side adjoining any other sole-occupancy unit, and have a clearance of at least 10mm to the other leaf*
>
> *(iv) Electrical outlets must be offset from each other –*
>
> *(A) In masonry walling, not less than 100mm; and*
> *(B) In timber or steel framed walling, not less than 300mm*

4.4.7 Sound Isolation of Pumps

As per F5.7 of the deemed to satisfy provisions, *"a flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump."*

4.4.8 Other

Other items to be considered are:

- All plant is to be vibration isolated to minimum 97% isolation efficiency. Requirements to be determined by mount supplier based on equipment speed and weight;
- Carpark Entry Door:
    - Is to be a hinged type door, fitted with a 'slow-down device'.
    - Is to be supported via its own structure.
    - Motors are to be vibration isolated to achieve minimum 97% isolation efficiency with guidance provided by a mount supplier such as Embelton's.
    - Closing latches to be quiet in operation.
    - Noise levels must comply with the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.
- Carpark Floor
    - Shall be constructed so that there are no significant gaps in construction or where these exist, are to be filled with non-hardening mastic.
    - Drainage grates are to be plastic or metal with rubber gasket and secure to avoid excess banging.
    - Brushed concrete finish to avoid tyre squeal. Where the concrete is to be sealed, a product such as Aquron 1000 by Markham is understood to be suitable and not contribute to tyre squeal.

5 CONCLUSION

This report demonstrates how the project will comply with the City of Cockburn Guidelines and relevant referenced standards. Following Development Application (DA), further work will be required as the project goes into Detailed Design (DD) to assist the project team. In particular, an environmental noise assessment for compliance with the *Environmental Protection (Noise) Regulations 1997* and a more detailed BCA Part F5 report.

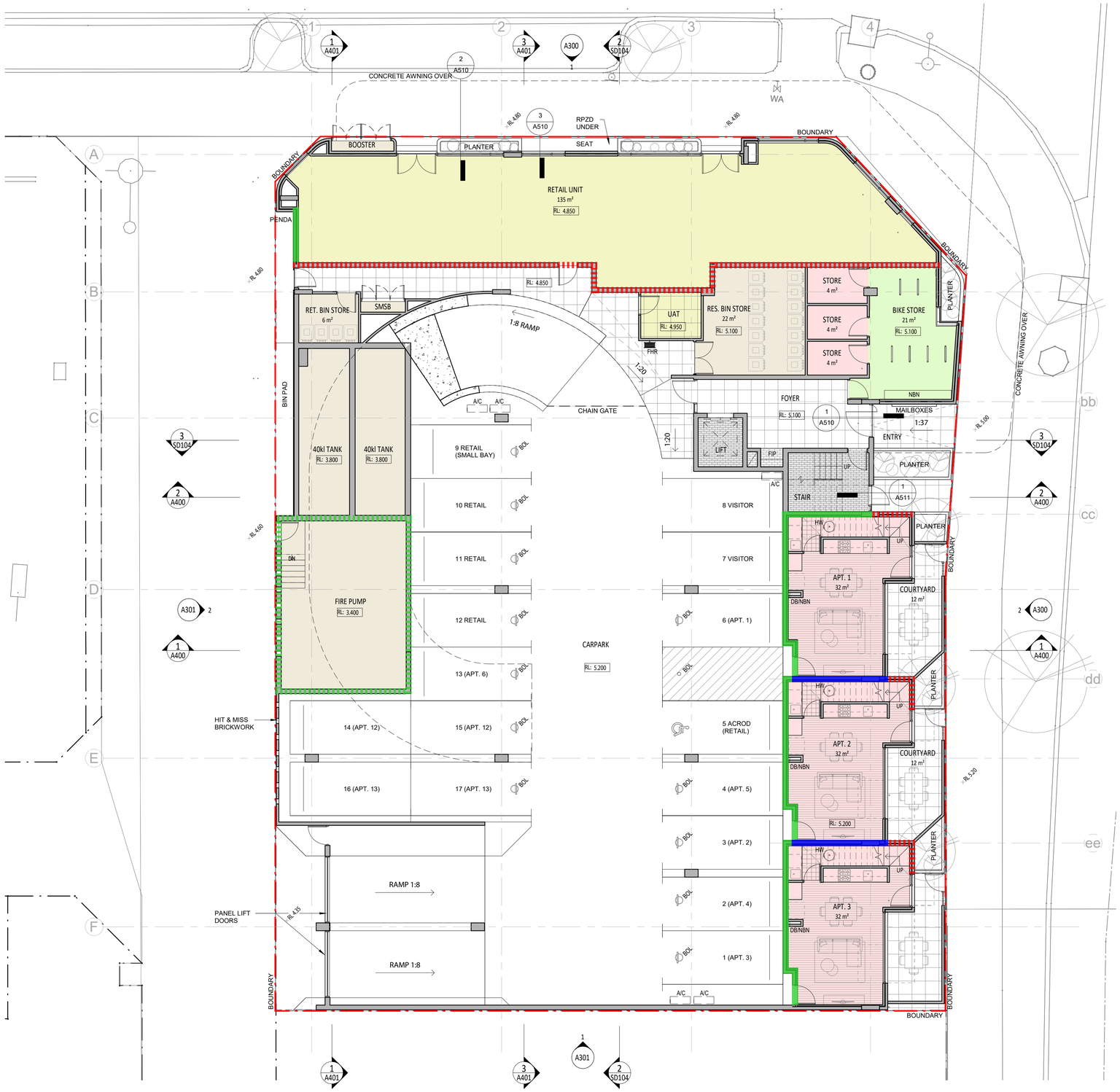
Ambient noise in the area is currently relatively low and for this site, not expected to increase significantly such that the default Cockburn Guideline construction will be adopted (refer *Section 4.2*) and as such, a further ambient noise study will not be required.

Appendix A

Development Plans

Appendix B

NCC Minimum Compliance Criteria Mark ups



PROJECT No: 21086563
PROJECT Name: Lot 203 Calypso Parade, PORT COOGEE

NCC VOL 1, PART F5: WALL / FLOOR TYPE & SHARED SERVICE DUCTS MINIMUM COMPLIANCE REQUIREMENTS

AIRBORNE SOUND INSULATION KEY:

NB: DASH = RECOMMENDED

>Rw+Ctr 50dB	
>Rw+Ctr 50dB PLUS **discontinuous**	
>Rw 50dB	
>Rw 50dB PLUS **discontinuous**	

SEPARATING FLOOR/CEILING CONSTRUCTIONS

CARPETED FLOOR COVERINGS

Carpeted floor coverings throughout bedrooms installed on foam underlay over minimum 200mm thick concrete slab meets the BCA minimum performance for both airborne sound separation
(> Rw+Ctr 50dB), and impact sound isolation(< 62dB $L_{nT,w}$) without further treatment.

HARD FLOOR COVERINGS

Hard floor coverings over a minimum 200mm thick concrete slab meets the NCC minimum airborne sound separation performance of Rw+Ctr 50dB.
To meet the NCC minimum standard for impact sound isolation of < 62dB $L_{nT,w}$ a compliant isolation treatment must be incorporated, pending floor finish, as follows:

SUSPENDED CEILING BELOW
Incorporate resilient matting between any hard floor finish and the concrete substrate, with suspended plasterboard ceiling (nominal void depth 100mm) installed below, including 50mm thick fibrous insulation quilt (minimum density 11kgm^{-3}) within the formed cavity.

SKIM COAT CEILING BELOW
Where suspended ceilings are absent, a higher performance (thicker) resilient system may need to be installed between any hard floor finish and the concrete substrate, to acheive acceptable levels of impact sound amenity, which meet the NCC minimum requirements;

CONCEALED BUILDING SERVICES DUCT WALLS (inc CEILINGS)

>Rw+Ctr 40dB	
>Rw+Ctr 25dB	

SHARED SERVICES DUCT CONSTRUCTIONS

Shared service duct walls to "habitable" areas must achieve NCC minimum airborne sound separation performance of Rw+Ctr 40dB. This rating can be achieved with 2 x 13mm plasterboard on stud frame with 11kgm-3 fibrous insulation retained in the services duct; Where standard PVC pipework is used, pipes must be wrapped in Pyrotek 4525C;
Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted, OR included and services duct wall reduced to 1 x 13mm FR plasterboard

Shared service duct walls to "non-habitable" areas must achieve the NCC minimum airborne sound separation performance of Rw+Ctr 25dB. This rating can be achieved with 1 x 13mm plasterboard on stud frame with 11kgm-3 fibrous insulation retained in the services duct;
Where standard PVC pipework is used, pipes must be wrapped in Pyrotek 4525C;
Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted;

APARTMENT LEGEND

- 1 x 1 BED
- AMENITIES
- CIRCULATION
- PLANT
- RETAIL

DESIGN DEVELOPMENT

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Fraser Property
Port Coogee Marina Village - Lot 3
16-18 Battersby St, Zillmere
GROUND FLOOR PLAN

SCALE 1:100 @A1 SHEET SIZE

DRAWN: LW	DESIGNED: LM	PRINCIPAL: JL	
CHECKED: DG	MODEL PATHNAME: BIM 360://Port Coogee/21113 Lot 3 Ortona Blvd Port Coogee DD R.01.rvt		
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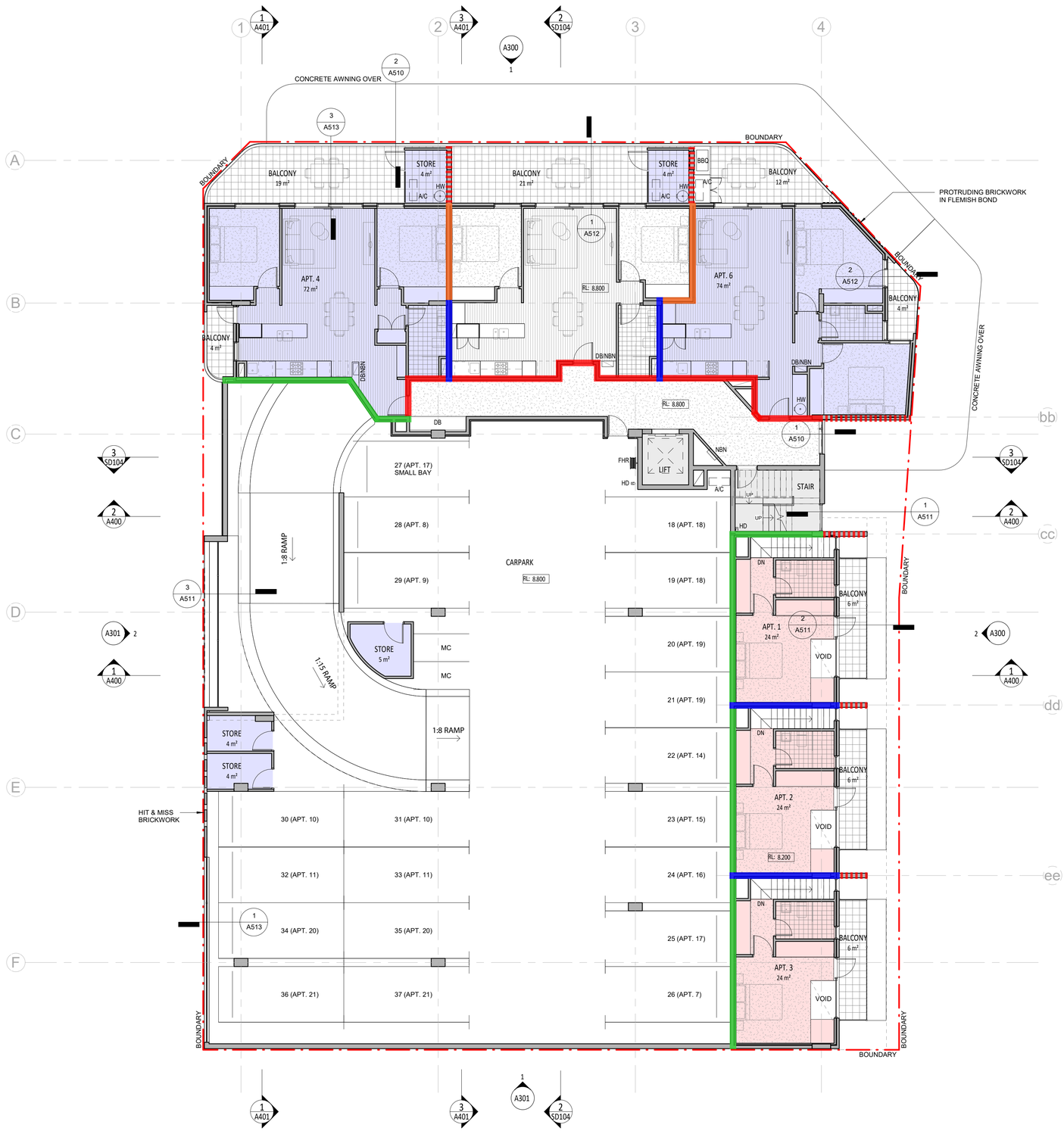

PROJECT No: 21086563
PROJECT Name: Lot 203 Calypso Parade, PORT COOGEE

NCC VOL 1, PART F5:
WALL / FLOOR TYPE & SHARED SERVICE DUCTS MINIMUM COMPLIANCE REQUIREMENTS

LLOYD acoustics

AIRBORNE SOUND INSULATION KEY:

NB: DASH = RECOMMENDED

- >Rw+Ctr 50dB
- >Rw+Ctr 50dB PLUS **discontinuous**
- >Rw 50dB
- >Rw 50dB PLUS **discontinuous**

SEPARATING FLOOR/CEILING CONSTRUCTIONS

CARPETED FLOOR COVERINGS

Carpeted floor coverings throughout bedrooms installed on foam underlay over minimum 200mm thick concrete slab meets the BCA minimum performance for both airborne sound separation
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Where standard PVC pipework is used, pipes must be wrapped in Pyrotek 4525C;
Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted;

APARTMENT LEGEND

- 1 x 1 BED
- 2 x 1 BED
- CIRCULATION

DESIGN DEVELOPMENT

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Fraser Property
Port Coogee Marina Village - Lot 3
16-18 Battersby St, Zillmere
LEVEL 1 FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

DRAWN: Author	DESIGNED: Designer	PRINTED: Approver	
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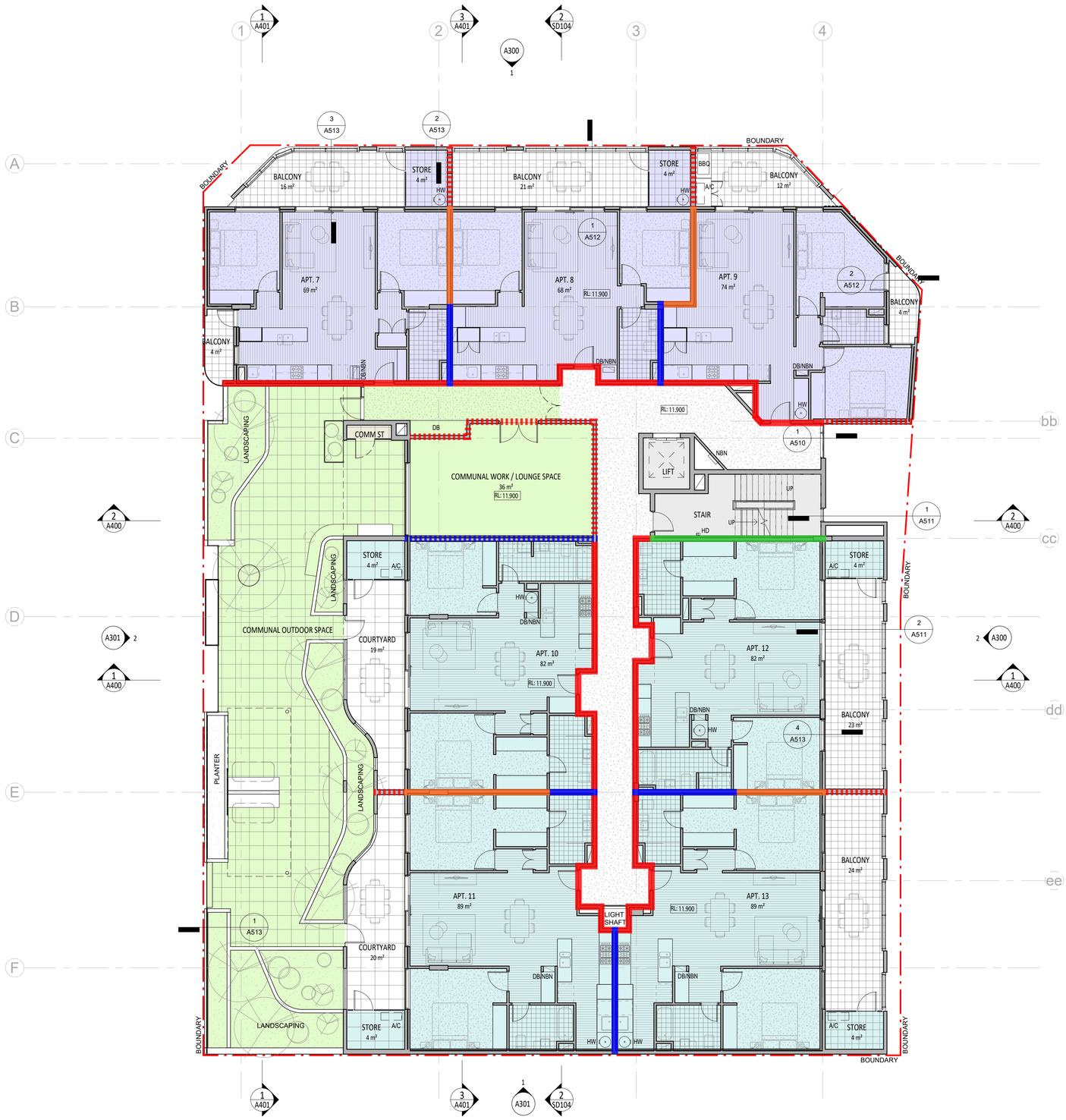

PROJECT No: 21086563
PROJECT Name: Lot 203 Calypso Parade, PORT COOGEE

LLOYD GEORGE Acoustics

NCC VOL 1, PART F5:
WALL / FLOOR TYPE & SHARED SERVICE DUCTS MINIMUM COMPLIANCE REQUIREMENTS

AIRBORNE SOUND INSULATION KEY:

NB: DASH = RECOMMENDED

>Rw+Ctr 50dB	———
>Rw+Ctr 50dB PLUS **discontinuous**	———
>Rw 50dB	———
>Rw 50dB PLUS **discontinuous**	———

SEPARATING FLOOR/CEILING CONSTRUCTIONS

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Where suspended ceilings are absent, a higher performance (thicker) resilient system may need to be installed between any hard floor finish and the concrete substrate, to acheive acceptable levels of impact sound amenity, which meet the NCC minimum requirements;

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Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted, OR included and services duct wall reduced to 1 x 13mm FR plasterboard

Shared service duct walls to "non-habitable" areas must achieve the NCC minimum airborne sound separation performance of Rw+Ctr 25dB. This rating can be achieved with 1 x 13mm plasterboard on stud frame with 11kgm-3 fibrous insulation retained in the services duct;
Where standard PVC pipework is used, pipes must be wrapped in Pyrotek 4525C;
Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted;

APARTMENT LEGEND

- 2 x 1 BED
- 2 x 2 BED
- AMENITIES
- CIRCULATION
- PLANT

DESIGN DEVELOPMENT

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Fraser Property
Port Coogee Marina Village - Lot 3
16-18 Battersby St, Zillmere
LEVEL 2 FLOOR PLAN

