

# Appendix M

ESD Memo

<b>DEPARTMENT OF PLANNING, LANDS AND HERITAGE</b>	
DATE	FILE
<b>16-Nov-2018</b>	<b>08-50167-1</b>



## Lot 37 - Montario Quarter - Shenton Park

### Green Star Pathways - Self Assessed Sustainability Services Report

Prepared for:

Prepared by:

**Client name**  
Iris Residential

\\WGE-PER-FS-01\PROJECTS\33380\PROJECT DOCUMENTATION\SUSTAINABILITY\GREEN STAR\SELF ASSESSED\SU-RE-LOT 37 MONTARIO QUARTER  
GREEN STAR PATHWAY\_003.DOCX

**Nathan Lawry**

Project No. 33380

**Date:**  
17 October 2018

Ground Floor, 226 Adelaide Terrace, Perth WA 6000

T: (08) 6222 7000 F: (08) 6222 7100 E: perth@wge.com.au W: www.wge.com.au

# Revision

REVISION	DATE	COMMENT	APPROVED BY
<b>00</b>	08/11/2017	Preliminary Issue	<b>PDS</b>
<b>01</b>	06/04/2018	CD Issue	<b>PDS</b>
<b>02</b>	05/10/2018	DA Issue	<b>PDS</b>
<b>03</b>	17/10/2018	DA Issue – minor corrections	<b>PDS</b>

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# Executive Summary

## 1. Executive Summary

This project is targeting the equivalent of a 4 Star Green Star rating using the Design and As Built tool. Whilst a formal rating is not required, it is still necessary to incorporate a number of sustainability initiatives into the project and to compare these to the Green Star benchmarks.

The following assumptions have been used to guide the recommendations in the shopping list.

- Building Size: 200 apartments with 40x1 bed, 100x2 bed and 60x3 bed options. 2,300m<sup>2</sup> of retail space with 94kWh/m<sup>2</sup> energy intensity based on retail use
- Building Use: Typical apartment Class 2 use for residential, predominantly retail use for commercial
- Building Consumption: Approximately 3,800kWh/yr for 2 person bedrooms, 4,700kWh/yr for 2 bedroom and 5,420 kWh/yr for 3 bedrooms and 94kWh/m<sup>2</sup>.yr for commercial areas.
- Solar PV will be provided to roof space with installation density of 8m<sup>2</sup>/kW of panels.

### 1.1 Design Guideline Requirement

Clarification from Landcorp on the design requirement for a 4 Star Green Star rating was sought. The following was received as Addendum 07-Green Star:

*“All development proposals are required to achieve a minimum of a 4 star Green Star rating. This needs to be demonstrated at development application stage by a certified Green Building Council of Australia (GBCA) professional. Official certification by the Green Building Council is not required. (Reference Clause 8.1.1).*

*Where bonus plot ratio is sought, this can be achieved via ‘Design Excellence’ or ‘Environmentally Sustainable Design’, or a combination of both. Where proponents seek bonus plot ratio for environmentally sustainable design, minimum of a 5 star Green Star rating needs to be achieved. An ESD Report outlining how the design intends to meet the 5 star rating is required to be submitted with the development application (as per the 4 star process). Additionally in the situation where bonus plot ratio is awarded, an ESD Detail Design Report is required to be submitted with the application for a building permit, and office certification from the Green Building Council of Australia is required*

### 1.2 Credits requiring early attention

- Significant Solar PV Array of no less than 85kW to be installed with at least 680m<sup>2</sup> of available roof space to be provided.
- Solar PV and private submetering to be bundled under Power Purchase Agreement for nil budget addition
- Lighting power density to be reduced by 50% below allowable maximums.
- Openable area of Class 2 façade to be at least 5% of floor area of each apartment.
- Air cooled split AC systems (3 star minimum), LED lighting, and 7.0 star average for apartments with either Solar Boosted Gas or Heat Pump DHW.
- Automated lighting control to common areas (daylight and occupant sensing).
- Stormwater to be infiltrated on site.
- Irrigation to be sub surface drip or night time sprinkler for grassed areas.
- Provision of generous EOT facilities suitable for encouraging sustainable transport (bike racks/storage to each apartment, lockers and showers to commercial)
- Blower Door Testing to be included as part of commissioning.
- Metering and Monitoring system that allows for convenient access and tracking.

## Equivalent Rating

### 2. Equivalent Rating

From our experience and clarifications with these requirements, the following points summarise the “equivalent” Green Star process and deliverables

- **Performance Requirement:** Target an equivalent (self-assessed) 4 star Green Star Design performance (i.e. minimum 45 points) as at the completion of working drawing stage (building licence).
- **DA Phase Deliverables:**
  - Preliminary statement of compliance to be provided by a practicing Green Star Accredited Professional (GSAP) confirming intent to comply with above performance requirement.
- **Working Drawings Phase Deliverables:**
  - Statement of compliance to be provided by a practicing Green Star Accredited Professional (GSAP) confirming compliance with above performance requirement.
  - Statement of compliance to be supported by summary report including the following.
    - \* Confirmation of final performance achieved as at completion of design documents.
    - \* Sustainability Strategy/Initiatives incorporated (Green Star Score Card) into the project.
    - \* Appropriate design documents/statements confirming compliance to claimed initiatives.
    - \* Energy modelling outcomes achieved for the project
- **Practical Completion Phase Deliverables:**
  - Head Contractor to provide standard certification confirming compliance to design documents.

## Green Star Process

### 3. Green Star Process

#### 3.1 Green Star Overview

The Green Star set of ratings tools have been compiled by the Green Building Council of Australia (GBCA) to assess the level of environmentally sustainable design that may be incorporated into a building. This project is eligible to achieve a rating using the Green Star Design and As Built tool.

The number of points available for each of the categories in the Green Star Design and As Built tool are:

**Table 1: Green Star Category Points**

Category	Available Points
Management	14
Indoor Environment Quality	17
Energy	22
Transport	10
Water	12
Materials	14
Land Use and Ecology	6
Emissions	5
Innovation	10
<b>Total</b>	<b>110</b>

Under the current set of Green Star tools, a 4 Star rating (“Best Practice”) is obtained when a certified score of 45-59 points are achieved. A 5 Star rating (“Australian Excellence”) is obtained when a certified score of 60-74 points are achieved. A 6 Star rating (“World Leader”) is obtained when a certified score above 75 points are achieved. For a certified rating the points require a buffer of 10% above the minimum points.

#### 3.2 Roles and Responsibilities of the Design Team

The roles and responsibilities of the design team include:

- Ensure the design documentation is compliant with the requirements of the targeted credits
- Review Contractor’s documentation and other technical information which the Contractor is required, or may submit for technical compliance with the Contract
- Respond to Requests for Information (RFI)
- Attendance at site meetings, if required



## Green Star Process

### 3.3 Roles and Responsibilities of the Head Contractor's Team

The Contractor shall provide all relevant documentation, material and incidentals necessary to ensure the targeted Green Star rating is achieved in accordance with the design documentation and programme. This requires the addition of a suitable Green Star Accredited Professional with sufficient time allowance to complete this job.

In addition, the Contractor shall have the following obligations:

- To bring to the attention of the design team in a timely manner, queries which require clarification from the Consulting Engineer, such as:
  - Interpretation of the Specification or any documentation
  - Non-compliance with the Specification
  - Discrepancies in the design documentation
- To comply with all aspects of the Contract

### 3.4 ESD Budget Allowance

We recommend that the Quantity Surveyor review the recommendations made throughout this report to confirm that they remain consistent with the budget limitations of the project.

# Green Star Plan

## 4. Green Star Plan

### 4.1 Summary

A Green Star feasibility study was carried out for the Project. The objective of the feasibility study was to investigate the estimated additional cost to achieve a 4 Star Green Star rating and to create a plan for the most cost effective points to target.

The information provided in this section of the report is based on industry rates and discussions with design team members.

The Green Star shopping list identifies indicative costs for the following:

- **Green** = Points achieved at nil cost
- **Blue** = Points that are achievable at a cost and should be included in the development
- **Gold** = Additional points that are achievable at a cost but are not required for a 4 Star Equivalent
- **Red** = Points that are not achievable, difficult or expensive to achieve.

The project has not been lodged with the GBCA as it is a self-assessed rating. If it is confirmed that this project will be targeting a formal Green Star rating, it will need to be formally registered with the GBCA. All costs are indicative only and will need to be confirmed through the tender process.

It is expected that the Client will review the comments made throughout this report and confirm in writing which of the proposed initiatives are to be incorporated into the project by the relevant members of the design team.

### 4.2 Shopping List

The Green Star rating scheme is a voluntary scheme that rates the sustainability of a development from a minimum of 4 Star, which represents Australian Best Practice, to 6 Star which represents World Leadership. In a formal rating, to account for changes that occur during construction and to minimise risk, a minimum 10% buffer is recommended. However, as this is an informal self-assessment, the number of buffer points can be reduced, depending on the design teams assessment of the risk associated with achieving each of the credits.

All design team members should review all credits to determine if they can be achieved and to refine the costs that have been allocated to these credits, however, once the points list has been refined, only the Green and the Blue points will need to be implemented on the job.

NOTE: An icon is added in each consultant comment. A tick indicates no action required at the moment, an explanation mark indicates that action is required now and a cross indicates that the credit has been confirmed to be not achievable.

### 4.3 Assumptions

The following assumptions have been used to guide the recommendations in the shopping list:

- Building Size: 200 apartments with 40x1 bed, 100x2 bed and 60x3 bed options. 2,300m<sup>2</sup> of retail space with 94kWh/m<sup>2</sup> energy intensity based on retail use
- Building Use: Typical apartment Class 2 use for residential, predominantly retail use for commercial
- Building Consumption: Approximately 3,800kWh/yr for 2 person bedrooms, 4,700kWh/yr for 2 bedroom and 5,420 kWh/yr for 3 bedrooms and 94kWh/m<sup>2</sup>.yr for commercial areas.
- Solar PV will be provided to roof space with installation density of 8m<sup>2</sup>/kW of panels.

## Conclusion

### 5. Conclusion

An equivalent 4 star Green Star Design and As Built rating can be achieved for negligible cost increase through the implementation of best practice design and attention to sustainability features.



Cumulative Cost	Category	Credit Number	Credit Name	Credit Criteria	Credit description	Targeted	Total Points Available	Points Achievable	Risk Level	Cumulative Points	Comments	Actions	PM/Client	QS	Arch	Mech	Head	Elec	Hydr	Acoustic	Landscape	Structural	Civil	Env	ESD		
\$0.00	Man	7.2	Responsible Construction Practices	High Quality Staff Support	1 point is available where high quality staff support practices are in place that: - Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site; and - Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs.	Yes	1	1	Low	7.0%	The Contractor must implement programs and policies that go beyond basic OHS requirements and extend to wellbeing promotion for all site workers.  At least three distinct issues, with one of those specifically addressing mental health impacts, must be addressed. Issues that may be considered include: - healthier eating and active living - reduced harmful alcohol and drug and tobacco-free living - increase social cohesion, community, and cultural participation - understanding depression - preventing violence and injury - suicide prevention - decrease psychological distress	1. Sustainability to include in specification. 2. Sustainability to provide template of Sustainable Practices training.															
\$0.00	Man	8B	Operational Waste	Prescriptive Pathway - Facilities	1 point is available when facilities are in place to collect and separate distinct waste streams, and where these facilities meet best practice access requirements for collection by the relevant waste contractor. This can be assessed using either a prescriptive deemed to satisfy pathway or waste consultant to create a Operational Waste Management Plan.	Yes	1	1	Low	8.0%	Generally good design although some constraints may make this difficult to achieve. The operational waste streams that should be allowed for include: - General waste - to landfill; - Paper and cardboard - to recycling; - Glass - to recycling; - Plastic - to recycling; - At least on other waste stream (e.g. organics to compost)  This may be achieved if there is an opportunity to provide mixed recycling which will be separated off site.	1. Architect to include recycling waste facilities.															
\$0.00	EQ	9.2	Indoor Air Quality	Provision of Outdoor Air	2 points are awarded where the nominated area is provided with sufficient outside air to ensure levels of indoor pollutants are maintained at acceptable levels.  For mechanically ventilated or mixed-mode spaces: - 1 point is awarded where outside air is provided at a rate 50% greater than that required in AS1668.2:2012 or CO2 concentrations are maintained below 800ppm. - 2 points are awarded where outside air is provided at a rate 100% greater than that required in AS1668.2:2012 or CO2 concentrations are maintained below 700ppm  For naturally ventilated spaces: - 2 points are awarded where the requirements of AS1668.4:2012 are met.  Nominated Area: All primary and secondary spaces.	Yes	2	1	Medium	9.0%	Adding additional outside air will have a negative impact on the energy points unless heat exchange and/or demand control ventilation is implemented.	Mech 14/09/18 Achievable/Confirmed. OA to be provided at a rate 50% greater than that required in AS1668.2:2012															
\$0.00	EQ	9.3	Indoor Air Quality	Exhaust or Elimination of Pollutants	1 point is awarded where the nominated pollutants, such as those arising from printing equipment, cooking processes and equipment and vehicle exhaust, are limited by either removing the source of pollutants from the nominated area, or exhausting the pollutants directly to the outside of the project while limiting their entry into other areas.  Nominated Area: All primary and secondary spaces.	Yes	1	1	Low	10.0%	All print room and kitchen exhaust must be ducted directly to the outside with no recirculation. Note: Kitchens need to be separated from adjacent spaces with a maximum opening no larger than 2.5m2. A project specific Query would be required to remove this requirement.	Mech 14/09/18 Achievable/Confirmed. All print room and kitchen exhaust must be ducted directly to the outside with no recirculation															
\$0.00	EQ	10.1	Acoustic Comfort	Internal Noise Levels	1 point is available where internal ambient noise levels in the nominated area are suitable and relevant to the activity type in the room. This includes all sound generated by the building systems and any external noise ingress.  Nominated Area: All primary and secondary spaces.	Yes	1	1	Medium	11.0%	Internal ambient noise levels in the nominated area is to be no more than 5dB(A) above the lower figure in the range recommended in Table 1 of AS/NZS 2107:2016. This may require additional detailing to increase above the minimum BCA requirements.  Requires confirmation through measurement conducted in at least 10% of the spaces in the nominated area.  Natural ventilated spaces to be considered with the windows open but the range extended to 10dB(A) above the lower figure in the range recommended in Table 1 of AS/NZS 2107:2016. Mixed mode is treated as Mechanical Conditioned space only.	Acoustics 14/09/2018 DG included, achievable for minimal or no cost															
\$0.00	EQ	11.0	Lighting Comfort	Minimum Lighting Comfort	The conditional requirement is met where lights are flicker free and accurately address the perception of colour in the space.	Yes	Pre-requisite	Yes	Low	11.0%	All lights must be flicker free and have a minimum CRI of 80.  Flicker-free lighting refers to luminaires that have either: - A minimum Class A1 & A2 ballast for all fluorescent lighting; - Electronic ballasts for all High Intensity Discharge (HID) lighting; - Electronic drivers that feature 12-bit or greater resolution for all LED lighting; or - High frequency ballasts for all other lighting types, including incandescent (incl Halogen, dichroic (e.g. low-voltage downlights), and High-Intensity Discharge (e.g. metal halide, low/high pressure sodium).	1. Electrical consultant to design															
\$0.00	EQ	11.1	Lighting Comfort	General Illuminance and Glare Reduction	1 point is available where, in the nominated area: - Lighting levels and quality comply with best practice guidelines; and - Glare is eliminated  Nominated Area: All primary and secondary spaces.	Yes	1	1	Low	12.0%	Lighting levels in all spaces must meet the recommended maintained illuminance levels and minimum uniformities as specified in AS 1680.  Additionally, glare must be limited by: - Ensuring that all bare light sources are obscured from direct viewing by occupants, including look directly upwards; or - The lighting system complies with the luminaire selection system as detailed in Section 8.3.4 of AS 1680.1																
\$0.00	EQ	11.2	Lighting Comfort	Surface Illuminance	1 point is available where, in the nominated area, a combination of lighting and surfaces improve uniformity of lighting to give visual interest.  Nominated Area: All primary and secondary spaces.	Yes	1	1	Low	13.0%	To meet the credit criteria, meet one of the following: Option 1. A. Ensure an average surface reflectance of at least 0.75 for ceilings, and B. Ensure an average surface illuminance on the ceiling of at least 30% of the lighting levels on the working plane. OR Option 2. Model spaces to show that: A. The average ceiling luminance does not exceed 0.5 kcd/m2 and that no point on the ceiling exceeds 1.5 kcd/m2; And B. That the ceiling has an average surface illuminance of at least 30% of the working plane.																
\$0.00	EQ	11.3	Lighting Comfort	Localised Lighting Control	1 point is available where, in the nominated area, occupants have the ability to control (on/off and lighting levels) the lighting in their immediate environment.  Nominated Area: All primary and secondary spaces.	Yes	1	1	Low	14.0%	GBCA have confirmed that this credit is cannot be targeted where tenants perform their own lighting installation.																
\$0.00	EQ	12.0	Visual Comfort	Glare Reduction	The conditional requirement is met where the glare in the nominated area from sunlight through all viewing facades is reduced through a combination of blinds, screens, fixed devices, or other means.  Nominated area: Primary Spaces (excluding bedrooms, sleeping areas and bathrooms).	Yes	Pre-requisite	Yes	Low	14.0%	Generally achieved with blinds but may require daylight glare modelling where some areas do not contain blinds.																