SCALE 1:100 @A1 SHEET SIZE

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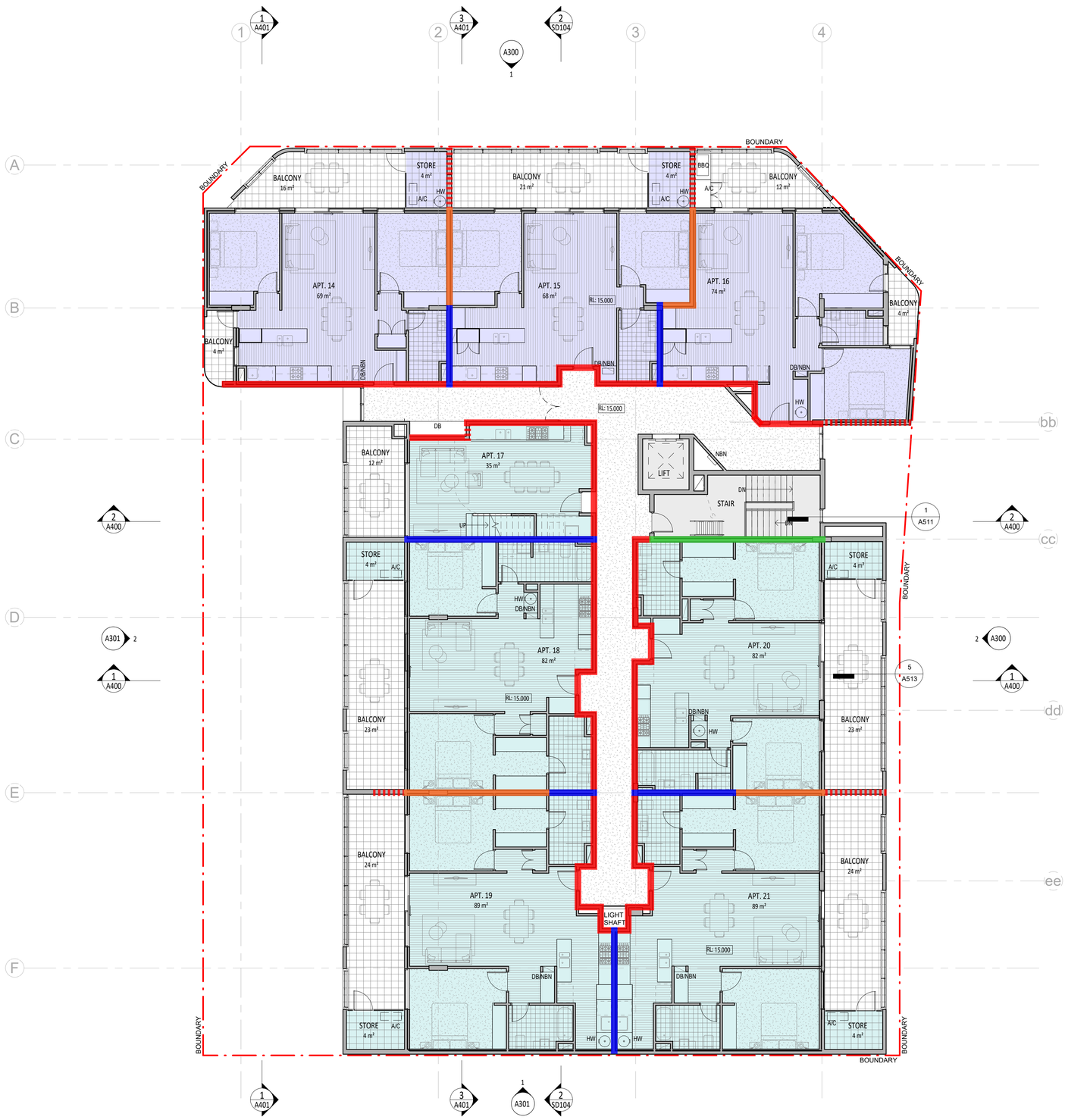

PROJECT No: 21086563
PROJECT Name: Lot 203 Calypso Parade, PORT COOGEE

NCC VOL 1, PART F5:
WALL / FLOOR TYPE & SHARED SERVICE DUCTS MINIMUM COMPLIANCE REQUIREMENTS

LLOYD acoustics

AIRBORNE SOUND INSULATION KEY:

NB: DASH = RECOMMENDED

>Rw+Ctr 50dB		
>Rw+Ctr 50dB PLUS **discontinuous**		
>Rw 50dB		
>Rw 50dB PLUS **discontinuous**		

SEPARATING FLOOR/CEILING CONSTRUCTIONS

CARPETED FLOOR COVERINGS

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Shared service duct walls to "non-habitable" areas must achieve the NCC minimum airborne sound separation performance of Rw+Ctr 25dB. This rating can be achieved with 1 x 13mm plasterboard on stud frame with 11kgm-3 fibrous insulation retained in the services duct;
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Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted;

APARTMENT LEGEND

- 2 x 1 BED
- 2 x 2 BED
- CIRCULATION

DESIGN DEVELOPMENT

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Fraser Property
Port Coogee Marina Village - Lot 3
16-18 Battersby St, Zillmere
LEVEL 3 FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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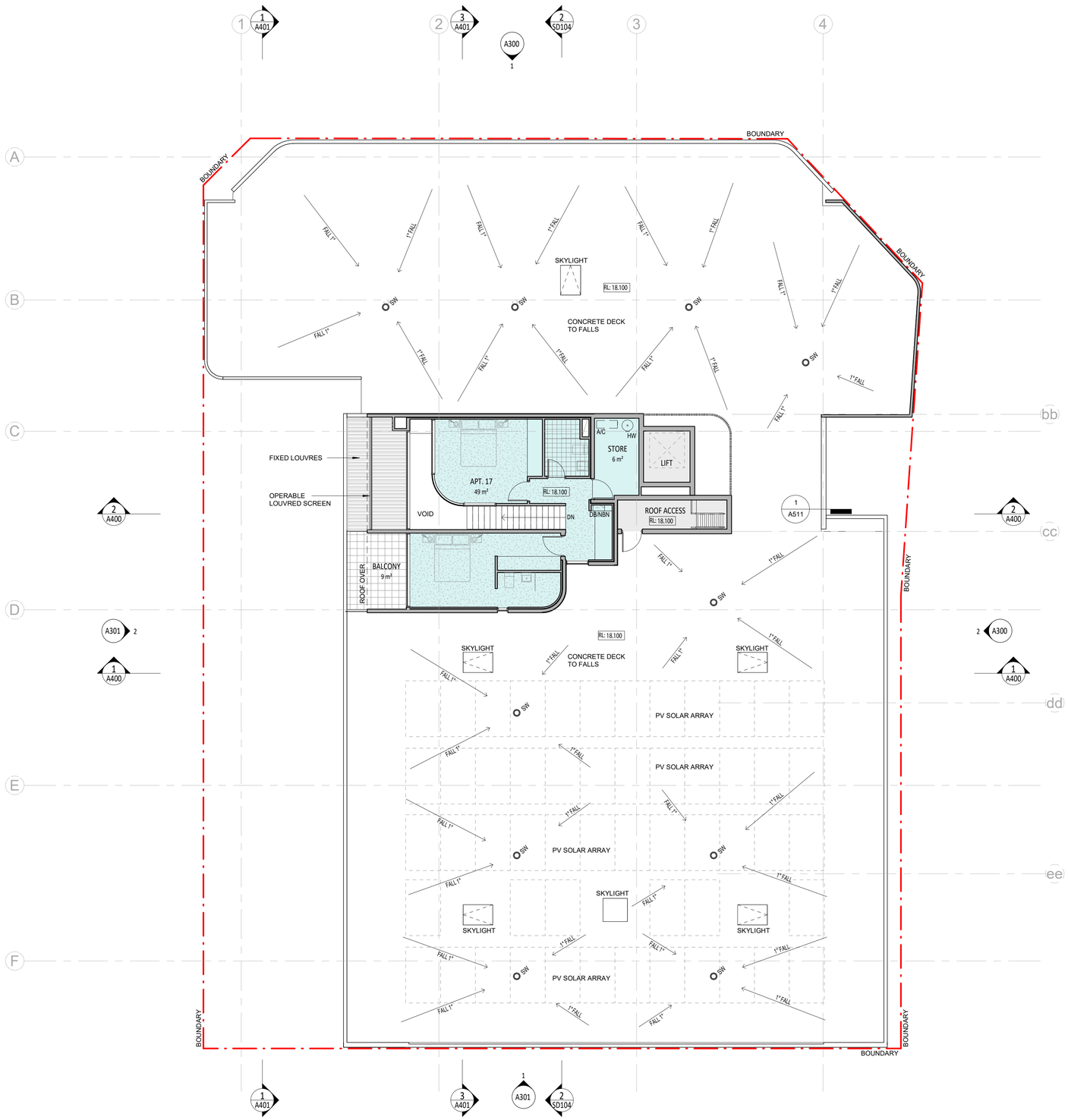

PROJECT No: 21086563
PROJECT Name: Lot 203 Calypso Parade, PORT COOGEE

NCC VOL 1, PART F5:
WALL / FLOOR TYPE & SHARED SERVICE DUCTS
MINIMUM COMPLIANCE REQUIREMENTS

AIRBORNE SOUND INSULATION KEY:

NB: DASH = RECOMMENDED

- >Rw+Ctr 50dB
- >Rw+Ctr 50dB PLUS **discontinuous**
- >Rw 50dB
- >Rw 50dB PLUS **discontinuous**

SEPARATING FLOOR/CEILING CONSTRUCTIONS

CARPETED FLOOR COVERINGS

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CONCEALED BUILDING SERVICES DUCT WALLS (inc CEILINGS)

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- >Rw+Ctr 25dB

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Shared service duct walls to "non-habitable" areas must achieve the NCC minimum airborne sound separation performance of Rw+Ctr 25dB. This rating can be achieved with 1 x 13mm plasterboard on stud frame with 11kgm-3 fibrous insulation retained in the services duct;
Where standard PVC pipework is used, pipes must be wrapped in Pyrotek 4525C;
Where acoustically-rated pipework is installed, e.g. REHAU - Raupiano Plus, pipe wrapping may be omitted;

DESIGN DEVELOPMENT

REV	DATE	AMENDMENT	BY

gresleyabas
architecture environment design
Gresley Abas Pty Ltd
ABN 46 109 290 842
Perth/ L5, 56 William Street, Perth WA 6000
Melbourne/ 10 York Street, Richmond VIC 3121
Telephone 08 9322 5322
www.gresleyabas.com.au

Fraser Property
Port Coogee Marina Village - Lot 3
16-18 Battersby St, Zillmere
LEVEL 4 FLOOR PLAN

0m 1m 2m 3m 6m
SCALE 1:100 @A1 SHEET SIZE

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Appendix C

Recommended Minimum Floor Isolation Treatment

SOUNDPROOFING

TIMBER FLOORS

REGUPOL SONUS CORE 10-S

REGUPOL sonus core 10-S is a high performance acoustic underlay, designed to reduce the transmission of impact sound generated by footfall noise.

Suitable for green buildings, the **REGUPOL sonus core 10-S** is a sustainable product made from post-consumer end of life tyre bound with polyurethane.

This environmentally preferable product has been independently certified as meeting the requirements of Good Environmental Choice Australia GECA 25-2011 v2.0i - Floor Coverings Standard. See www.geca.eco

REGUPOL sonus core 10-S can be installed under bonded and unbonded screed beds, laminate and engineered timber floors. All applications should be checked for suitability with the selected floor finish, waterproof membranes, **REGUPOL** adhesives, tile adhesives, grouts etc.

Available in:

Rolls	1.25m x 10lm, 20lm
Thickness	10mm

ACOUSTICAL PERFORMACE

ENGINEERED TIMBER Normalized Impact Sound Pressure Levels

Tested at CSIRO, in accordance with ISO 140-8: 2006 (E), ISO 140-6-2006, AS ISO 717.2-2004, ASTM E989-89.

Test area 10.8m². Results can vary when different floors are installed and/or if bonded.

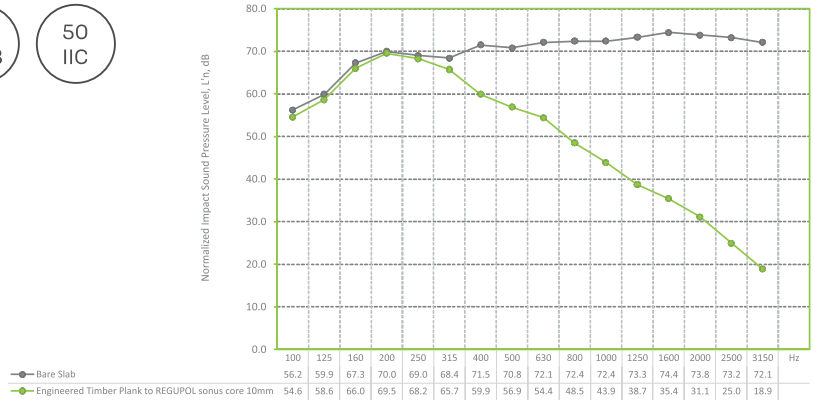
REPORT RG087

Layer of 14mm engineered timber (floating), to **REGUPOL sonus core 10mm**, to 150mm concrete slab (no ceiling).

Ln,w 58dB

ΔLw 18dB

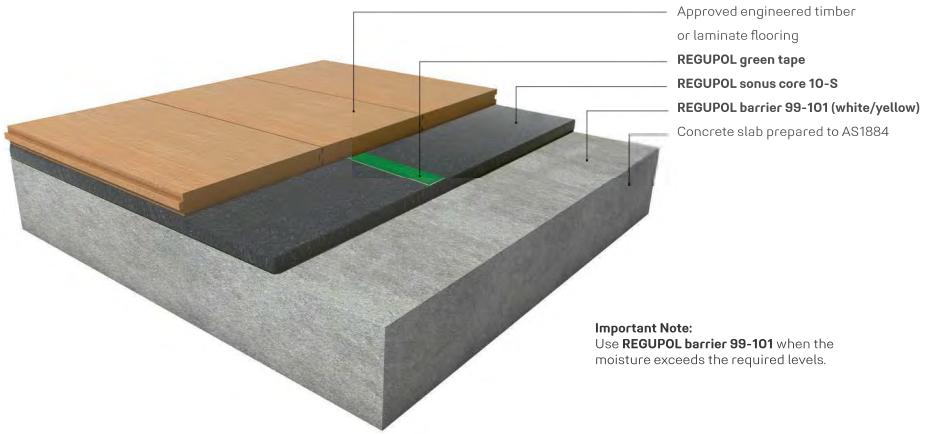
50 IIC



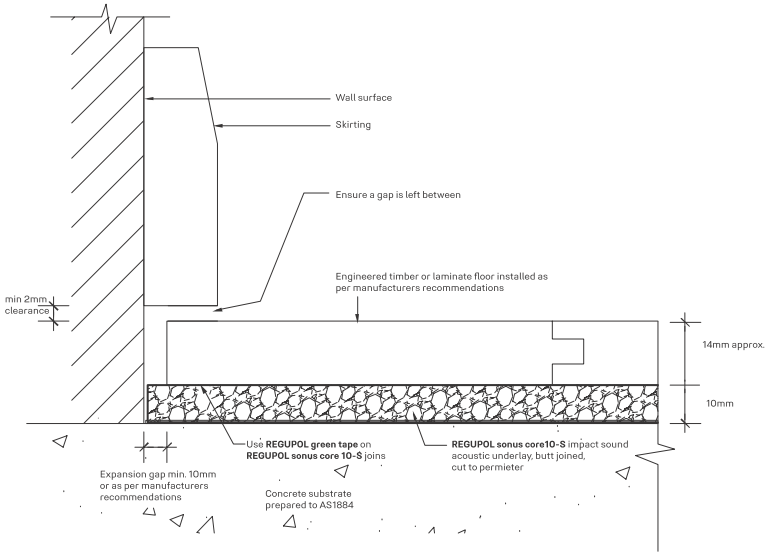
	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	Hz
Bare Slab	56.2	59.9	67.3	70.0	69.0	68.4	71.5	70.8	72.1	72.4	72.4	73.3	74.4	73.8	73.2	72.1	
Engineered Timber Plank to REGUPOL sonus core 10mm	54.6	58.6	66.0	69.5	68.2	65.7	59.9	56.9	54.4	48.5	43.9	38.7	35.4	31.1	25.0	18.9	

NON-BONDED ENGINEERED TIMBER OR LAMINATE

This **REGUPOL sonus core 10-S** system reflects a typical residential application with approved engineered timber or laminate floor coverings. For all other applications please contact **REGUPOL** acoustic division. Please note that drawings are not to scale and are for illustration purposes only.

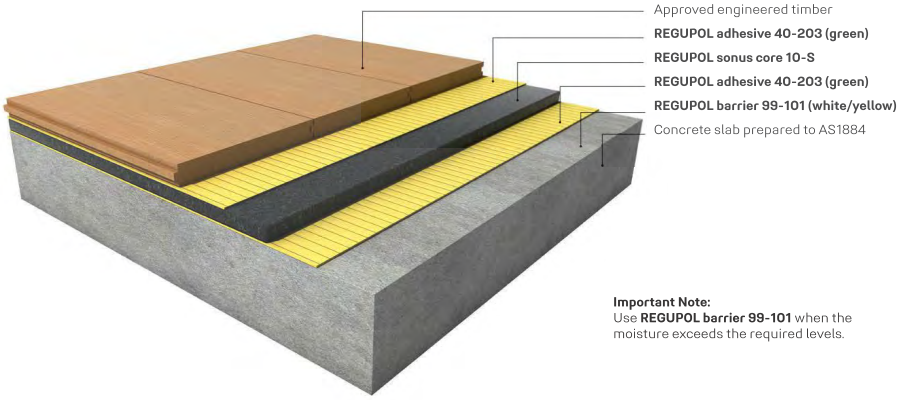


Important Note:
Use **REGUPOL barrier 99-101** when the moisture exceeds the required levels.

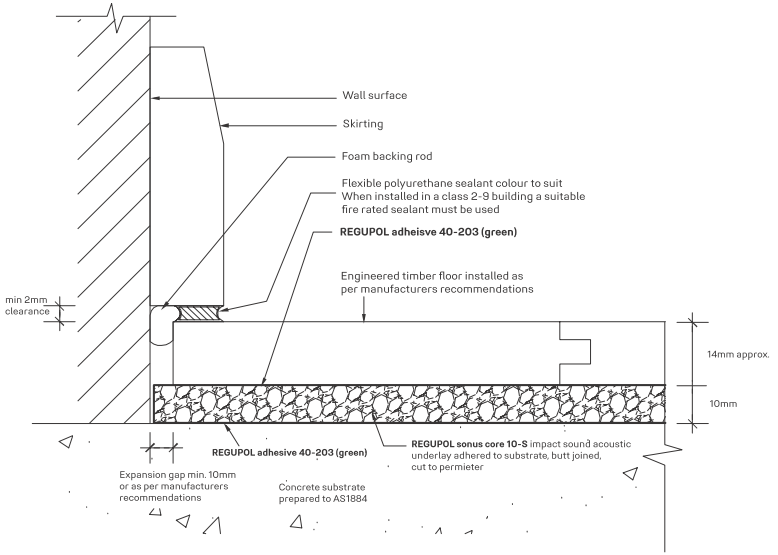


DUAL BOND ENGINEERED TIMBER

This **REGUPOL sonus core 10-S** system reflects a typical residential application with approved engineered timber floor coverings. For all other applications please contact **REGUPOL** acoustic division. Please note that drawings are not to scale and are for illustration purposes only.



Important Note:
Use **REGUPOL barrier 99-101** when the moisture exceeds the required levels.



Appendix D

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 $L_{A\ peak}$ and $L_{A\ Max\ slow}$ 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:

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a 100m radius of the premises receiving the noise

$\%\ \text{Type A}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a 100m radius of the premises receiving the noise

$\%\ \text{Type B}_{450}$ = 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.

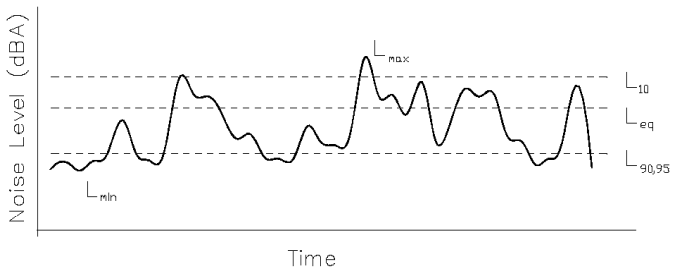
Peak Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

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.

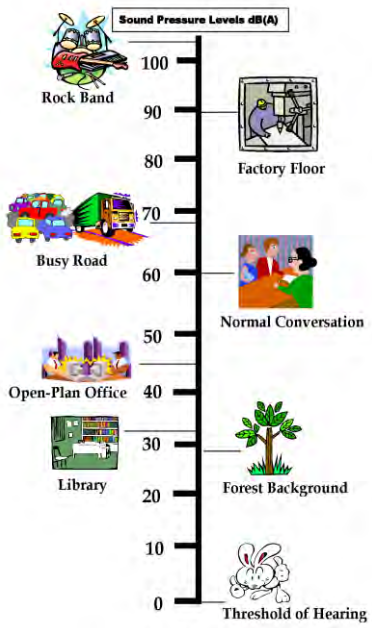
RMS Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance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



PORT COOGEE MARINA VILLAGE - LOT 203

Environmental Wind Assessment for DA Application

Prepared for:

Port Catherine Developments Pty Ltd
c/o Frasers Property Australia
Level 2, 3 De Vlamingh Avenue
EAST PERTH WA 6004

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PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street
North Sydney NSW 2060 Australia

T: +61 2 9427 8100
E: sydney@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.30464-R02-v1.0	21 October 2021	Dr Neihad Al-Khalidy	Dr Peter Georgiou	Dr Peter Georgiou

EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Port Catherine Development Pty Ltd (PCD) to assess the ground level wind environment surrounding the Port Coogee Marina Village precinct Lot 203 Development via an Advanced 3D CFD (Computational Fluid Dynamics) Simulation study.

In relation to this DA Application wind assessment, the following regulatory document is relevant:

- Port Coogee Marina Village Build Form Codes "PCMV-BFC", approved 12 June 2014.

In particular, PCMV-BFC (2014):

- Contains wind criteria, expressed as peak annual maximum wind speeds, according to the amenity of the specific locale (eg for walking comfort, strolling, sitting, outdoor dining, etc).

Project Site Wind Climate Model (Section 3)

A Project Site-specific wind probability model was developed for the study, using wind data from the following nearby Bureau of Meteorology (BoM) weather stations: Garden Island, Swanbourne and Jandakot Airport.

Project Site and Surrounds Modelling (Section 4)

SLR modelled the proposed development and the surrounds using the SketchUp and SpaceClaim software packages. This was then imported into ANSYS to prepare the model for numerical simulation via the specialised CFD (Computational Fluid Dynamics) software FLUENT.

- The buildings included in the modelling extended out to Cockburn Road to the east, so as to be able to reflect the upstream influence of buildings for east quadrant wind directions.
- A significant number of the already planned trees and vegetation were included in the model, primarily within the Port Coogee Marina Village precinct. Trees and vegetation were not included outside of the precinct, producing a mildly conservative outcome for east quadrant wind simulations.
- The 3D model also incorporated the variable topography at the site.

Analysis Methodology

Eight wind directions were modelled in the simulations:

• North Winds	Terrain Category 2.5	hybrid open water / suburban: 337.5° to 22.5°
• Northeast Winds	Terrain Category 3	suburban
• East Winds	Terrain Category 3	suburban
• Southeast Winds	Terrain Category 3	suburban
• South Winds	Terrain Category 2.5	hybrid open water / suburban: 157.5° to 202.5°
• Southwest Winds	Terrain Category 1.5	open-water
• West Winds	Terrain Category 1.5	open-water
• Northwest Winds	Terrain Category 1.5	open-water

EXECUTIVE SUMMARY

For each wind direction, local wind speeds were determined at 25 ground level locations around the Lot 203 Development – refer Figure 12. These included footpath locations, building corner locations, building entry points, etc. These were then converted into ratios of the local wind speed to the upstream reference wind speed.

The local wind speed ratios were combined with the Project-site wind probability distribution to determine the annual maximum wind speeds needed for comparison with the PCMV-BFC (2014) target wind levels.

Study Results

Calypso Parade

- Maximum winds are predicted to remain below 10 m/s for all wind directions except for westerly winds where funnelling of winds upstream of the site results in winds ranging between 10 m/s and 14 m/s at and upstream of the site. This complies with PCMV-BFC (2014) with the exception of the footpath areas in front of the Retail Unit on Calypso Parade for westerly wind conditions.

Orsino Boulevarde

- Maximum winds remain below 10.5 m/s for all wind directions due to the orientation of this carriageway and shielding from surrounding buildings. This complies with PCMV-BFC (2014).

Onyx Lane

- Maximum winds remain below 10.5 m/s for all wind directions with the exception of southwest winds which cause elevated winds (14.5 m/s) at Position 20 (close to the corner of Calypso Parade). This complies with PCMV-BFC (2014).

Park

- Maximum winds remain below 10.5 m/s for all wind directions due to shielding from surrounding buildings. This complies with PCMV-BFC (2014).

Discussion

The CFD predictions show that all locations comply with the PCMV-BFC (2014) target wind objectives with a single exception along the retail frontage on Calypso Parade. Regarding this potential non-compliance, the following is noted:

- The westerly wind non-compliance occurs because of funnelling ("canyon" effect) arising from buildings upstream of the site, not the proposed development itself. Design changes to the proposed development would not alter this outcome.
- The non-compliance ONLY occurs under high westerly wind conditions, which typically occur during winter/early spring. Compliance would be achieved throughout the remainder of the year (ie summer).
- The westerly wind non-compliance does not exceed the PCMV-BFC (2014) target level for "Walking Comfort", ie the non-compliance does not constitute a wind "safety" issue.
- In fact, maximum wind speeds at the relevant location are around the level which is suitable (according to PCMV-BFC Table 1) for "Strolling", "Window Shopping".

EXECUTIVE SUMMARY

Recommended Wind Mitigation

On the basis of the CFD simulation predictions and the single, potential non-compliance for the retail unit footpath area along Calypso Parade:

- The indicated mitigation for the footpath of interest should be vertical, given that the windflow of concern is mainly horizontal in nature.
- The preferred option here would be landscaping, of evergreen species to ensure efficacy during winter/early spring.
- Recommended landscaping positioning is shown in Figure 23.

Observation Regarding Existing Landscaping

During the early Masterplanning of the precinct, initial wind engineering studies foreshadowed the potential for funnelling of westerly winds along Calypso Parade. Accordingly, street landscaping was planned for this carriageway – refer Figure 24. This landscaping was NOT included in the current CFD modelling. It is located however in the same location as the recommended landscaping mitigation shown in Figure 23.

The type of landscaping that has been implemented (refer Figure 24) should be reviewed to confirm that is it is of evergreen species, so as to remain effective during the winter months of relevance to westerly winds.

Summary of Ground Level Wind Conditions

All ground level locations surrounding the development comply with PCMV-BFC (2014) target wind objectives with the exception of the retail unit footpath area along Calypso Parade. Given that:

- The non-compliance is caused by buildings upstream of the site (ie no changes to the proposed development would alter this condition);
- The non-compliance ONLY occurs under winter/early spring westerly wind conditions; and
- Maximum predicted wind speeds at the relevant location would be suitable (according to PCMV-BFC Table 1) for “Strolling”, “Window Shopping” …

… the proposed wind mitigation (refer Figure 23) which coincides with the already implemented landscaping (refer Figure 24) will address the objectives of PCMV-BFC (2014) for the proposed Lot 203 development, subject to confirmation of the landscaping species type.

Internal Areas (Level 2 Communal Space)

The large Level 2 communal space overlooking Onyx Lane is shielded on three sides (north, east and south). As a result of this shielding and the west side perimeter balustrade:

- The CFD modelling showed that wind throughout the space will remain below the 10 m/s target objective, even without the benefit of any landscaping that has already been planned for this space.

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1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Port Catherine Development Pty Ltd (PCD) to assess the ground level wind environment surrounding the Port Coogee Marina Village precinct Lot 203 Development via an Advanced 3D CFD (Computational Fluid Dynamics) Simulation study.

In relation to this DA Application wind assessment, the following regulatory document is relevant:

- Port Coogee Marina Village Build Form Codes "PCMV-BFC", approved 12 June 2014.

1.1 Location of Port Coogee Marina Village

The Port Coogee Marina Village development is shown in Figure 1. The direct exposure of the site to onshore winds is evident, especially during summer months when a strong sea breeze (the "Fremantle Doctor") develops between 12 Noon and 3 pm along southwest coastal waters in the Perth region.

Figure 1 Site Location

1.2 The Proposed Lot 203 Development

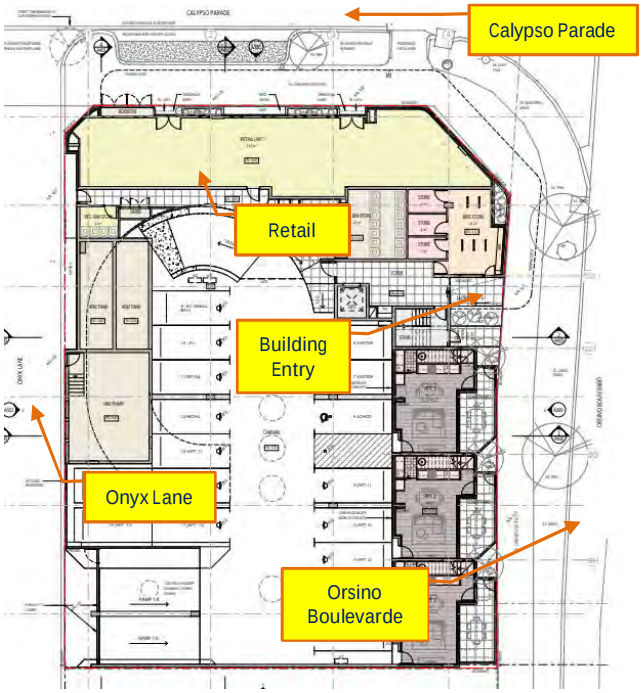
The Port Coogee Marina Village (PCMV) precinct and the Southern Peninsula sub-precinct have been designed as a mixed-use area with variable height apartment blocks. The proposed Lot 203 development will comprise a 4-storey residential building located at the eastern edge of the precinct at the corner of Calypso Parade and Orsino Boulevarde - refer Figure 2.

Figure 2 Context of the Proposed Lot 203 Residential Development within the Overall Village

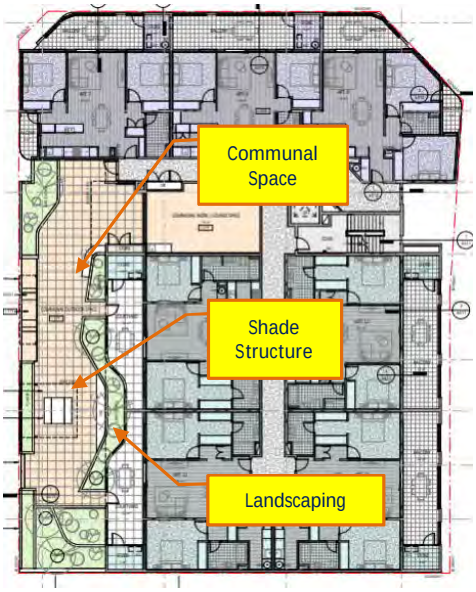
Figure 3 shows representative architectural views of the proposed Lot 203 development.

Figure 3 Architectural Views of the Proposed Lot 203 Development

Ground Floor



Level 2



View from Northeast

View from Northwest

1.3 The Surrounding Environment

The site lies on Perth's coastline, almost 20 km south-southwest of the Perth CBD.

- To the north-northeast clockwise around to the south-southeast are essentially suburban areas.
- To the south-southwest clockwise around to the north-northwest is essentially open-water.
- There is a transition zone just west of north and to the south with both suburban and open-water exposures influencing upstream wind conditions.

Figure 4 Far-field Aerial View of the Development Site

2 WIND ACCEPTABILITY CRITERIA

The relevant acceptability criteria for this project are the site specific criteria contained within PCMV-BFC (2014).

Table 1 sets out the classifications of wind adopted for use within the Built Form Codes, including the wind classifications to be achieved at ground level within Marina Village streets:

- The "bulk" form criteria set the street environment to be achieved via the design of the bulk form of the proposed buildings at street corners and on non-retail or commercial frontages.
- The "localised" criteria set the level to be achieved away from street corners and on retail and commercial frontages as well as residential building entries.

Environmental wind assessments are to assess compliance with the nominated classifications for the relevant site as stated in Table 1 and to consider whether further quantitative analysis via wind tunnel testing is required to demonstrate compliance.

Table 1 PCMV-BFC (2014) Wind Classification Zones

"Bulk Form" Criteria
PCMV-BFC Table 1

Classification	Description	Average Annual Maximum Wind Speed
Dangerous	Will knock people down.	23 m/s
Cockburn Coast Waterfront	Limit of acceptable conditions along a waterfront exposure.	21 m/s
Walking	Acceptable for walking comfort without stopping.	16 m/s
Short Term Stationary	Suitable for shop entrances. Suitable for window shopping.	13 m/s
Long Term Stationary	Suitable for outdoor restaurants, seating and tabled areas.	10 /ms
Cappuccino Criteria	Empirically the speed at which shop keepers close alfresco areas.	7-8 m/s

"Local" Criteria
PCMV-BFC Table 2

Street	Bulk Form	Localised
Calypso Parade	Short Term Stationary	Long Term Stationary
Calypso Walk (Site 7)	Long Term Stationary	Long Term Stationary
Calypso Walk (Site 8)	Short Term Stationary	Long Term Stationary
Chieftain Esplanade	Walking	Short Term Stationary
Pantheon Avenue	Walking	Short Term Stationary
Corsos	Cockburn Coast Waterfront	Walking
Napoleon and Socrates Parades and Site 9	Cockburn Coast Waterfront	Walking
Waterfront Street Corners	Cockburn Coast Waterfront	Cockburn Coast Waterfront
Other roads in Marina Village	Walking	Short Term Stationary

2.1 PCMV-BFC (2014) Target Objectives

Regarding PCMV-BFC (2014) Table 1 ...

Relevant Wind Objectives by Classification Usage

- Walking Comfort 16 m/s Walking Comfort (without stopping)
- Short-Term Stationary 13 m/s Window Shopping / Strolling
- Long-Term Stationary 10 m/s Sitting, Outdoor Dining

Regarding PCMV-BFC (2014) Table 2 ...

Relevant Wind Objectives by Specific Carriageway

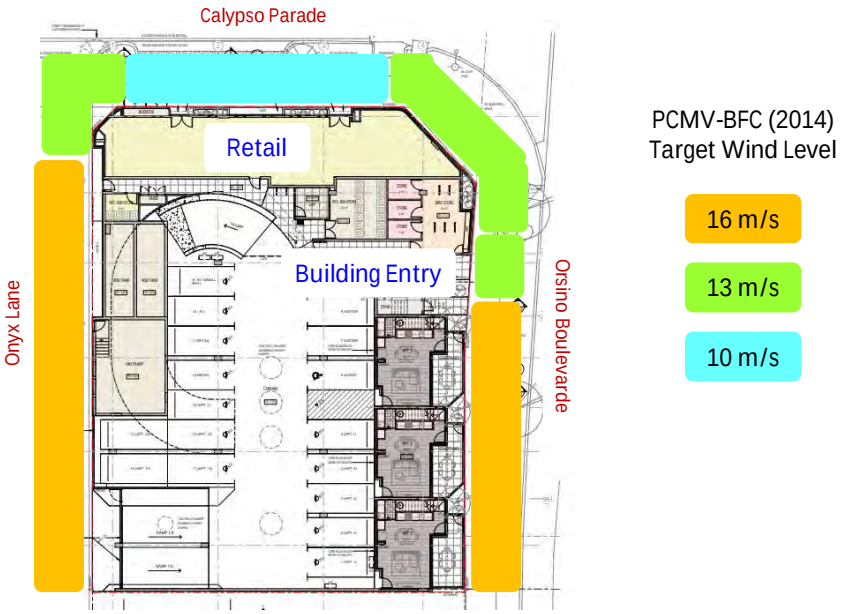
- Calypso Parade 13 m/s "Bulk" Form 10 m/s "Localised"
- Orsino Boulevarde 16 m/s "Bulk" Form 13 m/s "Localised"
- Onyx Lane 16 m/s "Bulk" Form 13 m/s "Localised"

Application

- In the above, the "Bulk" form criteria set the level to be achieved via the design of the bulk form of the proposed buildings at street corners and on non-retail or non-commercial frontages.
- The "Localised" criteria set the level to be achieved away from street corners and on retail and commercial frontages as well as at residential building entries.

On the basis of the above, the target levels relevant to the Lot 203 development are shown in Figure 5.

Figure 5 PCMV-BFC (2014) Target Levels for the Proposed Lot 203 Development



3 COASTAL PERTH WIND CLIMATE

The data of interest in this study are the mean hourly wind speeds and largest gusts experienced throughout the year (especially higher, less frequent winds), how these winds vary with azimuth, and the seasonal break-up of winds into the primary Coastal Perth wind seasons.

3.1 Perth's Regional Wind Climate

Prevailing winds in the Perth Region arise from two primary influences:

- synoptic winds (ie winds related to the ongoing easterly passage of large-scale pressure systems); and
- the influence of the ocean and the diurnal sea breezes generated at the coastline.

Prevailing synoptic winds are from east quadrants.

- They reach a peak in summer time as hot, gusty winds, with a generally easterly bias.
- Easterly winds become tempered as the day progresses with the arrival of the strong sea breeze which crosses the coast from midday onwards. The influence of east quadrant winds during summer is therefore most clearly evident during the morning.
- In winter, these winds become more northerly and are often associated with the passage of cold fronts and winter storms which usually bring both heavy rain as well as strong winds to the southwest of WA.

Sea breezes are from the west quadrants.

- Perth's coastline experiences a regular and pronounced sea breeze which occurs during summer months as a result of a significant temperature difference between the land and sea.
- This sea breeze (commonly referred to as the Fremantle Doctor) arrives from the southwest starting mid-morning till early afternoon. It can penetrate as far inland as 100 km inland.