Cumulative Cost	Category	Credit Number	Credit Name	Credit Criteria	Credit description	Targeted	Total Points Available	Points Achievable	Risk Level	Cumulative Points	Comments	Actions	PM/Client	QS	Arch	Mech	Elec	Hydr	Acoustic	Landscape	Structural	Civil	Other	ESD
\$0.00	IEQ	12.1	Visual Comfort	Daylight	Up to 2 points are available where a percentage of the nominated area receives high levels of daylight during 80% of the nominated hours. - 40% Nominated Area = 1 point - 60% Nominated Area = 2 points Nominated area: Primary Spaces (excluding bedrooms, sleeping areas and bathrooms).	Yes	2	1	Medium	15.0%	Daylight modelling is required to demonstrate compliance.													
\$0.00	IEQ	12.2	Visual Comfort	Views	1 point is awarded where 60 % of the nominated area has a clear line of sight to a high quality internal or external view. Nominated area: Primary Spaces (excluding bedrooms, sleeping areas and bathrooms).	Yes	1	1	Low	16.0%	WGE will complete mark ups to determine if this is achieved.													
\$0.00	IEQ	13.1	Indoor Pollutants	Paints, Adhesives, Sealants and Carpets	1 point is available where at least 95% of all internally applied paints, adhesives, sealants and carpets meet stipulated 'Total VOC Limits'. or, where no paints, adhesives, sealants or carpets are used in the building. Nominated Area: All primary, secondary and tertiary spaces.	Yes	1	1	Low	17.0%	WGE will include this in the sustainability specification. Generally easy to achieve for paints, adhesives and sealants. The Architect will need to review proposed selections for carpet (if any)													
\$0.00	IEQ	13.2	Indoor Pollutants	Engineered Wood Products	1 point is available where at least 95% of all engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used in the building. Nominated Area: All primary, secondary and tertiary spaces.	Yes	1	1	Low	18.0%	WGE to include in the sustainability specification. Generally easy to achieve with the selection of E0 or equivalent engineered wood products.													
\$0.00	Ene	15E.0	Greenhouse Gas Emissions	Conditional Requirement: Reference Building Pathway	Project teams must demonstrate that the Proposed Building greenhouse gas (GHG) emissions are less than those of the equivalent Benchmark Building. The Benchmark Building represents a 10% improvement on the Reference Building. The Reference Building is a building which achieves minimal compliance with the NCC Section J DTS provisions.	Yes	Pre-requisite	Yes	Low	18.0%	Requires the project to achieve at least 10% above the minimum Section J requirements.													
\$0.00	Ene	15E.1A	Greenhouse Gas Emissions	Comparison to a Reference Building Pathway	Up to 20 points are available for this credit. The first 4 points are awarded based on improvements to the building's fabric against a Reference Building (4 points).	Yes	4	1	Low	19.0%	WGE to do undertake energy assessment as the design progresses. To achieve these points, the efficiency of the building and the use of renewable energy must be maximised.													
\$0.00	Ene	15E.1B	Greenhouse Gas Emissions	Comparison to a Reference Building Pathway	The remaining 16 points are awarded for reducing emissions against the Benchmark Building (16 points). In order for GreenPower contracts to be rewarded, the project must demonstrate that a supply contract is in place for a minimum period of ten years after the building's practical completion. Where a project enters into a contract for a period less than ten years, the emissions reduction benefit will be prorated; at this time, no benefit is given for periods greater than ten years. The maximum benefit that can be derived from accredited GreenPower® products is limited to the number of points awarded for GHG emissions reduction due to the building design improvements alone. Hence full points for this credit involving GreenPower will only be able to be achieved by buildings which have already achieved at least 50% emission reduction below the Benchmark Building. This calculation is performed by the Greenhouse Gas Emissions Calculator.	Yes	16	5	Low	24.0%	WGE to do undertake energy assessment as the design progresses. To achieve these points, the efficiency of the building and the use of renewable energy must be maximised.													
\$0.00	Ene	16B	Peak Electricity Demand Reduction	Performance Pathway - Reference Building	Up to 2 points are available where it is demonstrated that the project's predicted peak electricity demand has been reduced below that of a Reference Building: - 0-10%: 0 point - 20% - 1 point - 30%: 2 points	Yes	2	2	Low	26.0%	This can be achieved based on the energy modelling in 15E. It is generally relatively easy to achieve 1 - 2 points.													
\$0.00	Tra	17B.1	Sustainable Transport	Access by Public Transport	Up to 3 points are available based on the accessibility of the site by public transport.	Yes	3	3	Low	29.0%														
\$0.00	Tra	17B.3	Sustainable Transport	Low Emission Vehicle Infrastructure	1 point is available where parking spaces and/or dedicated infrastructure is provided to support the uptake of low-emission vehicles.	Yes	1	1	Low	30.0%														
\$0.00	Tra	17B.4	Sustainable Transport	Active Transport Facilities	1 point is available where bicycle parking and associated facilities are provided to regular building occupants and visitors	Yes	1	1	Low	31.0%	Staff Numbers have been confirmed: 147 total. Requirement of 101 bicycle spaces for Residents, 12 Bicycle parking for staff for the commercial area, 8 bicycle parking for visitors of the residential area and 3 bicycle parking for the commercial area visitors. 4 Showers and 14 Lockers are required.													
\$0.00	Tra	17B.5	Sustainable Transport	Walkable Neighbourhoods	1 point is available where the project is located conveniently to amenities or the project achieves a specified walk score.	Yes	1	1	Low	32.0%														
\$0.00	Wat	18B.1	Potable Water	Sanitary Fixture Efficiency	All fixtures are within one star of the stated WELS rating - 4 Star toilets, 6 Star taps in kitchen and bathroom, 7.5 l/min shower.	Yes	1	1	Low	33.0%	See credit description.													
\$0.00	Wat	18B.3	Potable Water	Heat Rejection	No water is used for heat rejection.	Yes	2	2	Low	35.0%	See credit description.	Mech 14/09/18 Achievable.												
\$0.00	Wat	18B.4	Potable Water	Landscape Irrigation	Either drip irrigation with moisture sensor override is installed, or where no potable water is used for irrigation.	Yes	1	1	Low	36.0%	See credit description.													
\$0.00	Wat	18B.5	Potable Water	Fire System Test Water	Fire protection system does not expel water for testing. The Fire Protection System Test Water criterion (18B.5) is deemed 'Not applicable' for projects where: - A sprinkler system is not required under Part E of the NCC, or - A sprinkler system is not provided by the project team, and does not include a water-based fire protection system	Yes	1	1	Low	37.0%	See credit description.													
\$0.00	Mat	20.1	Responsible Building Materials	Structural and Reinforcing Steel	1 point is available where 95% of the building's steel is sourced from a Responsible Steel Maker; and For steel framed buildings, at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI); or For concrete framed buildings, at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).	Yes	1	1	Low	38.0%	See credit description.													