3.2 Perth Region BoM Wind Data

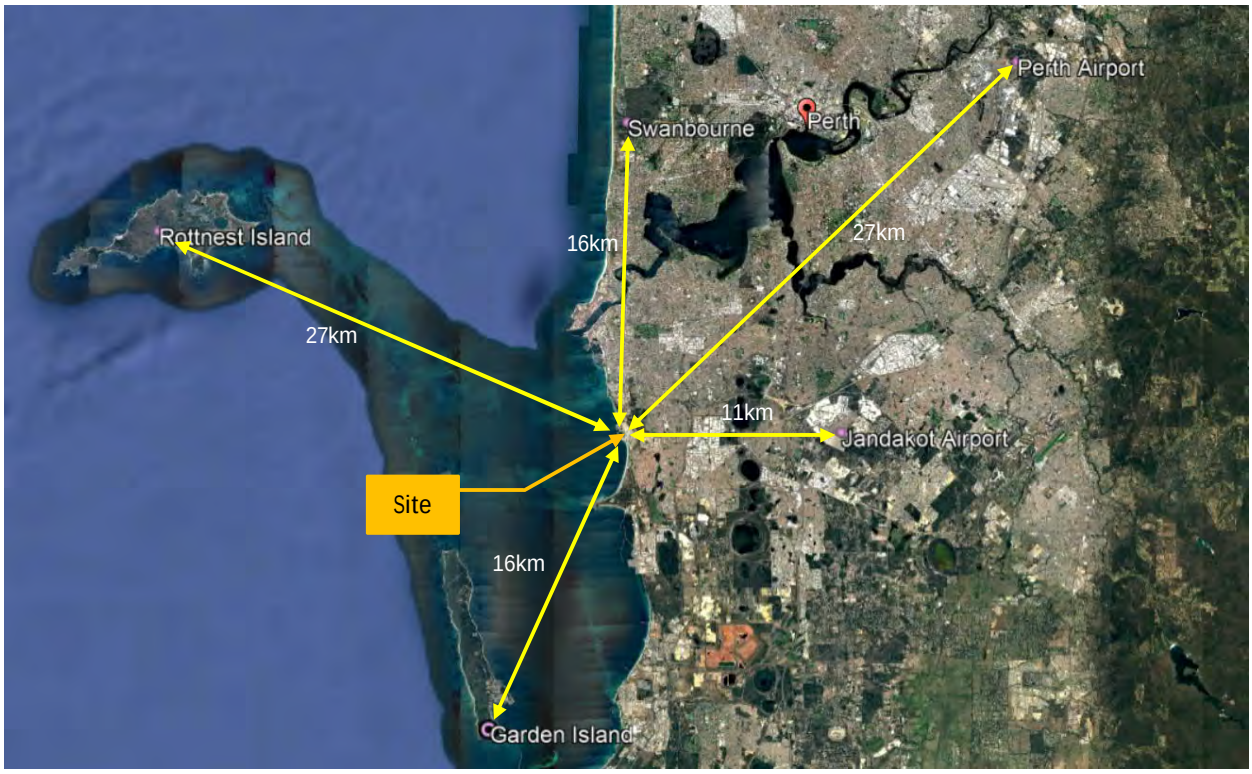
Key characteristics of Perth's Regional Wind Climate have been assessed through an analysis of long-term wind records obtained from the following Bureau of Meteorology (BoM) weather stations:

- BoM 09021: Perth Airport (1998-2020)
- BoM 09172: Jandakot Airport (1998-2020)
- BoM 09215: Swanbourne (1998-2020)
- BoM 09256: Garden Island (2013-2020)
- BoM 09193: Rottnest Island (1998-2020)

The above stations were chosen as being located at generally "even" topography with either open or fairly suburban surrounding terrain and built environment (ie no medium to high-rise buildings close by).

The surrounding met stations relative to the project site are shown in Figure 6.

Figure 6 Nearby BoM Met Stations



3.3 Wind Speed and Direction at the Project Site

Figure 7 shows the "Top100" peak mean winds and gusts recorded at the BoM stations shown in Figure 6.

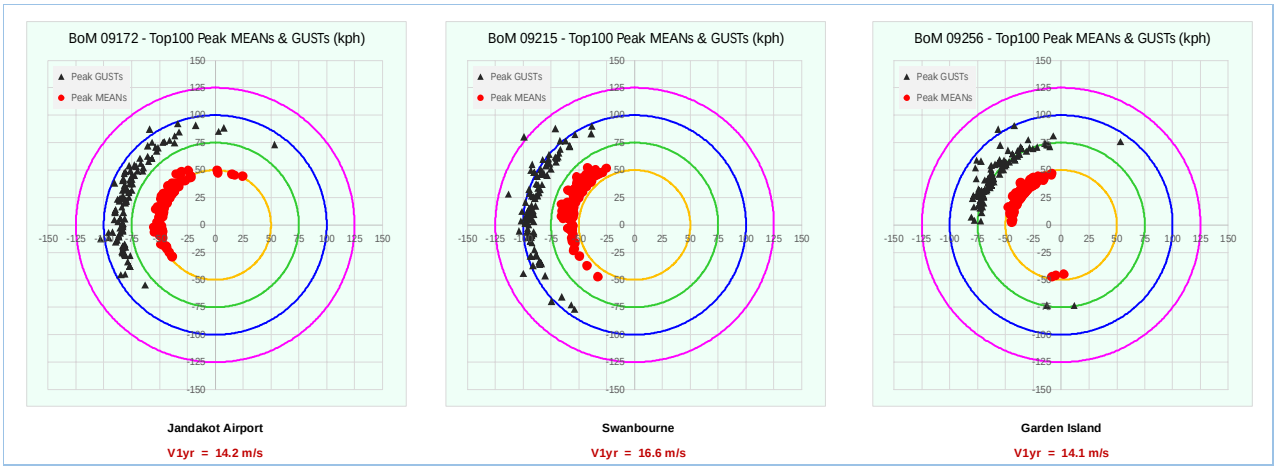
The influence of the surrounding terrain and topography is evident in the Top100 plots:

- The Group "A" stations (Jandakot Airport, Swanbourne and Garden Island) show consistent trends in their "Top100" peak winds. The magnitudes of their "Top100" mean winds and gusts have similar magnitude and extend from the west-southwest clockwise around to the north-northwest. The average arrival direction of peak winds as these stations is approximately 300°.
- The Group "B" stations (Perth Airport and Rottnest Island) show distinctive characteristics not seen in the Group "A" stations.
- Perth Airport has a prominent lobe of "Top100" peaks from the east – reflecting the significant influence of the nearby Perth Hills on amplifying east quadrant winds.
- Rottnest Island shows two "Top100" peak lobes from the north and south, reflecting the topographical "speed-up" experienced at the elevated anemometer site. Note that this station also does not experience the "normal" coastal influence of summer sea breezes.

Figure 7 Top100 Mean (Hourly) Winds and Maximum Gusts at Perth BoM Stations

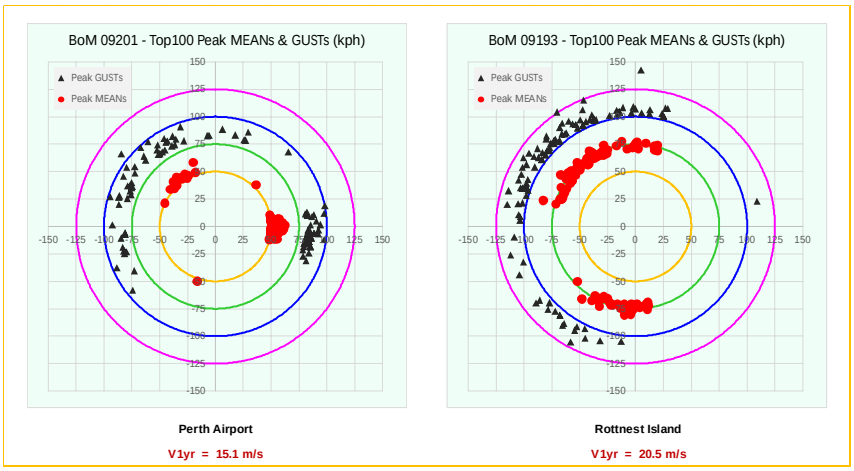
Group "A" Stations

Jandakot Airport | Swanbourne | Garden Island



Group "B" Stations

Perth Airport | Rottnest Island



3.4 The "Local" Coastal Perth Wind Environment

Close to the ground, the "regional" wind patterns described above are affected by the local terrain, topography and built environment, all of which influence the "local" wind environment. Accordingly, the impact of wind on the Port Coogee Marina Village development site will be a function of two basic elements: (a) the "regional" wind climate – refer previous sections, and (b) the influence of local factors (buildings, terrain, topography, etc).

3.5 Reference Design Wind Speeds

Following SLR's study of Perth Region wind speeds at the relevant Bureau of Meteorology's (BoM) weather stations, a Coastal Perth Wind Climate Model and Local Project Site Wind Climate Model were developed as follows:

Step 1: Selection of Representative BoM Site

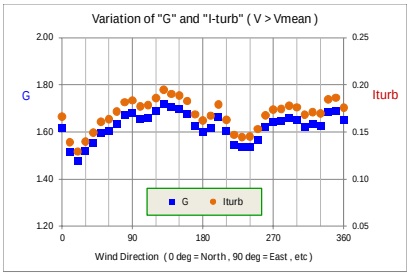
- BoM data from the Group "A" stations (Jandakot Airport, Swanbourne and Garden Island) was chosen for further detailed analysis. These stations all have a generally open exposure in the immediate surrounds of the relevant anemometer, ie no close-by obstacles, buildings, etc. They are also not prone to significant topographical influences. They are therefore representative of Coastal Perth areas and relevant to the project site.
- Wind roses for these three sites have been included in Appendix A.

Step 2: Development of a "Reference" Perth Coastal Wind Climate Model

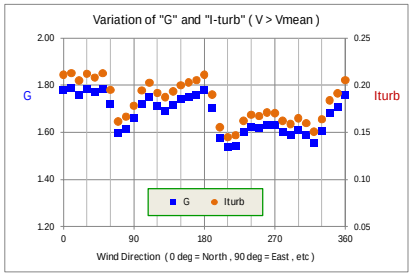
- A local 10 m height, "Open Country", "Reference" Coastal Perth wind climate model was then developed by applying surface corrections to the Group "A" data, using the locally measured values of turbulent intensity – refer Figure 8. Gust factors at the three chosen BoM sites generally vary between 1.6-1.8 at Jandakot Airport, 1.6-1.85 at Swanbourne and 1.6-2.0 at Garden Island. Across all three sites, the average gust factor is 1.7-1.75.

Figure 8 BoM Group "A" Station Turbulence Intensity & Gust Factor Used for BoM Data Correction

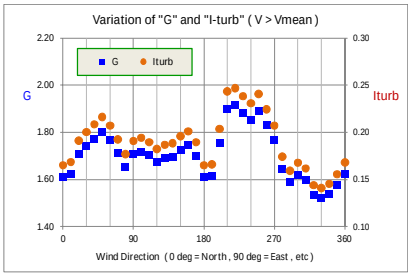
Jandakot Airport



Swanbourne



Garden Island



Step 3: Development of the LOCAL Port Coogee Site Wind Climate Model

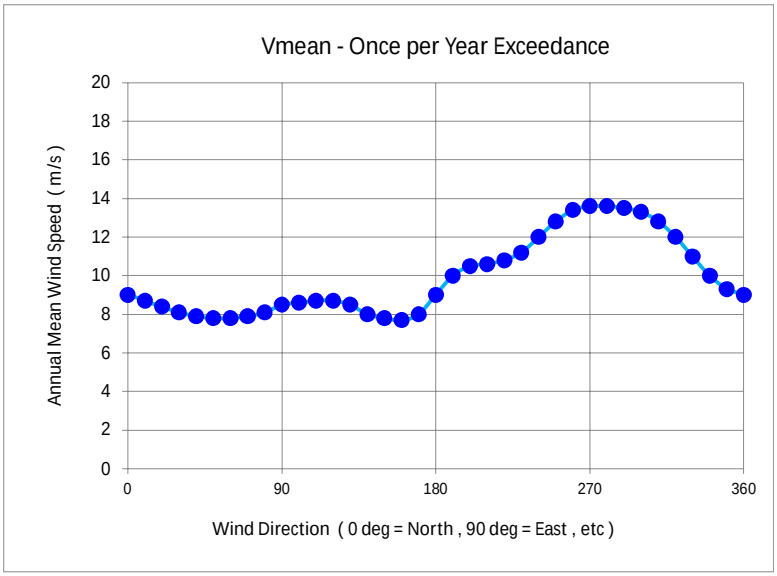
- The final step is to adjust the "Reference" Coastal Perth wind climate model to the Port Coogee site by applying surface correction factors relevant to the Port Coogee site that reflect the upstream terrain variations shown in Figure 4, namely essentially open-water to the west (Terrain Category 1.5) and suburban to the east (Terrain Category 3), with a narrow transition zone between the two (to the north and south).

3.6 Reference Height Annual Mean Wind Speeds

The local Port Coogee Wind Climate Model, based on transformation of BoM data described above, is shown in Figure 9. These winds have a once-per-year exceedance probability.

- Highest annual recurrence mean wind speeds are predicted to occur from the west.
- The gust factor relevant to westerly winds would be approximately 1.6. This is in agreement with the recommended value of turbulence intensity for a Terrain Category 1.5 profile found in the Australian Wind Code AS/NZS 1170.2.

Figure 9 Reference Height (10 m) Annual Recurrence Mean Wind Speed at Port Coogee Project Site



4 CFD METHODOLOGY

4.1 3D Model of Development Site and Surrounds

SLR has modelled the proposed development and the surrounds using the SketchUp and SpaceClaim software packages. This was then imported into ANSYS to prepare the model for solving.

- The buildings included in the modelling extended out to Cockburn Road to the east, so as to be able to reflect the upstream influence of buildings for east quadrant wind directions.
- A significant number of the already planned trees and vegetation were included in the model, primarily within the Port Coogee Marina Village precinct. Trees and vegetation were not included outside of the precinct, producing a mildly conservative outcome for east quadrant wind simulations.
- The 3D model also incorporated the variable topography at the site.

4.2 Building Geometry

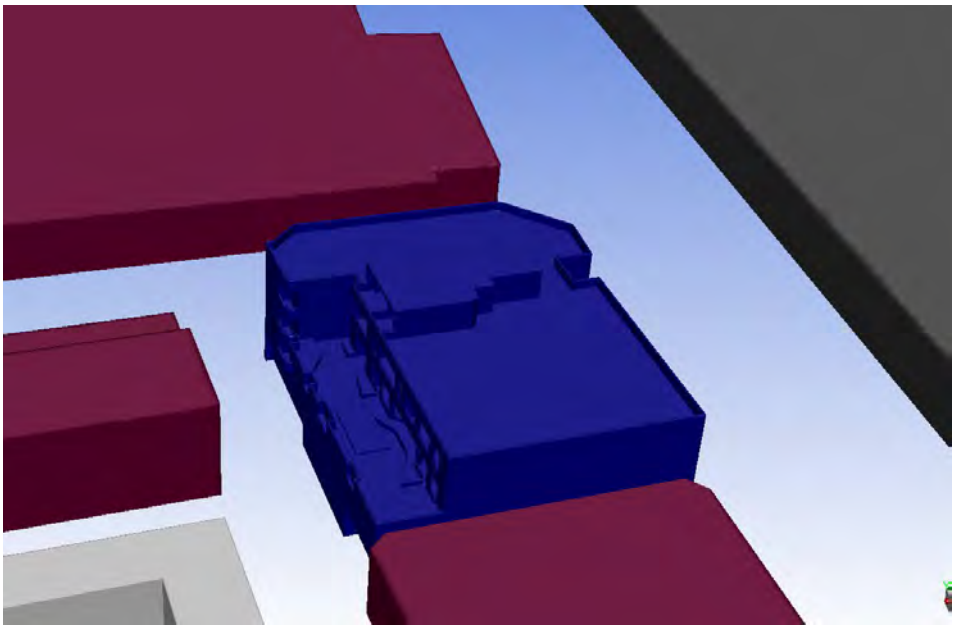
The 3D geometry for CFD Modelling is shown in Figure 10. A calculation domain of 2 km length, 2 km width and 0.5 km height was used for the CFD analysis.

Figure 10 CAD Model of the Project Site and Surrounds

3D View from South

(Fig.9 cont'd)

Lot 203 Close-Up (View from South-Southwest)



4.3 CFD Simulation Boundary Conditions

4.3.1 Wind Conditions

The following wind conditions were modelled:

- North Winds — Terrain Category 2.5 — represents a hybrid of open water / suburban
- Northeast Winds — Terrain Category 3 — suburban
- East Winds — Terrain Category 3 — suburban
- Southeast Winds — Terrain Category 3 — suburban
- South Winds — Terrain Category 2.5 — represents a hybrid of open water / suburban
- Southwest Winds — Terrain Category 1.5 — open-water
- West Winds — Terrain Category 1.5 — open-water
- Northwest Winds — Terrain Category 1.5 — open-water

4.3.2 Boundary Conditions

The following additional boundary conditions were used:

- Turbulence quantities (kinetic energy and dissipation rate) were calculated from empirical relationships.
- A wall function data group was used to avoid using a very fine mesh near the wall and improve turbulent flow simulation.

4.4 Discretization

The software package utilised in the current CFD analysis is the commercially available code Fluent. The CFD model solves continuity and momentum equations in the computational domain to predict the steady state airflow inside and around the redevelopment.

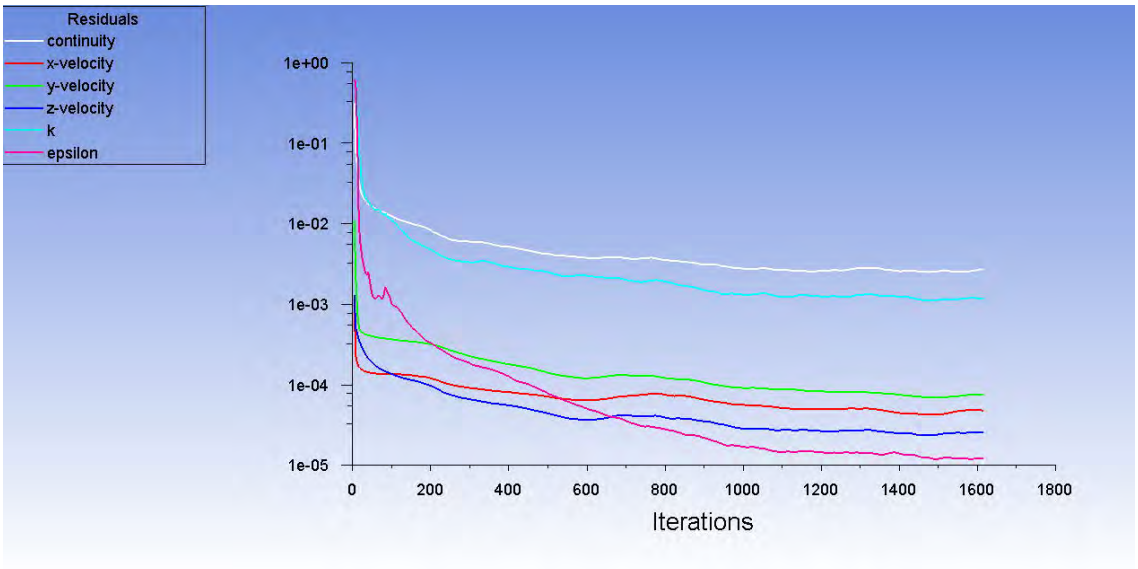
- For the current analysis, polyhedral elements with a total 41,005,415 nodes were used to cover the computational domain for the proposed redevelopment. Polyhedral cells are especially beneficial for handling recirculating flows and used to provide more accurate results than even hexahedra mesh. For a hexahedral cell, there are three optimal flow directions which lead to the maximum accuracy while for a polyhedron with 12 faces there are six optimal directions which, together with the larger number of neighbours lead to a more accurate solution with a lower cell count.
- A Realizable k-epsilon (rke) turbulence model was used for all analysed cases. The rke model is capable of providing more accurate results for flow involving separation and pressure gradients.
- A Second Order numerical scheme for momentum and pressure discretisation was used to obtain more accurate results.
- An iterative procedure was used to estimate the air velocity in terms of three directions, pressure profile and turbulence parameters. For the pressure velocity coupling a global solver based on the SIMPLE algorithm was employed

4.5 Iterative Solution Test

CFD simulations are run till a “steady-state” solution is achieved. This is defined as when “residuals” within the computations become increasingly small and insignificant.

Figure 11 shows an example for one of the simulation runs of the residuals and where the simulation was stopped at the desired "steady-state" outcome.

Figure 11 PCMV Lot 203 CFD Model Residual Example

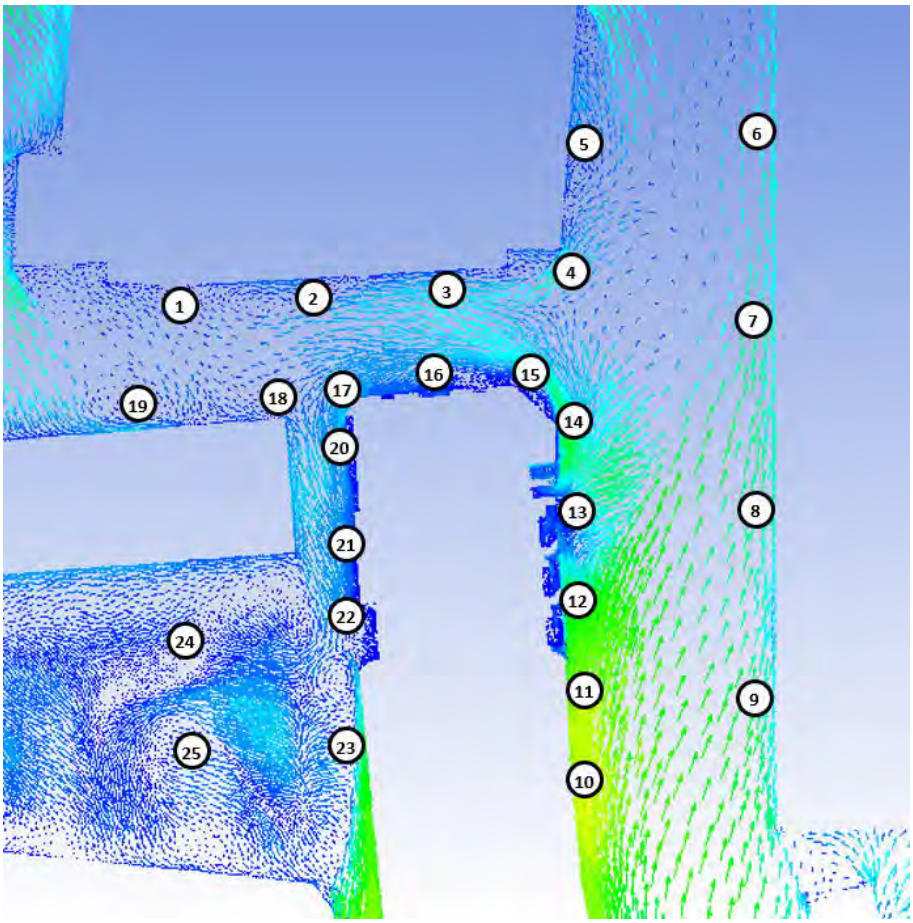


5 CFD Results – Simulation Runs

5.1 Monitoring Positions

Figure 12 shows the locations where local wind speeds were determined around the Lot 203 Development. There were selected as being footpath locations, building corner locations, building entry points, etc.

Figure 12 Lot 203 and Surrounds Monitoring Positions



The results of the CFD Simulations are presented in Figure 13 to Figure 21.

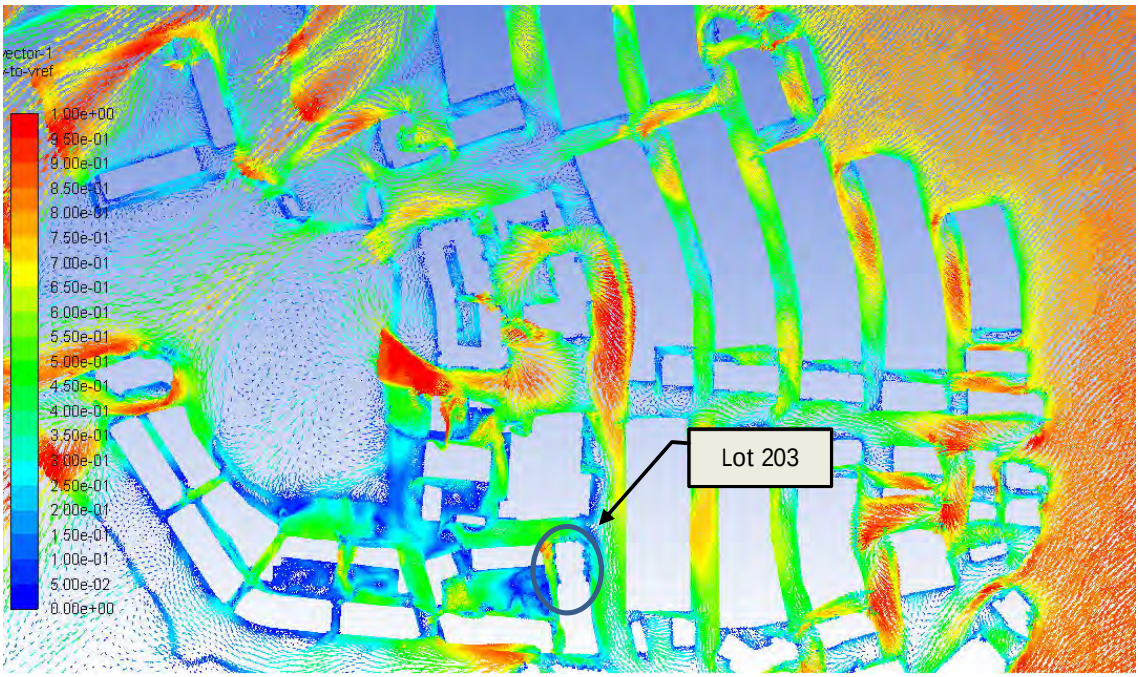
- The results have been shown as RATIOS of the local mean wind speed at ground level (pedestrian height) to the upstream Port Coogee Wind Climate Model 10 m height wind speed.
- The colour range extends from a ratio of 0 (dark blue) to 1.0 (dark red).

5.2 Site-Wide Wind Example

Figure 13 shows an example of the CFD Simulation output – for Northeast winds – covering the entire project domain.

- Areas of local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.
- In this instance, many thoroughfares which are oriented either north-south or east-west can be seen to have generally mild local ground level wind conditions.

Figure 13 Site-Wide Wind Output from the CFD Simulation (Northeast Winds)

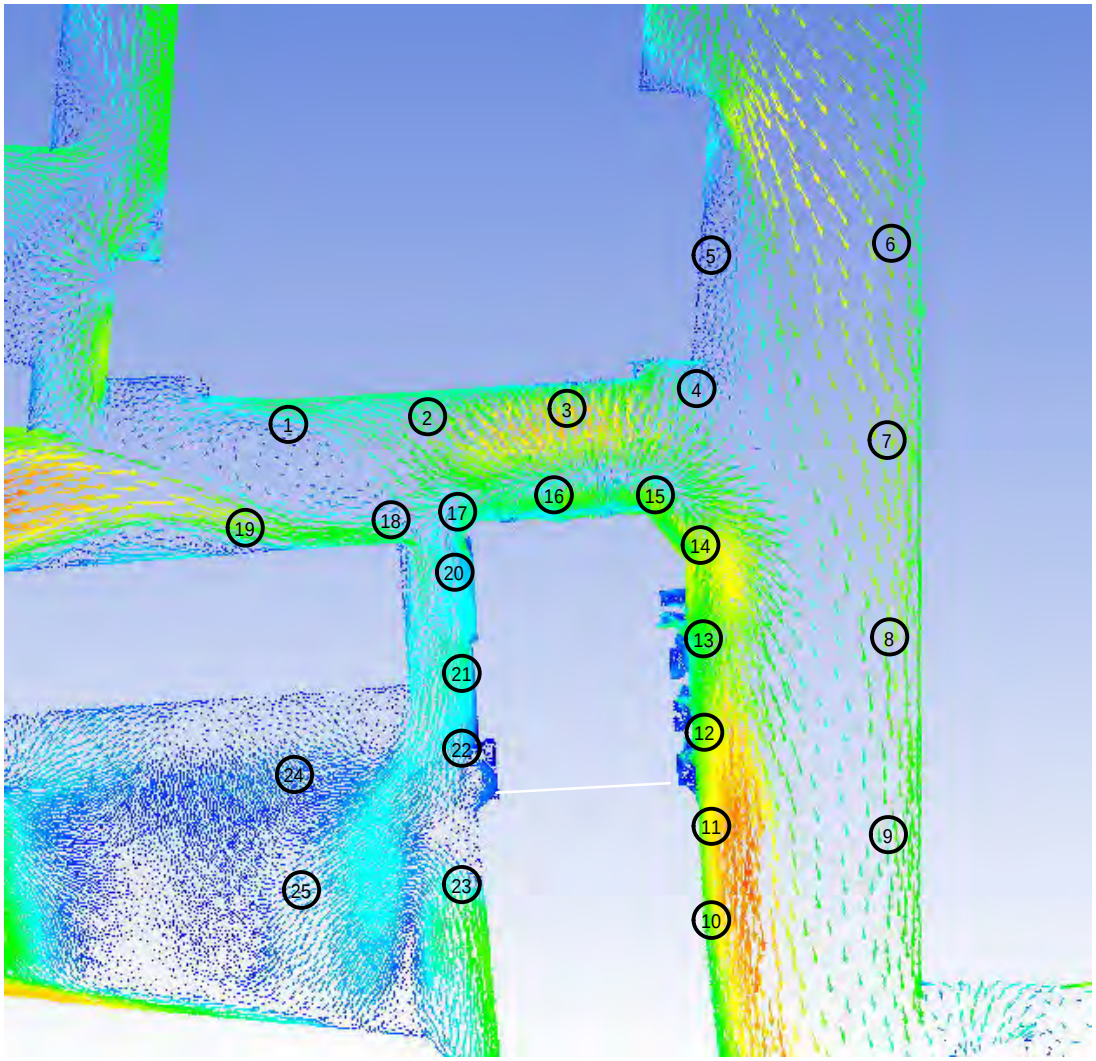


5.3 North Winds

In Figure 14, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are moderate, with an area of elevated winds in the middle of this carriageway reflecting a combination of downwash off the proposed development's north facade and recirculated windflow over the roof of the block to the north.
- Onyx Lane are low.
- Winds along Orsino Boulevarde are moderately higher than for Calypso Parade, especially to the south of the proposed development (refer Positions 10 and 11), where the funnelling along this carriageway reflects the closer alignment and slight rotational orientation of the "Concept" Design facades of the block to the south of Lot 203.

Figure 14 CFD Simulation Results – NORTH Winds (Mixed TC2.5)

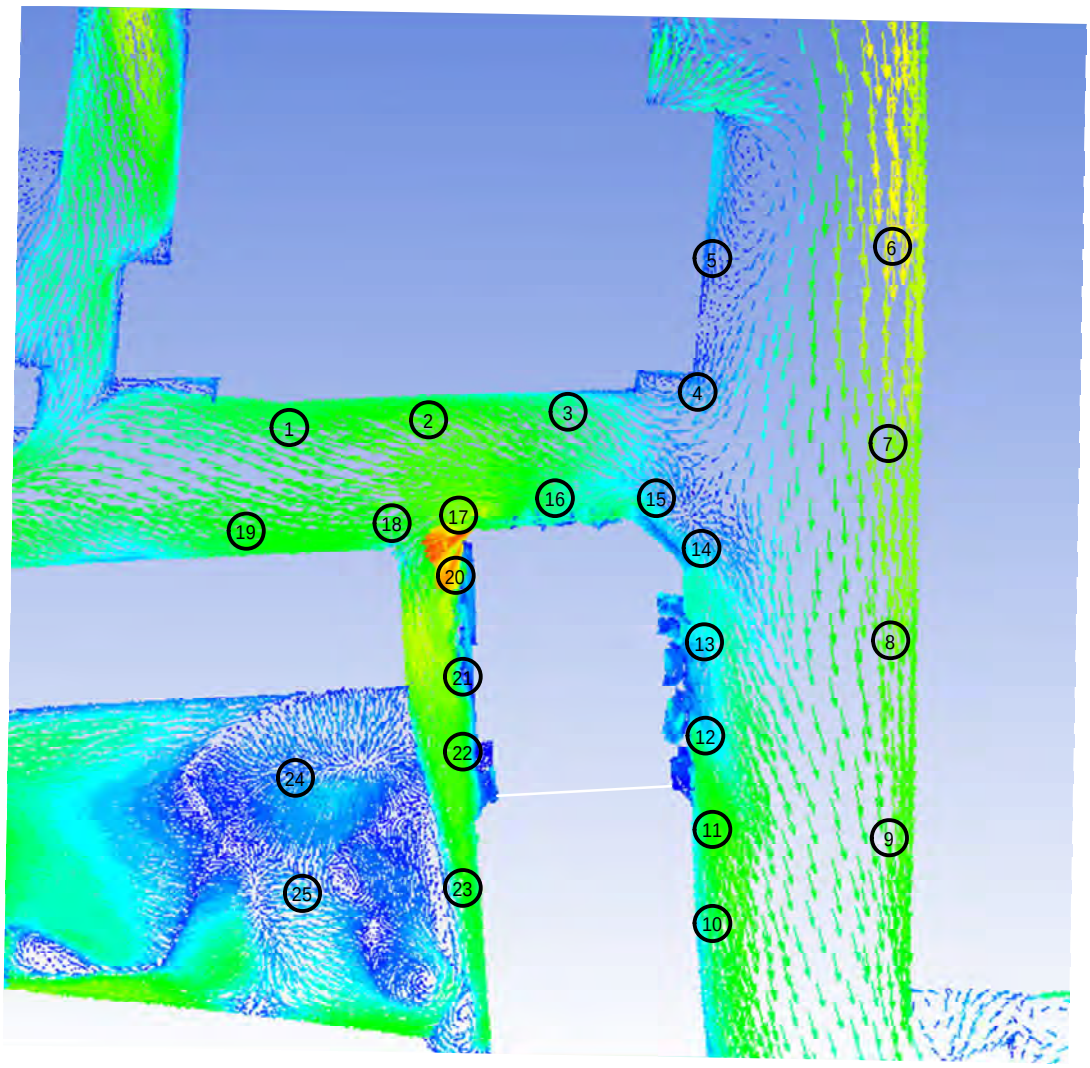


5.4 Northeast Winds

In Figure 15, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are moderate, with an area of elevated winds at the northwest corner of the proposed development spilling out onto the middle of Onyx Lane (refer Positions 17 and 20).
- Onyx Lane are generally moderate, with the exception of the zone mentioned above close to the proposed development's northwest corner. Some downwash off the east façade of the block adjacent to the site is also evident.
- Winds along Orsino Boulevarde are moderate, except for an area to the north of the proposed development

Figure 15 CFD Simulation Results – NORTHEAST Winds (TC3)

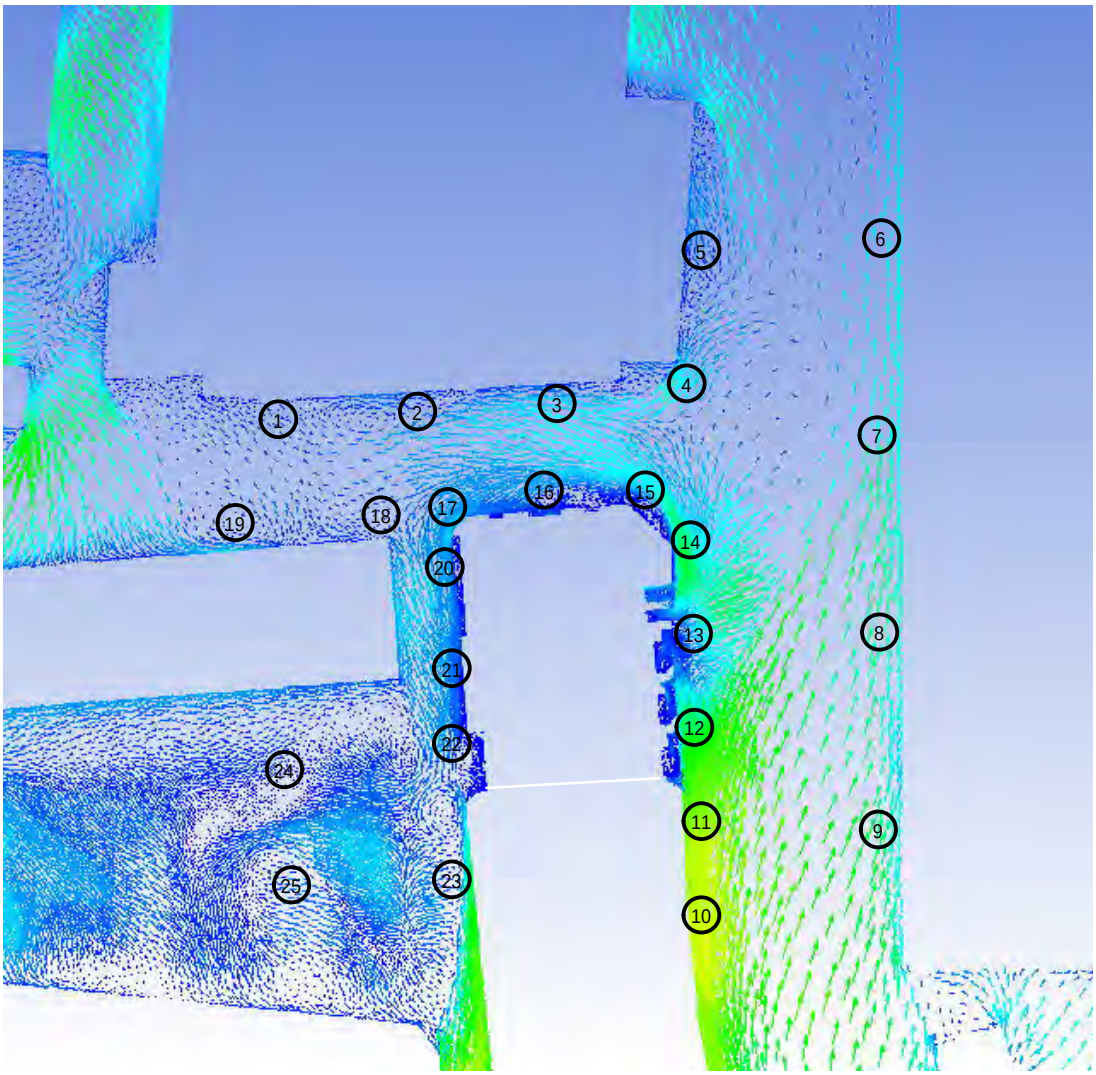


5.5 East Winds

In Figure 16, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are generally mild, even more so for Onyx Lane along the western side of the development.
- Winds along Orsino Boulevarde are moderately higher than for Calypso Parade, especially to the south of the proposed development (refer Positions 10 and 11), where the "Concept" Design facades of the block to the south of Lot 203 are assumed to run along the Orsino Boulevarde footpath.