Cumulative Cost	Category	Credit Number	Credit Name	Credit Criteria	Credit description	Targeted	Total Points Available	Points Achievable	Risk Level	Cumulative Points	Comments	Actions	PM/Client	GS	Arch	Mech	Elec	Hydr	Acoustic	Landscape	Structural	Civil	Env	ESD		
\$0.00	Mat	20.3	Responsible Building Materials	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1 point is available where 90% (by cost) of all permanent formwork, cables, pipes, flooring and blinds in a project either: - Do not contain PVC and have a recognised product declaration (either EPD or SDS); or - Meet Best Practice Guidelines for PVC as defined by GBCA and supported by product accreditation certificate from a GBCA scheme or a JAS_ANZ accredited audit verification certificate	Yes	1	1	Low	39.0%	Generally easy to achieve. Specification clauses to be provided.															
\$0.00	Mat	22B	Construction and Demolition Waste	Percentage Benchmark	One (1) point is awarded where project teams can demonstrate that 90% of the waste generated during construction and demolition has been diverted from landfill. Waste shall be reported in kilograms of waste per square meter of GFA, as well as in percentage.  To calculate the amount of waste diverted from landfill, the project is required to report the total amount of waste generated (kg/m <sup>3</sup> ), and the total amount of waste diverted from landfill (kg/m <sup>3</sup> ), and report on the proportion diverted as a percentage	Yes	1	1	Low	40.0%	Generally easy to achieve in metropolitan areas.  The contractor can use a single bin solution or on-site separation to achieve a 90% C&D waste recycling.															
\$0.00	Eco	23.0	Ecological Value	Endangered, Threatened or Vulnerable Species	The project team must demonstrate that no critically endangered, endangered or vulnerable species or ecological communities were present on the site at time of purchase.	Yes	Pre-requisite	Yes	Low	40.0%	If the DA approval does not refer to any endangered species or the Environment Protection and Biodiversity Conservation act this credit is achieved.															
\$0.00	Eco	23.1	Ecological Value	Ecological Value	To be awarded points in this credit, the project must demonstrate that no endangered, threatened or vulnerable species were present on the site at time of purchase.  Up to 3 points are awarded where the ecological value of the site is improved by the project  The number of points awarded is determined by the Green Star - Change of Ecological Value Calculator based on a comparison of the state of the site before and after design/construction.  Improvement Points Achieved of Ecological Value 0.01 1 0.10 2 0.20 3	Yes	3	2	Medium	42.0%	Landscape design must maximise the native and indigenous planting to maximise the points achieved.															
\$0.00	Eco	24.0	Sustainable Sites	Conditional Requirement	The Conditional Requirement is met where, 5 years prior to the project's Green Star Registration date, the project site met the following conditions: - The project is not on land containing old-growth forest - The project does not impact on any wetland listed as being 'High National Importance' - Where the project may have an impact on any wetland NOT listed as being of 'High National Importance', Wetland Protection Measures must be in place - The project must not have a significant impact on 'Matters of National Significance' listed under the Environmental Protection and Biodiversity Conservation Act 1999	Yes	Pre-requisite	Yes	Low	42.0%	See credit description.															
\$0.00	Eco	24.1	Sustainable Sites	Reuse of Land	1 point is available where 75% of the site was Previously Developed Land at the date of site purchase or (for previously owned land) at the project's Green Star registration date.	Yes	1	1	Low	43.0%	See credit description.															
\$0.00	Eco	25.0	Heat Island Effect	Heat Island Effect Reduction	1 point is available if at least 75% of the total project site area comprises building or landscaping elements that reduce the impact of heat island effect.	Yes	1	1	Medium	44.0%	Generally only metal deck roof sheeting or specialist roof paint products will have the solar reflective data required to achieve this credit.															
\$0.00	Emi	26.1	Stormwater	Reduced Peak Discharge	1 point is available where the post-development peak event discharge from the site does not exceed the pre-development peak event discharge.	Yes	1	1	Low	45.0%	Requires modelling by the civil / hydraulic engineer to demonstrate this is achievable. Can be achieved where all stormwater is infiltrated on site.															
\$0.00	Emi	27.0	Light Pollution	Light Pollution to Neighbouring Bodies	For the project to be awarded a point for this credit, the project must comply with AS 4282 'Control of the Otrusive Effects of Outdoor Lighting'	Yes	Pre-requisite	Yes	Low	45.0%	This involves careful assessment of the AS 4282 requirements. Whilst AS 4282 only refers to 'at the boundary of residential windows', the GBCA expect these levels to be applied at the site boundary, regardless of the distance to the nearest residential development.															
\$0.00	Emi	27.1	Light Pollution	Light Pollution to Night Sky	For the project to be awarded a point for this credit, the project must comply with AS 4282 'Control of the Otrusive Effects of Outdoor Lighting'	Yes	1	1	Low	46.0%	Should be easy to achieve but prevents the use of any uplighting to facade or landscape elements. All external lighting must have a maximum upward light ratio of 5%.															
\$0.00	Emi	28.0	Microbial Control	Legionella Impacts from Cooling Systems	1 point is awarded where the building either: - is naturally ventilated; - has waterless heat-rejection systems; or - has a water-based heat rejection system that includes measures for Legionella control and a Legionella Risk Management Plan has been provided	Yes	1	1	Low	47.0%	This can only be achieved with an air-cooled HVAC system or a evaporative system which includes a Legionella Risk Management Plan. Cooling towers cannot be made to comply with this credit.	Mech 14/09/18 Achievable. Air cooled systems used throughout														
\$0.00	Inn	30A	Innovative Technology or Process	Onsite Renewable Energy	Up to two (2) points may be awarded for installing onsite renewable energy sources on site. See 'Greenhouse Gas Emissions' credit for more information. 5% = 1 point. 10% = 2 points.	Yes	2	2	Medium	49.0%	Solar photovoltaic energy generally provides a good return on investment these days.  1 point achieved if renewable energy contributes 5% of the building load. 2 points achieved if renewable energy contributes 10% of the building load.															
\$0.00	Inn	30D.3	Innovation Challenge	Community Benefits	Provide community benefits based on needs analysis	Yes	1	1	Low	50.0%																
\$0.00	Opt	15E	Energy	Greenhouse Gas Emissions	Solar PV array	Yes	1.6	1.6	Low	51.6%		Client to include														
\$0.00	Inn	30C	Improving on Green Star Benchmarks	Lighting	The actual installed aggregate illumination power density is 50% less than the maximum illumination power densities defined in Table J6.2a;	Yes	1	1	Medium	52.6%		1. Electrical Consultant to design														
4 Star Sub total			(Minimum 45% + 5% = 50% required)			Total			53			52.6%														