Figure 16 CFD Simulation Results – EAST Winds (TC3)

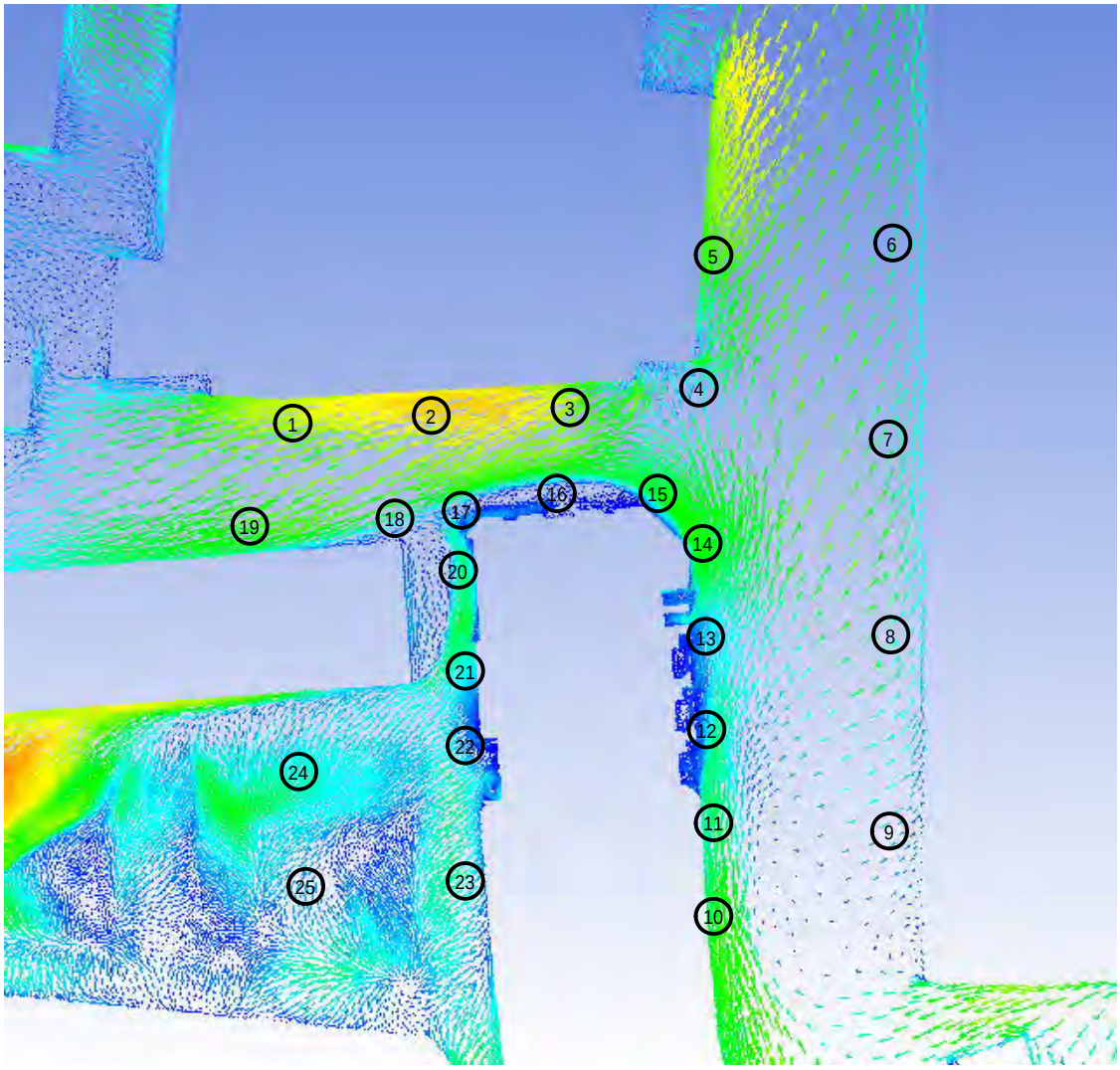


5.6 Southeast Winds

In Figure 17, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are generally mild adjacent to the proposed development, with higher winds running along the north side footpath (eg Position 2) reflecting downwash off the buildings to the north of the site.
- Onyx Lane winds are low.
- Winds along Orsino Boulevarde close to the Lot 203 site are similar to Calypso Parade, with only a moderate wind speed-up indicated around the northeast corner of the proposed development (refer Positions 14 and 15).

Figure 17 CFD Simulation Results – SOUTHEAST Winds (TC3)

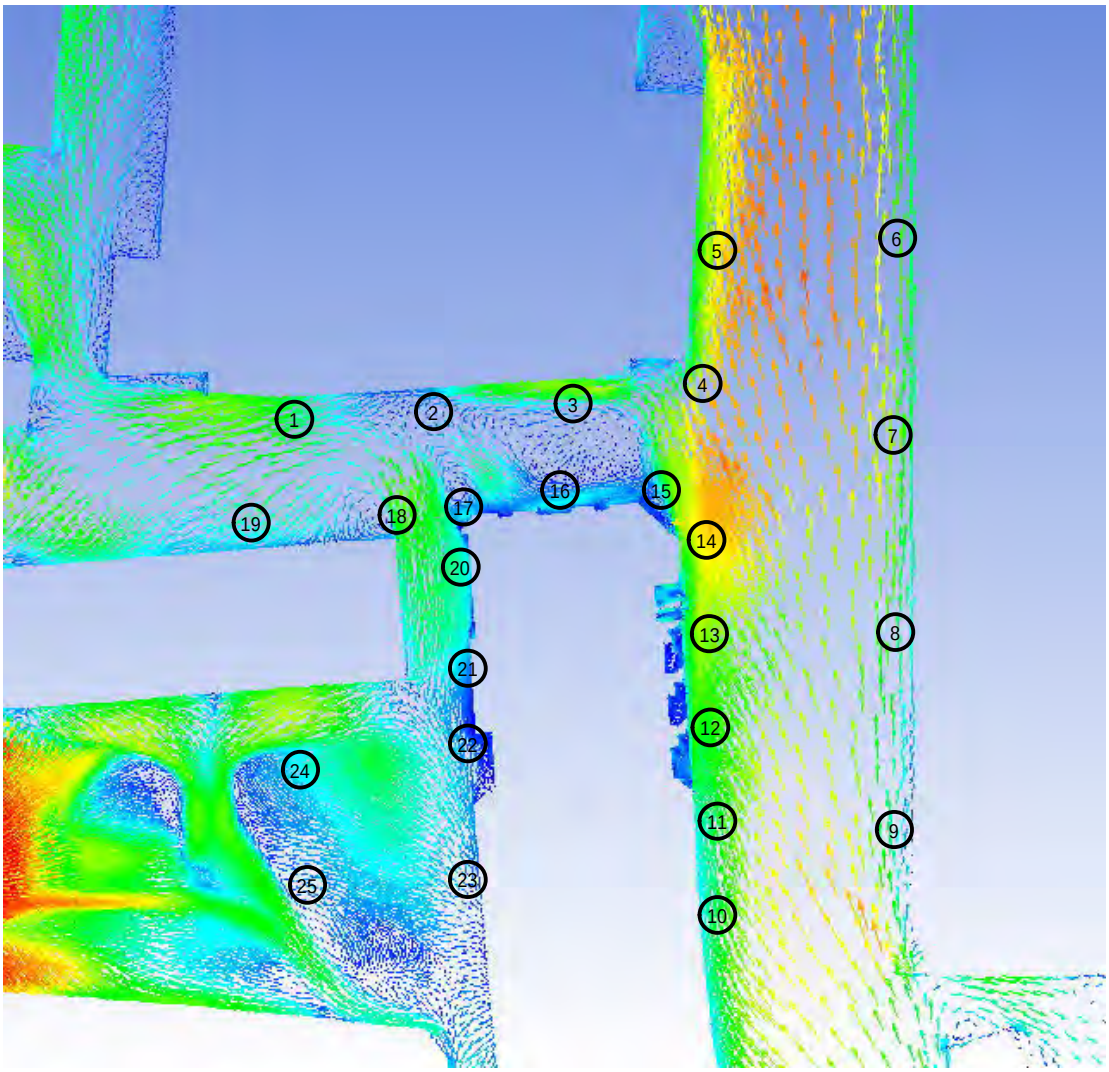


5.7 South Winds

In Figure 18, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- As expected, Calypso Parade footpath winds are generally mild due to shielding from the proposed development.
- Onyx Lane winds are low to moderate, again reflecting shielding from nearby buildings.
- Winds along Orsino Boulevarde are elevated in the middle of the carriageway, especially level with and to the north of Calypso Parade (refer Position 14). Winds along Orsino Boulevarde footpaths are lower.

Figure 18 CFD Simulation Results – SOUTH Winds (TC2.5)

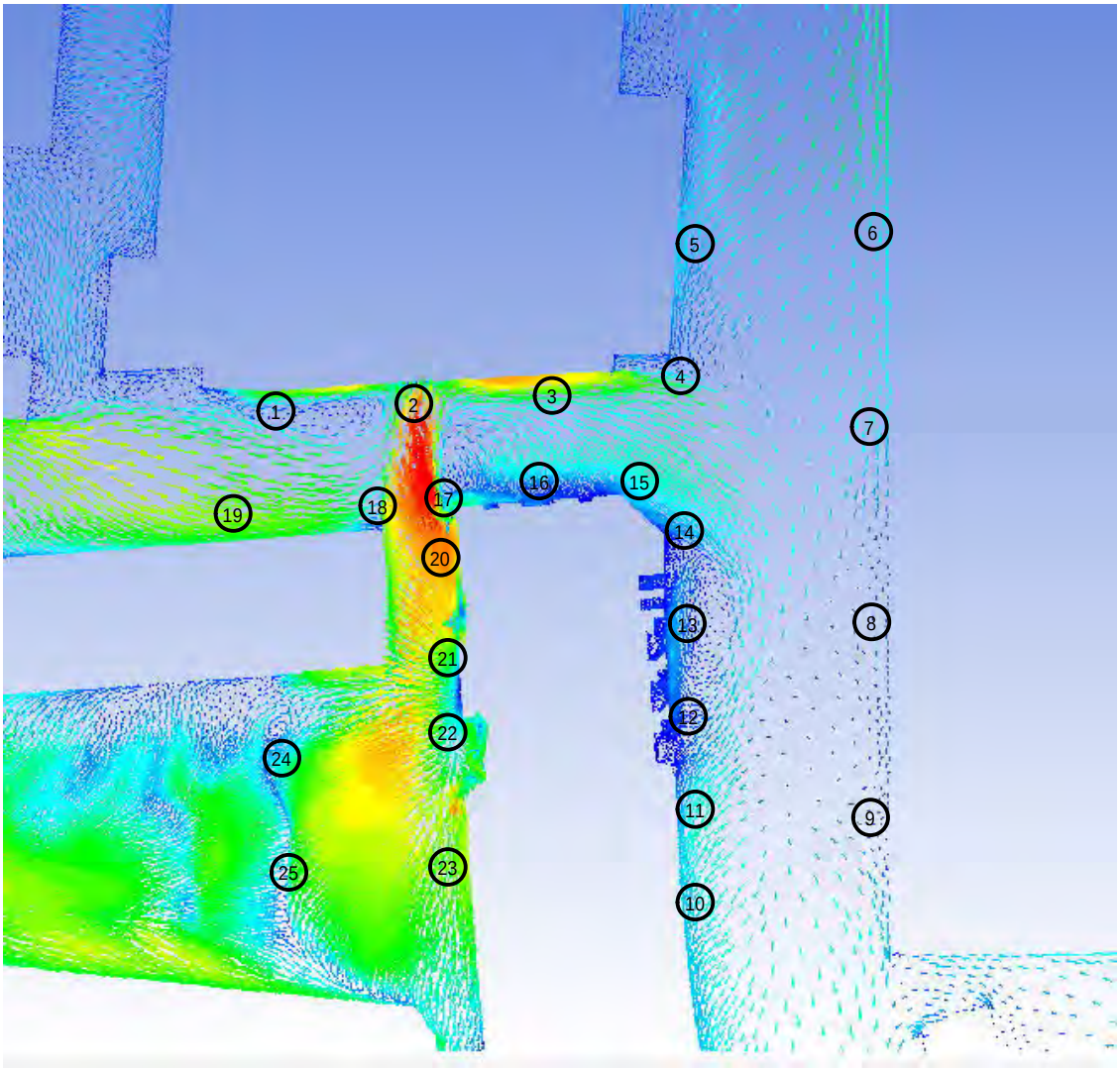


5.8 Southwest Winds

In Figure 19, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are generally mild except for a small area immediately to the north of Onyx Lane (refer Positions 2, 17 and 18), where winds funnel in between the proposed development and the block to the west, with downwash spilling out into Calypso Parade.
- Onyx Lane winds are moderately high as a result of the above funnelling (refer Position 20).
- Winds along Orsino Boulevarde are mild, due to shielding from west side blocks, including the proposed development.

Figure 19 CFD Simulation Results – SOUTHWEST Winds (TC1.5)

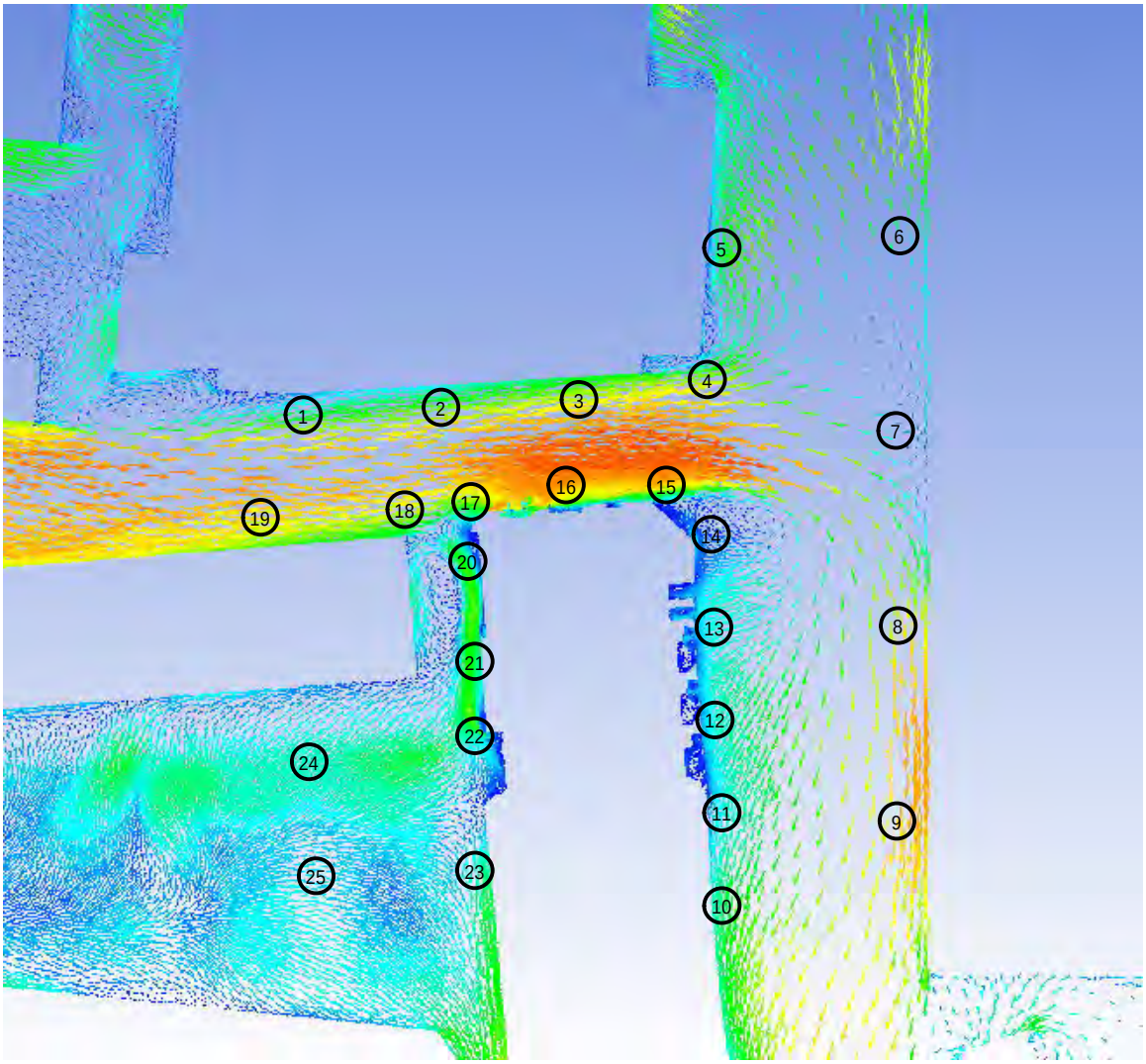


5.9 West Winds

In Figure 20, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are moderately high in the middle of the carriageway due to funnelling of westerly winds along this east-west oriented road. Winds are lower along the adjacent footpath areas of the roadway.
- Onyx Lane winds and Orsino Boulevarde winds are mild, due to shielding from blocks to the west of the respective lots, including the proposed development in the case of Orsino Boulevarde winds.

Figure 20 CFD Simulation Results – WEST Winds (TC1.5)

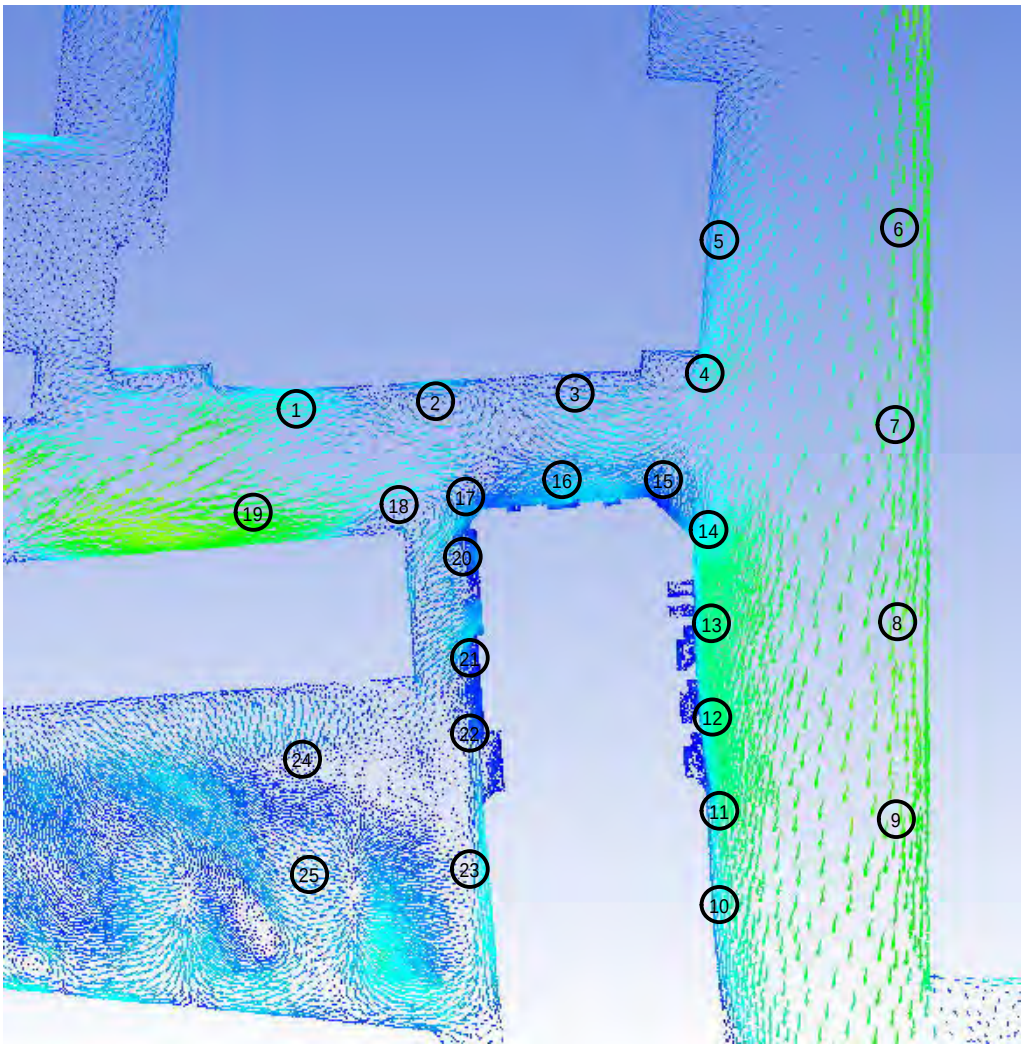


5.10 Northwest Winds

In Figure 21, areas of elevated local ground level wind speed-up are evident in the CFD output plots within the dark orange and red bands.