DEPARTMENT OF PLANNING, LANDS AND HERITAGE	
DATE	FILE
16-Nov-2018	08-50167-1



# Lot 37 - Montario Quarter

## NCC Section J Compliance Report

### Prepared for:

Scott Archibald  
Iris Residential c/o  
**Cameron Chisholm Nicol**

### Prepared by:

**Nathan Lawry**  
Project No. 33380

\\WGE-PER-FS-01\PROJECTS\33380\PROJECT DOCUMENTATION\SUSTAINABILITY\SECTION J\SU-RE\_Montario  
Quarter\_Section J Report\_02.DOC

**Date:**  
17/10/2018

Ground Floor, 226 Adelaide Terrace, Perth WA 6000  
T: (08) 6222 7000 E: perth@wge.com.au W:  
www.wge.com.au



# Revision

REVISION	DATE	COMMENT	APPROVED BY
1	06/08/2018	For Development Application	PDS
2	17/10/2018	For Development Application – minor correction	PDS

## Qualifications to this Report

The following qualifications apply to this report:

- Information has been based on our understanding of the proposed building and documentation provided, as noted.
- This report outlines the scope of works required for NCC Section J compliance only.
- The project design team (including the Architect) will be required to review and consider the implications of these recommendations on their design for the project.
- For example:
  - Glazing selections have considered the thermal rating to the glazing and frame configurations only. The design team should also coordinate these recommendations with any specific acoustic, wind, structural, safety (during design and installation) or Architectural Design requirements for a particular project.
  - Different insulation products will have varying spatial allowances. The design team should coordinate the proposed insulation types, with specified R-values required throughout this report.

## Disclaimer

This energy model provides an estimate of the base building’s energy performance. This estimate is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building and its operation. As a result, the energy model results only represent an interpretation of the potential performance of the building. No guarantee or warrantee of building performance in practice can be based on energy modelling results alone.

The results generated from this analysis are based on specific criteria outlined in the NCC Volume One and are not considered to be a true representation of the actual operation of the building. The intent of these criteria is to permit the comparison of the estimated annual energy consumption of a Proposed Building against that of a Reference Building and therefore determine if a specific building has the ability to be energy efficient.

The thermal properties described in the following report are to meet the minimum energy efficiency requirements stated by the NCC provisions only. It does not directly account for any requirements for the following aspects: Thermal Comfort, Vapour Barriers and Condensation, Wind, Impact and Structural, Acoustic requirements, Fire Requirements.

# Revision

## File Records

For records the files used in this report are as follows:

- All modelling completed on the basis of the following documents:

Drawing #	Drawing Name	Revision
1	P18009_Montario Quarter_A01 01 to A07-03	SK

- The following inputs and outputs are the basis of assessment for this report:

### JV3

Record	Reference	Proposed
IES Thermal Model:	33380_Reference_Rev00_VE17	33380_Proposed_Rev00_VE17
Apache Vista File:	33380_Reference_Rev00	33380_Proposed_Rev02
Energy Analysis Results	33380_JV3_Energy Model_Template Rev 6.4 (VE2017) _00 (4).xlsm	
Reference Glazing Calculators	33380_Ground_CalculatorGlazingVolOne2014 33380_Lower Ground_Gym_CalculatorGlazingVolOne2014 33380_Lower Ground_Internal_CalculatorGlazingVolOne2014	NA

### NatHERS

Record	Reference
Heat Map Files	\\Wge-per-fs-01\Projects\33380\Project Documentation\Sustainability\Section J\NatHERS\ 33380_NatHERS Models_20180601\25_06_2018 16_43_46
Heat Map Results	33380_First Rate Brief and Results_20180601.xlsm
FR5 Files	\\Wge-per-fs-01\Projects\33380\Project Documentation\Sustainability\Section J\NatHERS\33380_NatHERS Models_20180601

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# 1. Executive Summary

This report has been prepared at the instruction of Iris Residential c/o Cameron Chisholm Nicol for the proposed development located at Corner Selby Street and Victoria Avenue, Shenton Park, WA, 6008.

The purpose of this investigation is to review the development against the NCC (2016) Section J Requirements utilising the following methodology:

## Commercial/Common Areas

- Part J1 to J2 – JV3 Performance Engineered Approach
- Part J3 – Deemed-to-Satisfy Prescriptive requirements
- Part J4 – No longer included in the NCC

## Residential Areas

- Part J1 Building Fabric Design;
- Part J2 Glazing; and
- Part J3 Building Sealing

For the State of WA BCA part J0.2 is applicable and requires residential dwellings to meet the following requirements: J0.2 Heating and cooling loads of sole-occupancy units of a Class 2 building or a Class 4 part

The sole-occupancy units of a Class 2 building or a Class 4 part of a building must—

- for reducing the heating or cooling loads—
  - collectively achieve an average energy rating of not less than 6 stars; and
  - individually achieve an energy rating of not less than 5 stars, using house energy rating software;

The house energy rating software applied for this assessment is FirstRate5.

In addition to the NCC energy efficiency requirements, the development needs to comply with the Multiple dwelling & Mixed Use Design Guidelines, which requires projects to demonstrate equivalency with a 4 star Greenstar rating (equivalency), demanding a minimum average of 7 star NatHERS.

## 1.1 Findings

Subject to the conditions and requirements noted in this report, the proposed development is considered to comply with the NCC Volume One Section J JV3 requirements.

It is noted that any variation to the conditions and requirements may impact the performance outcomes and impact the level of compliance.

### Commercial/ Common Areas

**Table 1 Energy consumption summary and comparison.**

Model	Energy Consumption (MWh)	Comparison	Compliance
Reference Building	207.90	-	-
Proposed Building	205.00	98.61%	<b>Compliant</b>

### Residential Areas

**Table 2 NatHERS Star rating results and summary**

Average Energy Intensity (Mj/M <sup>2</sup> )	Average Star Rating	Minimum Star Rating
41.0	7.6	5.5

## 1.2 Conditions and Requirements

### 1.2.1 Performance Requirements - Façade

The Façade shall comply with the performance requirements outlined within this report;

- Location of insulation and the building fabric thermal performance requirements
- Glazing thermal performance requirements

The thermal performance of all construction materials associated with this specification has been summarised in Section 3.1.3.

Reference is made to A.1.APPENDIX A for mark-up indicating extent of any added insulation included within the construction specifications.

### 1.2.2 Prescriptive Requirements

In addition to the performance related compliance requirements outlined above, there are further prescriptive Section J elements which must be complied with. These are outlined below and shall be complied with during the delivery phase of the project.

- A.1.APPENDIX F - Part J1 – Building Fabric
- A.1.APPENDIX G - Part J3 – Building Sealing

## 1.3 Building Fabric

### 1.3.1 Construction Thermal Performance

Overall thermal performance of the building fabric is shown below. Refer to A.1.APPENDIX A for the locations of insulation.

**Table 2 Building fabric thermal performance requirements.**

Roof Type	Ceiling Type	Solar Absorbance	Total Roof R-value (m <sup>2</sup> K/W)	Minimum Typical Insulation (m <sup>2</sup> K/W)	Example insulation requirement
Concrete	No Ceiling	0.7	4.2	4.0	e.g. 215 mm glasswool batts on ceiling

External Wall Type	Cavity Type	Total Wall R-value (m <sup>2</sup> K/W)	Typical Insulation R-value (m <sup>2</sup> K/W)	Example insulation requirement
Heavyweight	No Cavity	2.3	2.2	e.g. 140 mm glasswool batt or 50 mm rigid board

Internal Wall Type	Cavity Type	Total Wall R-value (m <sup>2</sup> K/W)	Typical Insulation R-value (m <sup>2</sup> K/W)	Example insulation requirement
Heavyweight	No Cavity	1.8	1.7	e.g. 140 mm glasswool batt or 40 mm rigid board

*Note that these internal walls reference walls dividing conditioned and unconditioned spaces*

Floor Type	In-slab / Screed system	Total Floor R-Value (m2K/W)	Typical Insulation R-value (m2K/W)	Example insulation requirement
Slab on Ground	No in-slab heating or cooling	Nil	Nil	NA
Suspended Slab above ventilated space	No in-slab heating or cooling	2	1.78	e.g. 40 mm rigid board
Suspended Slab above enclosed space	No in-slab heating or cooling	1	0.78	e.g. 25 mm rigid board

**Table 3 External glazing thermal performance requirements.**

Window Type	Location	U-value (W/m <sup>2</sup> K)	SHGC
<b>Single Low-e Clear</b>	All levels and orientations of Commercial and Residential Areas	4.59	0.62
<b>Double Glazing Clear</b> (optional for improved performance)	All levels and orientations of Residential Areas	3.54	0.61

Please notice that apartments comply with minimum requirements using Single Low e Glazing. Double glazing has been applied to apartments for testing and improve performance. See section 4 for Double Glazing results.

## 2. Introduction

### 2.1 Section J Objective

It is understood that the objective is as follows:

- Confirm compliance with the Parts J1 to J2 of Section J of the NCC Volume One (2016) utilizing the “JV3 – Verification using a Reference Building” method
- Confirm compliance with the Parts J3 Section J of the NCC Volume One (2016)
- Part J4 Section J of the NCC Volume One (2016) is not applicable.

It is noted that all modelling has been carried out in accordance with NCC Volume One Section J. Refer to A.1.APPENDIX E for Verification Using a Reference Building protocol for details describing the JV3 method relating to common areas. Residential areas have been assessed the First Rate 5, an accredited nationwide house energy rating scheme (NatHERS) software as per J0 requirements.

This report should be read in conjunction with all relevant plans and specifications and any supplementary regulatory information.

### 2.2 Site Context

The JV3 solution applies to the development area highlighted in Figure 1.



Figure 1 Applicable location(s) of the JV3 and NatHERS solution.

## 2.3 Development Overview

Property Title	Lot 37 - Montario Quarter
Address	Cnr Selby St And Victoria Av, Shenton Park, WA, 6008
Number of storeys	8
Building Description	Mixed Development
NCC Volume	2016
NCC Volume One Climate Zone	5
Name and Version of the Software used in the Analysis	IES Virtual Environment, v2017