- Calypso Parade footpath winds are low to moderate close to the proposed development, due to shielding from the block to the north.
- Onyx Lane winds are low.
- Orsino Boulevarde winds are low to moderate, aided by shielding from the proposed development itself. The higher winds on this carriageway reflect the downwash occurring for northwest winds off the facades of the blocks running along the east side of the carriageway.

Figure 21 CFD Simulation Results – NORTHWEST Winds (TC1.5)



6 Summary of the CFD Simulation Results

Table 2 provides a summary of the local wind speed ratios at the monitoring positions shown in Figure 12 from the simulation output contour plots in Figure 14 to Figure 21.

Table 2 Local Wind Speed Ratios (Relative to 10m Height Upstream Wind)

Position	Wind Direction							
	N	NE	E	SE	S	SW	W	NW
1	0.5	0.5	0.2	0.6	0.45	0.45	0.5	0.5
2	0.5	0.5	0.2	0.7	0.35	0.8	0.5	0.35
3	0.8	0.45	0.3	0.55	0.4	0.6	0.6	0.3
4	0.5	0.3	0.35	0.5	0.55	0.5	0.6	0.45
5	0.3	0.3	0.2	0.5	0.6	0.4	0.5	0.4
6	0.5	0.6	0.3	0.4	0.5	0.4	0.5	0.5
7	0.4	0.5	0.35	0.45	0.5	0.4	0.5	0.5
8	0.4	0.5	0.4	0.45	0.5	0.3	0.6	0.5
9	0.4	0.45	0.45	0.4	0.4	0.3	0.6	0.5
10	0.65	0.4	0.5	0.5	0.5	0.4	0.5	0.45
11	0.65	0.4	0.5	0.5	0.5	0.4	0.5	0.5
12	0.6	0.35	0.45	0.45	0.5	0.3	0.4	0.5
13	0.55	0.35	0.3	0.5	0.6	0.3	0.4	0.5
14	0.55	0.3	0.45	0.55	0.65	0.4	0.3	0.5
15	0.5	0.35	0.4	0.55	0.5	0.4	0.6	0.3
16	0.5	0.5	0.3	0.4	0.4	0.3	0.65	0.35
17	0.45	0.8	0.3	0.4	0.4	0.5	0.6	0.3
18	0.5	0.6	0.25	0.5	0.5	0.5	0.6	0.4
19	0.45	0.55	0.25	0.55	0.4	0.6	0.7	0.5
20	0.3	0.8	0.25	0.55	0.5	0.8	0.5	0.3
21	0.3	0.5	0.25	0.5	0.45	0.5	0.5	0.3
22	0.2	0.5	0.2	0.4	0.35	0.5	0.5	0.3
23	0.35	0.45	0.25	0.45	0.35	0.5	0.5	0.35
24	0.2	0.3	0.2	0.45	0.4	0.5	0.45	0.3
25	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.3

6.1 CFD Results – Predicted Annual Return Period Maximum Winds

The local ground level wind speed ratios shown in Figures 13-20 were then combined with the annual return period winds shown in Figure 9 to compare to the PCMV-BCF (2014) wind speed criteria (refer Table 1). The results are shown in Table 3, with the maximum annual wind speeds rounded to the nearest 0.5 m/s.

Table 3 CFD-Predicted Annual Maximum Winds at Monitored Positions

Position		Wind Direction							
		N	NE	E	SE	S	SW	W	NW
1	Calypso Parade	7.5	6.5	3	8.5	6.5	8	10	10
2		7.5	6.5	3	10	5	14.5	10	7
3		12	6	4.5	7.5	6	10	13	6
4		7.5	4	5	7	8	9	13	9
15		7.5	4.5	5.5	7.5	7.5	7	13	6
16		7.5	6.5	4.5	5.5	6	5.5	14	7
17		6.5	10	4.5	5.5	6	9	13	6
18		7.5	8	3.5	7	7.5	9	13	8
19		6.5	7.5	3.5	7.5	6	10	13.5	10
5	Orsino Boulevard	4.5	4	3	7	9	7	10.5	8
6		7.5	8	4.5	5.5	7.5	7	10.5	10
7		6	6.5	5	6.5	7.5	7	10.5	10
8		6	6.5	5.5	6.5	7.5	5.5	13	10
9		6	6	6.5	5.5	6	5.5	13	10
10		9.5	5.5	7	7	7.5	7	10.5	9
11		9.5	5.5	7	7	7.5	7	10.5	10
12		9	4.5	6.5	6.5	7.5	5.5	8.5	10
13		8	4.5	4.5	7	9	5.5	8.5	10
14		8	4	6.5	7.5	9.5	7	6.5	10
20	Onyx Lane	4.5	10.5	3.5	7.5	7.5	14.5	10.5	6
21		4.5	6.5	3.5	7	6.5	9	10.5	6
22		3	6.5	3	5.5	5	9	10.5	6
23		5	6	3.5	6.5	5	9	10.5	7
24	Park	3	4	3	6.5	6	9	9.5	6
25		3	2.5	3	4	6	9	10	6

6.2 Summary of CFD Results

A review of Table 3 shows the following:

Calypso Parade

- Maximum winds remain below 10 m/s for most wind directions with the exception of westerly winds where funnelling of winds upstream of the site results in winds ranging between 10 m/s and 14 m/s at and upstream of the site.

Orsino Boulevarde

- Maximum winds remain below 10.5 m/s for all wind directions due to the orientation of this carriageway and shielding from surrounding buildings.

Onyx Lane

- Maximum winds remain below 10.5 m/s for all wind directions with the exception of southwest winds which cause elevated winds (14.5 m/s) at Position 20 (close to the corner of Calypso Parade).

Park

- Maximum winds remain below 10.5 m/s for all wind directions due to shielding from surrounding buildings.

6.3 Compliance of Proposed Lot 203 with PCMV-BFC (2014) Target Objectives

Table 4 shows a comparison between the CFD-Predicted winds (refer Table 3) with the PCMV-BFC (2014) target wind objectives outlined in Section 2.1.

Table 4 Comparison of Predicted Winds with PCMV-BFC (2014) Target Winds

Location	PCMV-BFC Target	Worst-Case CFD-Predicted Wind Level	Comment
Calypso Parade – Retail Frontages	10 m/s	13-14 m/s	Non-compliance only occurs for west wind conditions, due to funnelling of winds between buildings upstream of site; for all other wind directions, winds remain below 10 m/s.
Orsino Boulevarde	13 m/s	13 m/s	Winds comply with PCMV-BFC (2014) for all wind directions
Onyx Lane	13 m/s	13 m/s	Winds comply with PCMV-BFC (2014) for all wind directions
Corner Calypso Parade & Orsino Boulevarde	13 m/s	13 m/s	Winds comply with PCMV-BFC (2014) for all wind directions
Corner Calypso Parade & Onyx Lane	16 m/s	13 m/s	Winds comply with PCMV-BFC (2014) for all wind directions

Discussion

Table 4 shows that all locations comply with the PCMV-BFC (2014) target wind objectives with a single exception along the retail frontages on Calypso Parade.

Regarding this potential non-compliance, the following is noted:

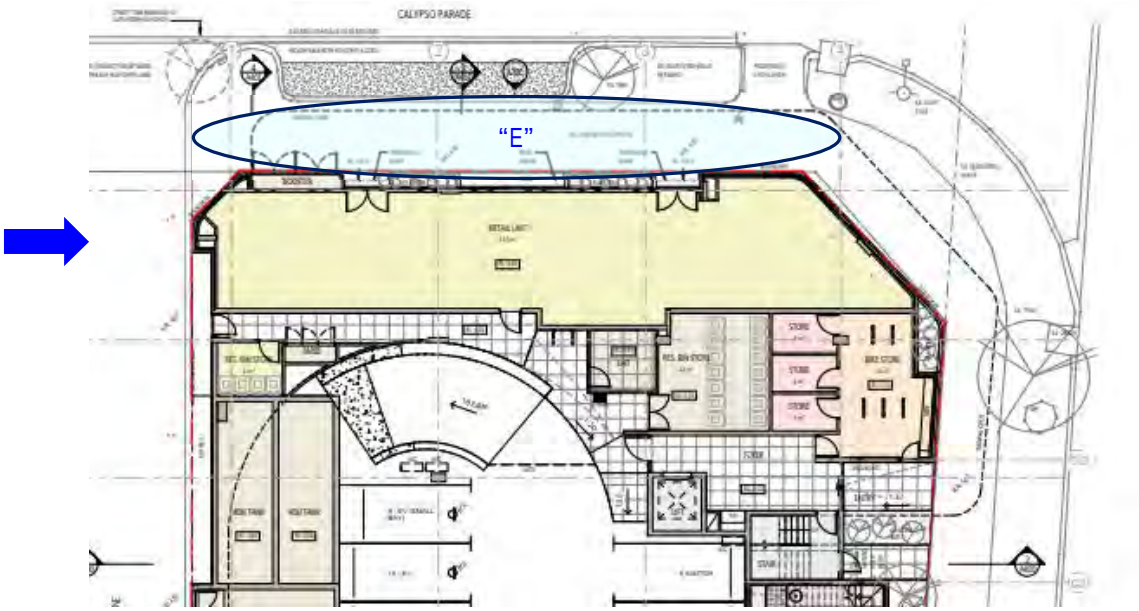
- The westerly wind non-compliance occurs because of funnelling ("canyon" effect) arising from buildings upstream of the site, not the proposed development itself. Design changes to the proposed development would not alter this outcome.
- The non-compliance ONLY occurs under high westerly wind conditions, which typically occur during the winter months. Compliance is achieved for all other wind directions and hence throughout the summer.
- The westerly wind non-compliance does not exceed the PCMV-BFC (2014) target level for "Walking Comfort", ie the non-compliance does not constitute a wind "safety" issue.
- In fact, maximum wind speeds at the relevant location are around the level which is suitable (according to PCMV-BFC Table 1) for "Strolling", "Window Shopping".

7 Recommended Wind Mitigation

Section 6 showed that there is an isolated instance of potential exceedance of the recommended PCMV-BCF (2014) wind criteria for the Calypso Parade retail frontage of the proposed development under westerly wind conditions. All other wind directions comply. The exceedance location of interest (refer "E") is shown in Figure 22.

- The wind direction of concern is from the west.
- The funnelling winds of interest are essentially horizontal in nature, which is why the proposed awning running along the Calypso Parade façade of the development does not provide significant amelioration, compared to other wind directions.

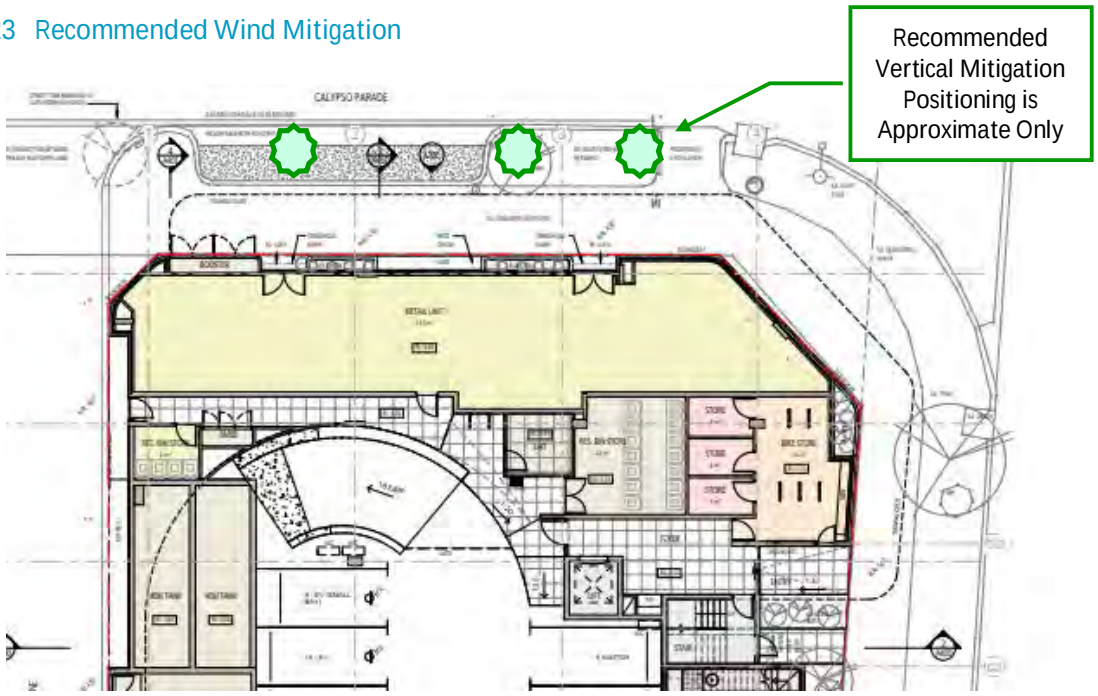
Figure 22 PCMV-BCF (2014) Exceedance Location at Lot 203



On the basis of the above:

- The indicated mitigation for the Calypso Parade retail frontages of interest should be vertical in nature.
- The preferred option here would be landscaping, of evergreen species to ensure efficacy during winter/early spring.
- Recommended landscaping positioning (approximate only) is shown in Figure 23. It is noted that any landscaping would need to avoid being underneath the building awning at this location, nor in the middle of the footpath for pedestrian usage reasons.

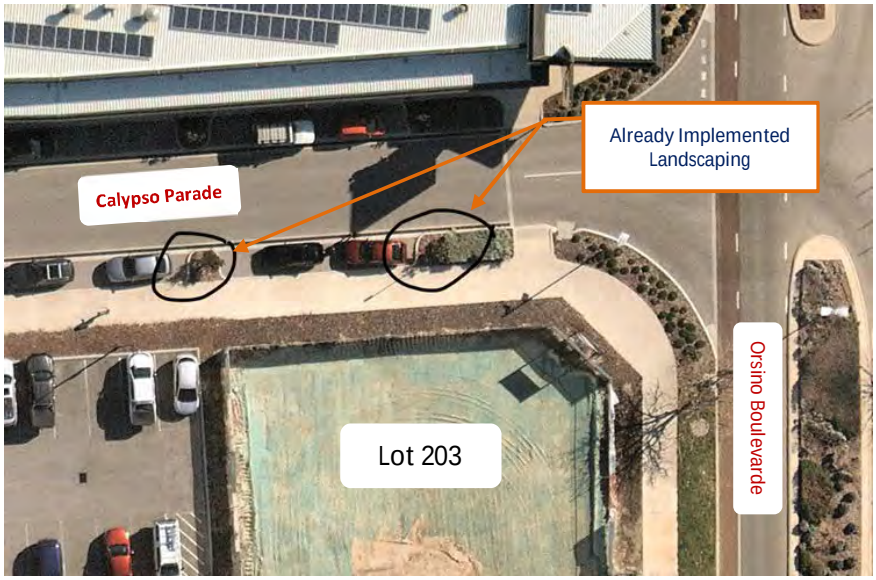
Figure 23 Recommended Wind Mitigation



Existing Landscaping

During the early Masterplanning of the precinct, initial wind engineering studies foreshadowed the potential for funnelling of westerly winds along Calypso Parade. Accordingly, street landscaping was planned for this carriageway – refer Figure 24.

Figure 24 Already Planned and Implemented Street Landscaping (Calypso Parade)



This landscaping was NOT included in the current CFD modelling. It is located however in essentially the same location as the recommended landscaping mitigation shown in Figure 23.

The type of landscaping that has been implemented (refer Figure 24) should be reviewed to confirm that is it is of evergreen species.

Summary

When taking into account …

- The retail footpath non-compliance ONLY occurs under winter/early spring, and for westerly wind conditions;
- The non-compliance is caused by buildings upstream of the site (ie changes to the proposed development would not alter this outcome); and
- Maximum predicted wind speeds at the relevant location are suitable (according to PCMV-BFC Table 1) for “Strolling”, “Window Shopping” …

… the proposed wind mitigation (refer Figure 23) which coincides with the already implemented landscaping (refer Figure 24) will address the objectives of PCMV-BFC (2014) for the proposed Lot 203 development, subject to confirmation of the landscaping species type.

8 INTERNAL COMMUNAL SPACE

As shown in Figure 3, the proposed development has a large communal space on Level 2 overlooking Onyx Lane, ie facing the park to the west of the site.

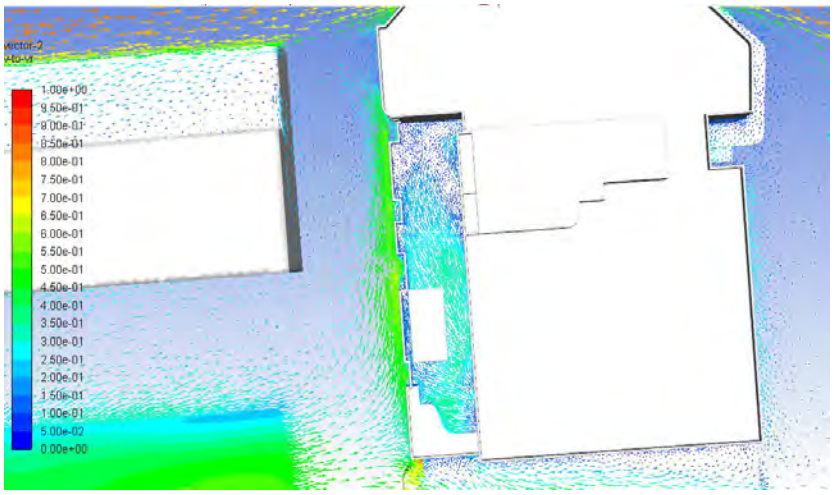
Figure 25 shows windflow over the Level 2 Communal Space for three key wind directions – southwest, west and northwest. The level of the CFD windflow contours is approximately chest height, ie approximately 1.5 m above the Level 2 RL. The Communal Space is shielded by the development and adjoining block to the south for all other wind directions.

It can be seen that:

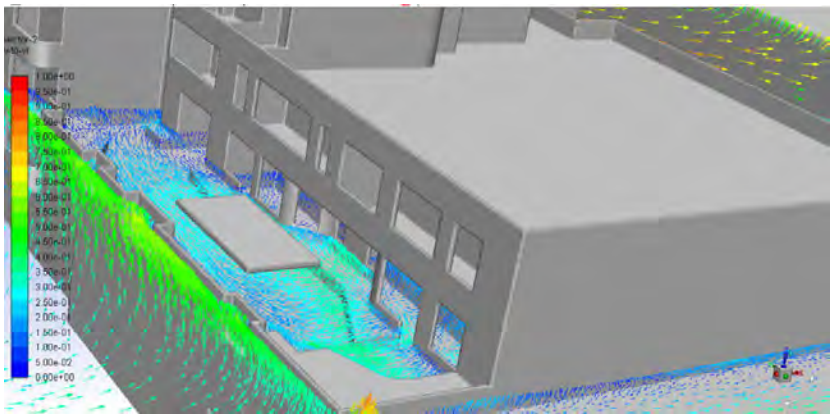
- Local wind speed ratios remain below 0.5 for the key wind directions.
- These ratios translate into worst-case annual maximum wind speeds of LESS THAN 10 m/s.
- This is achieved without the benefit of the landscaping that has already been planned for this space.