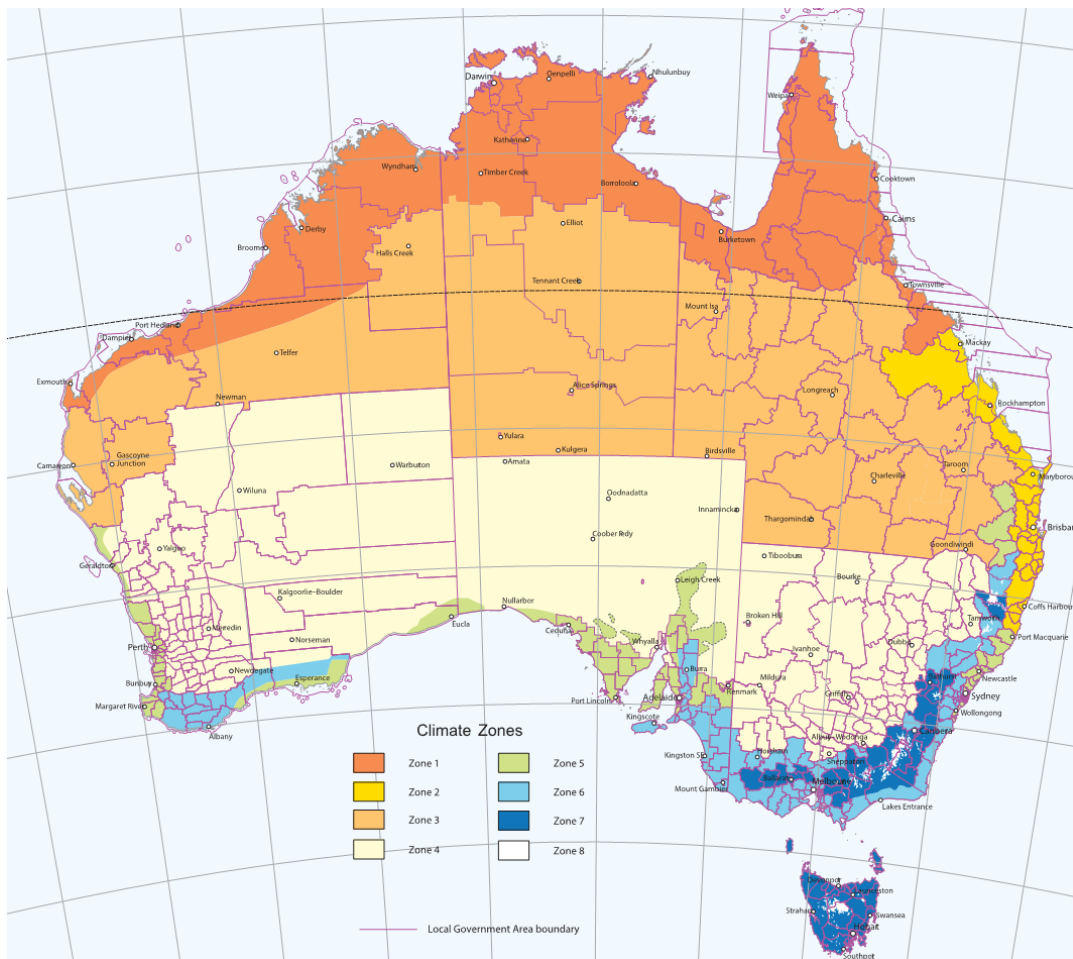


Figure 2: BCA Climate Map ([abcb.gov.au](http://abcb.gov.au))



## 2.4 Building Function and BCA Classification

The following Building Classifications (As defined by BCA) have been identified for this development:

Table 4: BCA Building Function and BCA Classification

BCA Class	Included/Excluded
1a	
1b	
2	✓
3	
4	
5	✓
6 (Café/Restaurant)	✓
6 (Shop)	✓
7a	
7b	
8	
8 (Laboratory)	
9a	
9a (Ward)	
9b	
9b (School)	
9c	
10	

## 3. JV3 Methodology

### 3.1 Non-Class 2 Area- JV3

Compliance is verified when it is determined that the estimated annual energy consumption of the Proposed Building with its services is not more than the estimated annual energy consumption of a (deemed-to-satisfy compliant) Reference Building when:

- i. The Proposed Building is modelled with the proposed services; and
- ii. The Proposed Building is modelled with the same services as the Reference Building.

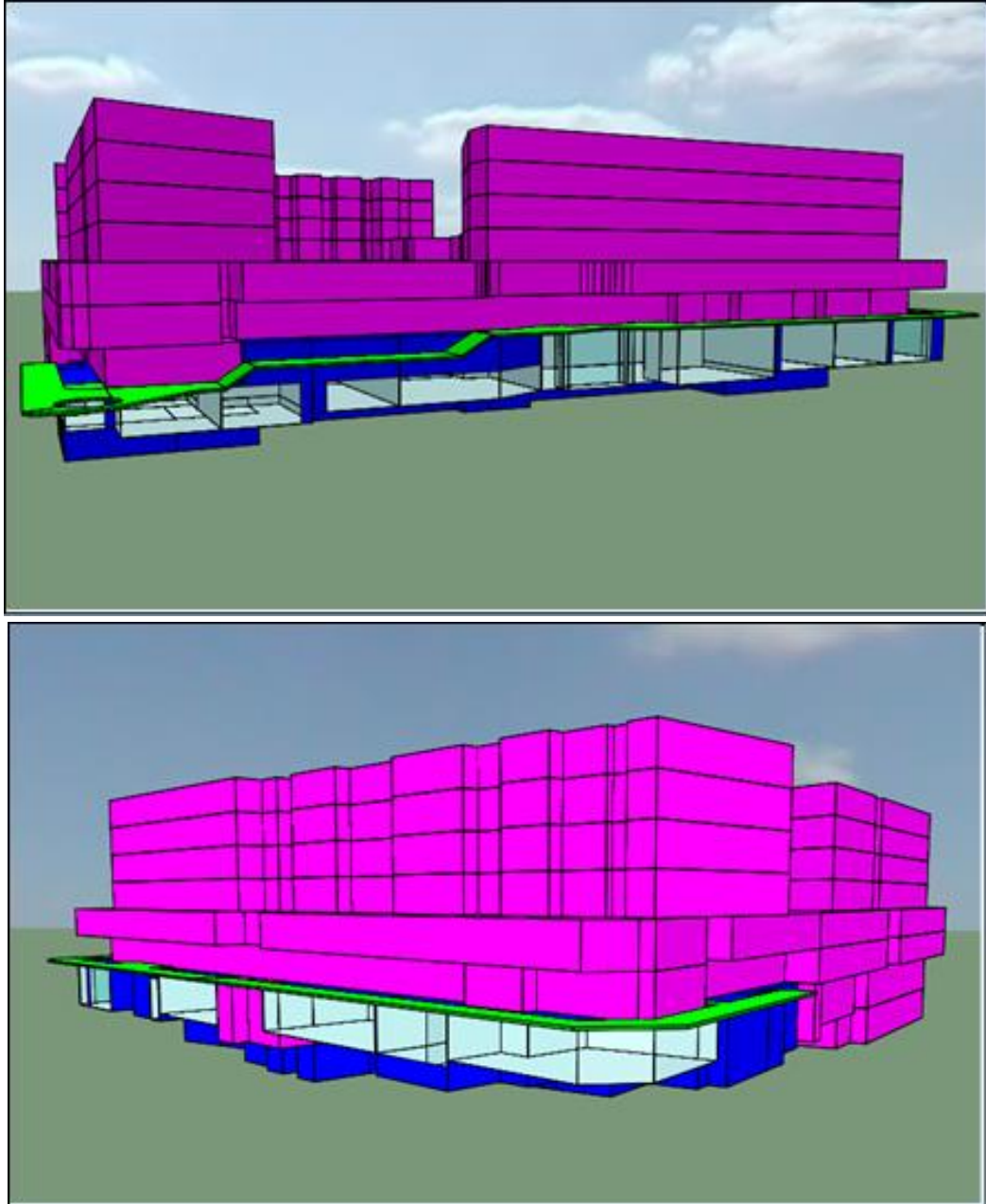


Figure 3 Images of the JV3 model.