Figure 25 Windflow on the Lot 203 Level 2 Communal Space

Westerly Winds
Plan View

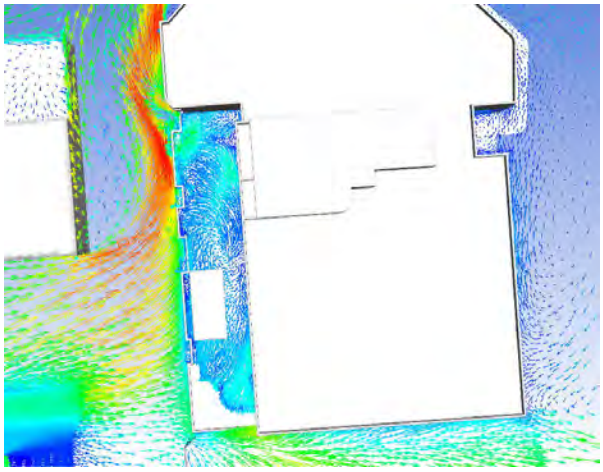


Westerly Winds
Perspective View

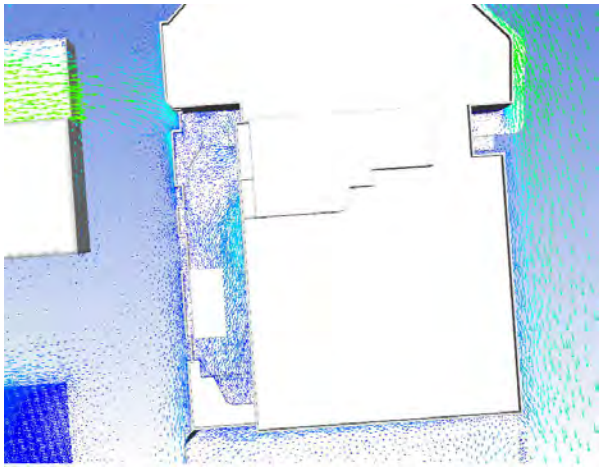


(Fig.25 cont'd)

Southwest Winds



Northwest Winds



On the basis of the above, it has been concluded that the planned west side perimeter porous balustrade at the Level 2 Communal Space – refer Figure 26 - provides sufficient wind amelioration for a comfortable wind environment in this area.

Figure 26 Level 2 Communal Space Perimeter Balustrade

9 CONCLUSIONS

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Port Catherine Development Pty Ltd (PCD) to assess the ground level wind environment surrounding the Port Coogee Marina Village precinct Lot 203 Development via an Advanced 3D CFD (Computational Fluid Dynamics) Simulation study.

In relation to this DA Application wind assessment, the following regulatory document is relevant:

- Port Coogee Marina Village Build Form Codes "PCMV-BFC", approved 12 June 2014.

In particular, PCMV-BFC (2014):

- Contains wind criteria, expressed as peak annual maximum wind speeds, according to the amenity of the specific locale (eg for walking comfort, strolling, sitting, outdoor dining, etc).

Project Site Wind Climate Model (Section 3)

A Project Site-specific wind probability model was developed for the study, using wind data from the following nearby Bureau of Meteorology (BoM) weather stations: Garden Island, Swanbourne and Jandakot Airport.

Project Site and Surrounds Modelling (Section 4)

SLR modelled the proposed development and the surrounds using the SketchUp and SpaceClaim software packages. This was then imported into ANSYS to prepare the model for numerical simulation via the specialised CFD (Computational Fluid Dynamics) software FLUENT.

- The buildings included in the modelling extended out to Cockburn Road to the east, so as to be able to reflect the upstream influence of buildings for east quadrant wind directions.
- A significant number of the already planned trees and vegetation were included in the model, primarily within the Port Coogee Marina Village precinct. Trees and vegetation were not included outside of the precinct, producing a mildly conservative outcome for east quadrant wind simulations.
- The 3D model also incorporated the variable topography at the site.

Analysis Methodology

Eight wind directions were modelled in the simulations:

• North Winds	Terrain Category 2.5	hybrid open water / suburban: 337.5° to 22.5°
• Northeast Winds	Terrain Category 3	suburban
• East Winds	Terrain Category 3	suburban
• Southeast Winds	Terrain Category 3	suburban
• South Winds	Terrain Category 2.5	hybrid open water / suburban: 157.5° to 202.5°
• Southwest Winds	Terrain Category 1.5	open-water
• West Winds	Terrain Category 1.5	open-water
• Northwest Winds	Terrain Category 1.5	open-water

For each wind direction, local wind speeds were determined at 25 ground level locations around the Lot 203 Development – refer Figure 12. These included footpath locations, building corner locations, building entry points, etc. These were then converted into ratios of the local wind speed to the upstream reference wind speed.

The local wind speed ratios were combined with the Project-site wind probability distribution to determine the annual maximum wind speeds needed for comparison with the PCMV-BFC (2014) target wind levels.

Study Results

Calypso Parade

- Maximum winds are predicted to remain below 10 m/s for all wind directions except for westerly winds where funnelling of winds upstream of the site results in winds ranging between 10 m/s and 14 m/s at and upstream of the site. This complies with PCMV-BFC (2014) with the exception of the footpath areas in front of the Retail Unit on Calypso Parade for westerly wind conditions.

Orsino Boulevarde

- Maximum winds remain below 10.5 m/s for all wind directions due to the orientation of this carriageway and shielding from surrounding buildings. This complies with PCMV-BFC (2014).

Onyx Lane

- Maximum winds remain below 10.5 m/s for all wind directions with the exception of southwest winds which cause elevated winds (14.5 m/s) at Position 20 (close to the corner of Calypso Parade). This complies with PCMV-BFC (2014).

Park

- Maximum winds remain below 10.5 m/s for all wind directions due to shielding from surrounding buildings. This complies with PCMV-BFC (2014).

Discussion

The CFD predictions show that all locations comply with the PCMV-BFC (2014) target wind objectives with a single exception along the retail frontage on Calypso Parade. Regarding this potential non-compliance, the following is noted:

- The westerly wind non-compliance occurs because of funnelling ("canyon" effect) arising from buildings upstream of the site, not the proposed development itself. Design changes to the proposed development would not alter this outcome.
- The non-compliance ONLY occurs under high westerly wind conditions, which typically occur during winter/early spring. Compliance would be achieved throughout the remainder of the year (ie summer).
- The westerly wind non-compliance does not exceed the PCMV-BFC (2014) target level for "Walking Comfort", ie the non-compliance does not constitute a wind "safety" issue.
- In fact, maximum wind speeds at the relevant location are around the level which is suitable (according to PCMV-BFC Table 1) for "Strolling", "Window Shopping".

Recommended Wind Mitigation

On the basis of the CFD simulation predictions and the single, potential non-compliance for the retail unit footpath area along Calypso Parade:

- The indicated mitigation for the footpath of interest should be vertical, given that the windflow of concern is mainly horizontal in nature.
- The preferred option here would be landscaping, of evergreen species to ensure efficacy during winter/early spring.
- Recommended landscaping positioning is shown in Figure 23.

Observation Regarding Existing Landscaping

During the early Masterplanning of the precinct, initial wind engineering studies foreshadowed the potential for funnelling of westerly winds along Calypso Parade. Accordingly, street landscaping was planned for this carriageway – refer Figure 24. This landscaping was NOT included in the current CFD modelling. It is located however in the same location as the recommended landscaping mitigation shown in Figure 23.

The type of landscaping that has been implemented (refer Figure 24) should be reviewed to confirm that is it is of evergreen species, so as to remain effective during the winter months of relevance to westerly winds.

Summary of Ground Level Wind Conditions

All ground level locations surrounding the development comply with PCMV-BFC (2014) target wind objectives with the exception of the retail unit footpath area along Calypso Parade. Given that:

- The non-compliance is caused by buildings upstream of the site (ie no changes to the proposed development would alter this condition);
- The non-compliance ONLY occurs under winter/early spring westerly wind conditions; and
- Maximum predicted wind speeds at the relevant location would be suitable (according to PCMV-BFC Table 1) for “Strolling”, “Window Shopping” …

… the proposed wind mitigation (refer Figure 23) which coincides with the already implemented landscaping (refer Figure 24) will address the objectives of PCMV-BFC (2014) for the proposed Lot 203 development, subject to confirmation of the landscaping species type.

Internal Areas (Level 2 Communal Space)

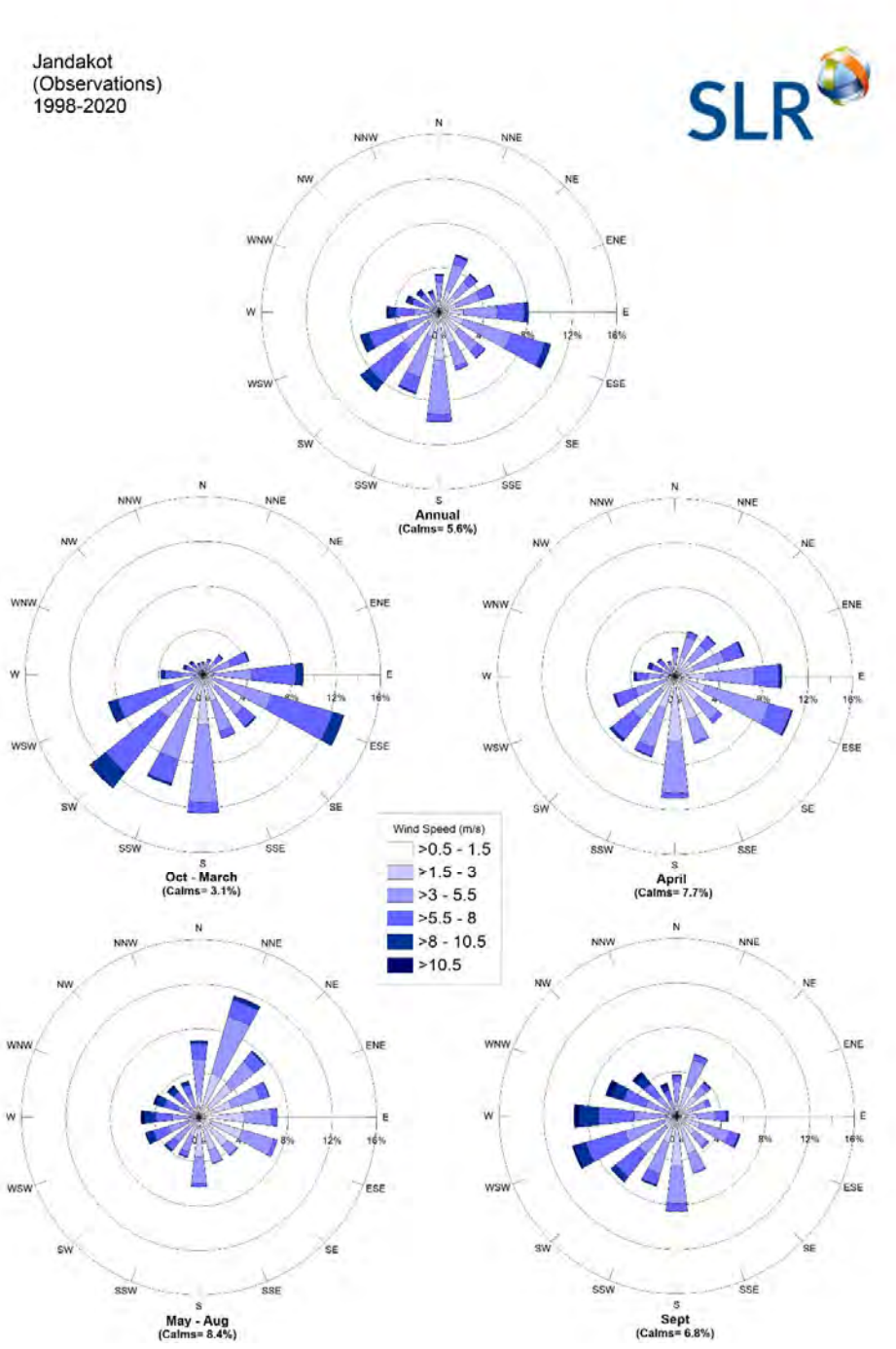
The large Level 2 communal space overlooking Onyx Lane is shielded on three sides (north, east and south). As a result of this shielding and the west side perimeter balustrade:

- The CFD modelling showed that wind throughout the space will remain below the 10 m/s target objective, even without the benefit of any landscaping that has already been planned for this space.

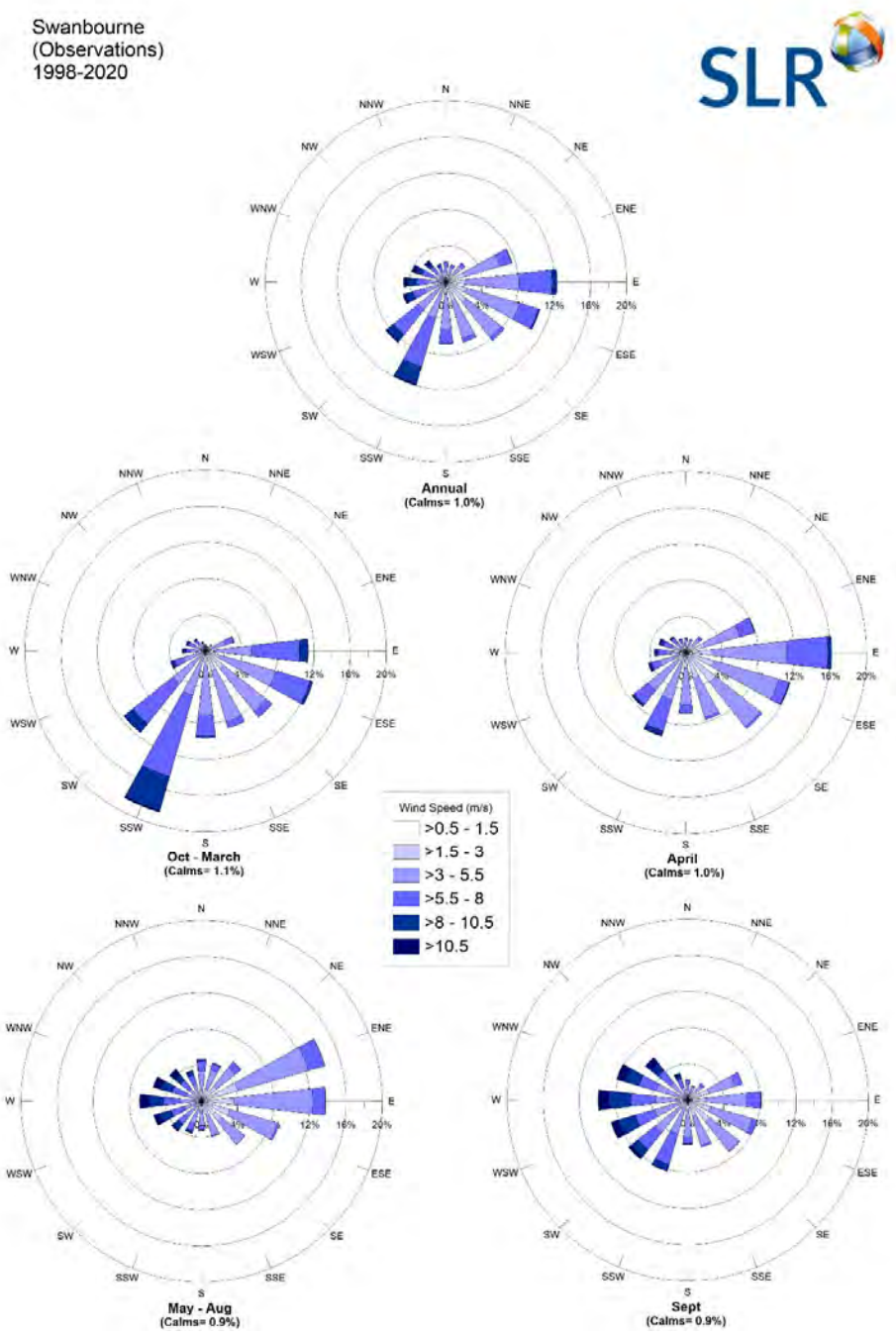
APPENDIX A

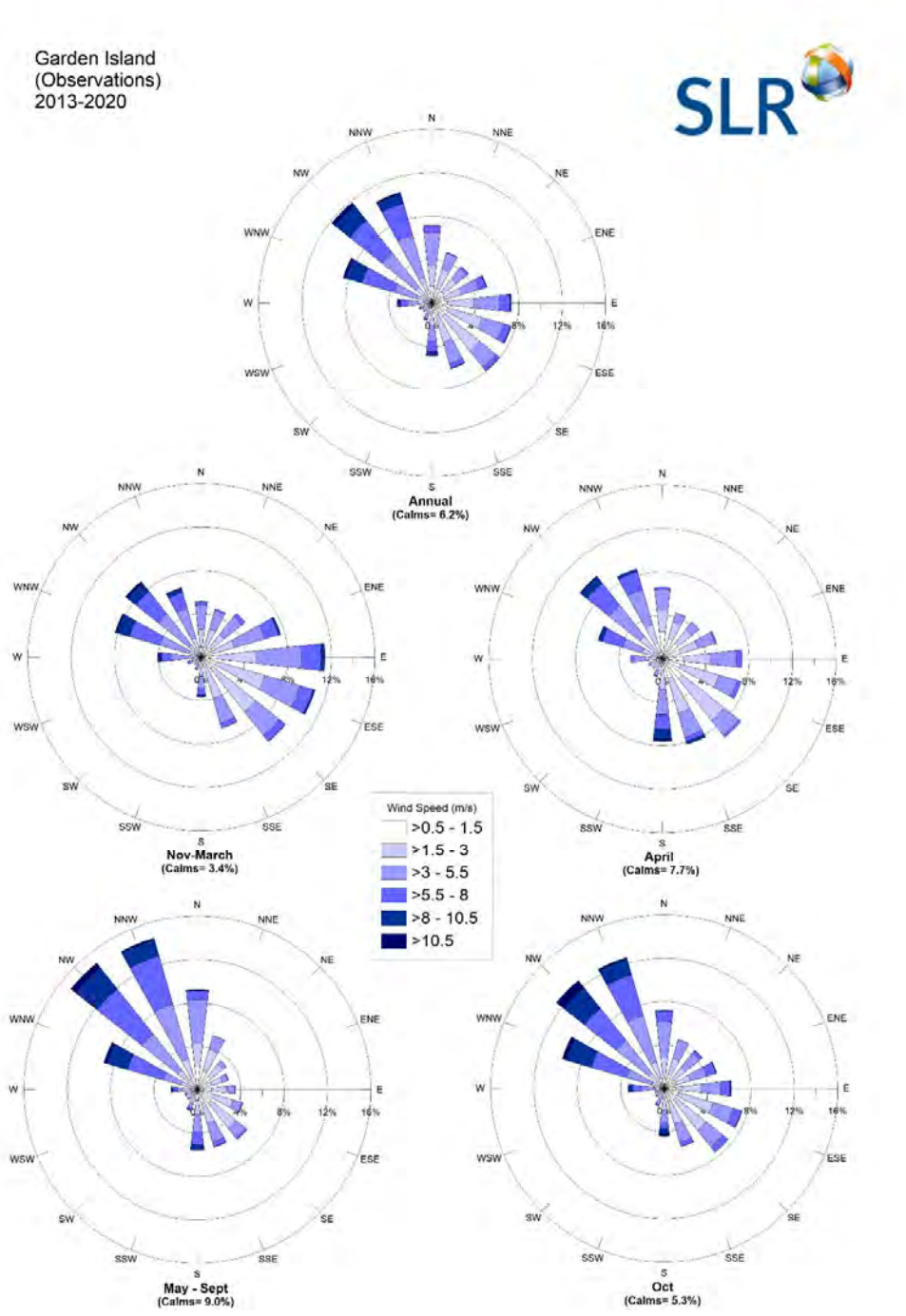
Perth Region Bureau of Meteorology Wind Roses

BoM Station 09172 – Jandakot Airport



BoM Station 09215 – Swanbourne





ASIA PACIFIC OFFICES

ADELAIDE
60 Halifax Street
Adelaide SA 5000
Australia
T: +61 431 516 449

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE CBD
Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Grd Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

AUCKLAND
Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

WELLINGTON
12A & B Waterloo Quay
Wellington 6011
New Zealand
T: +64 2181 7186

SINGAPORE
39b Craig Road
Singapore 089677
T: +65 6822 2203

www.slrconsulting.com