### 3.1.1 Proposed Building with Reference Services

#### Construction Thermal Performance

Refer to Section 1.3 Building Fabric for overall thermal performance of the proposed building fabric. Refer to A.1.APPENDIX A for the locations of each insulation type.

## 3.2 Class 2 Areas- NatHERS

Compliance is verified when it is determined that the minimum star rating of any apartment is no less than 5.0 stars and the average of all apartments is no less than 6.0 stars. Star ratings are calculated using accredited software under the National House Energy Rating Scheme.

First Rate 5 is an approved software under this scheme and assesses the potential efficiency of the apartment's thermal envelope.

The development needs to comply with the Multiple dwelling & Mixed Use Design Guidelines, which requires projects to demonstrate equivalency with a 4 star Greenstar rating (equivalency), demanding a minimum average of 7 star NatHERS.

### 3.2.1 Modelling Assumptions

- Internal walls are uninsulated cavity panel.
- Draught seals present on all doors to external envelope
- Floor to ceiling height as per sections and elevations.
- Floor Coverings:
  - Carpet to bedrooms
  - Tiles to bathroom and laundry
  - Timber floor to kitchen and living (subject to future design selections)

### 3.2.2 Proposed Building Fabric

Overall thermal performance of the building fabric is presented in Section 1.3.1. Refer to Appendix A for the locations of insulation.

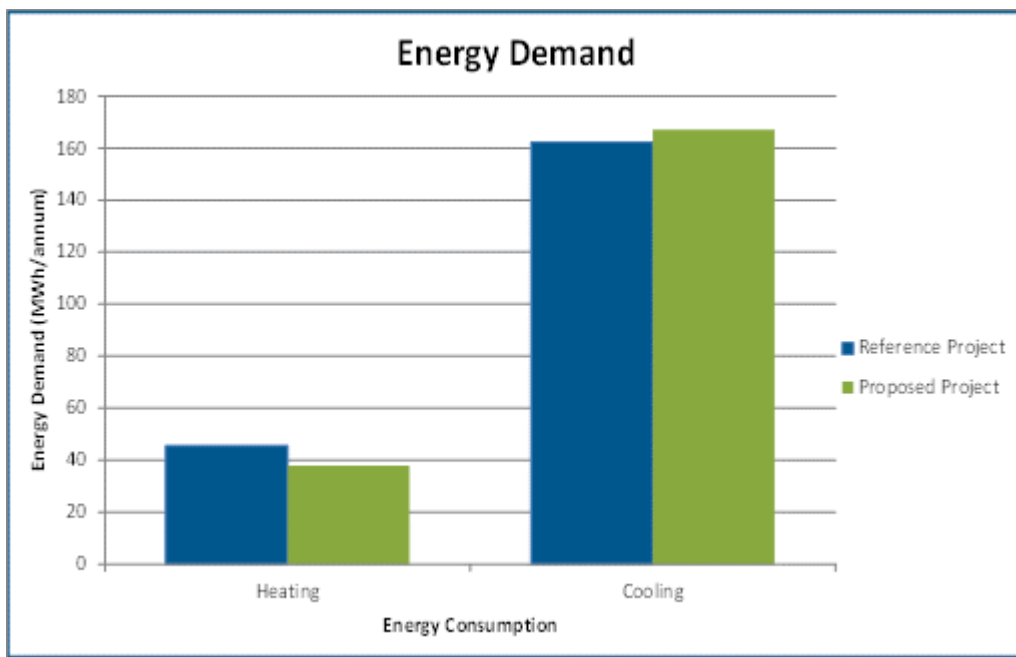
## 4. Modelling Results

### 4.1 Non-Class 2 Areas

The following annual energy consumption has been taken from the IES Virtual Environment Vista results file for the site:

Table 5 Modelling Results – Building Energy Consumption Results.

Energy Consumption	Source	Energy Demand (MWh/annum)		Energy Demand Improvement on Reference
		REFERENCE	PROPOSED	
Heating	Grid Electricity	45.6	37.8	17.1%
Cooling	Grid Electricity	162.3	167.2	-3.0%
<b>TOTAL</b>		<b>207.9</b>	<b>205</b>	<b>1.4%</b>



### 4.2 Class 2 apartments

The tables below summarises the results of the NatHERS assessments for the building. 850+ simulations have been completed using 13 different glazing values to test thermal performance and determine the sensitivities of the apartments design.

Table 12- NatHERS results for Class 2 areas

AVERAGE ENERGY INTENSITY (MJ/m <sup>2</sup> )	AVERAGE STAR RATING	MINIMUM STAR RATING
41	7.6	5.5

Based on the above results, there are no dwellings that require additional work.

The results for each thermally unique apartment type and the various glazing options simulated are presented below for reference:

NatHERS Star Rating Glazing Heat Map				
Climate Zone	13	Perth		
NatHERS Star Rating for Different Glazing Types				
Average Rating (6 Star required)		7.7	7.6	8.0
Minimum Rating (5 Star required)		4.8	5.5	5.8
Average Energy Intensity (MJ/m <sup>2</sup> )		38.5	41	35.0
Window Total U-Value (W/m <sup>2</sup> K)		6.45	4.59	3.54
Window Total SHGC		0.76	0.64	0.61
Apartment Name	Number of Apartments	Single Glazed Clear	Single Glazed Low e Clear	Double Glazed Clear
	85			
1A	1	6.6	7.3	7.7
1B	1	7.1	8	8.3
1B_F	1	6.8	7.8	8.3
1B_P	1	6.6	7.6	8.2
1B_S	1	5.7	7.2	7.8
1B_S_F	1	5.2	6.7	7.4
1B_S_P1	1	5.2	6.6	7.4
1B_S_P2	1	4.9	6.4	7.1
1C	1	8.3	8.9	9.2
1D	1	6.4	7.5	7.6
1D_R	1	5.1	6.2	6.4
2A	1	8.6	8.9	9.2
2A_E	1	8.1	8.6	8.9
2A_E_F	1	7.9	8.5	8.8
2A_E_P1	1	7.9	8.5	8.8
2A_E_P2	1	7.8	8.4	8.7
2A_E_P3	1	7.4	8.1	8.4
2A_E_R	1	7.0	7.7	8.1
2A_G	1	9.1	9.4	9.5
2A_P1	1	8.4	8.8	9.0
2A_P2	1	8.3	8.7	9.0
2B	1	5.6	6.1	6.6
2B_F	1	5.6	6	6.5
2B_P	1	5.3	6	6.5
2C	1	6.1	6.9	7.3
2C_P	1	5.4	6.2	6.7
2D	1	6.7	7.6	7.7
2D_R	1	5.4	6.4	6.6
2E	1	5.5	6.3	6.4
2E_R	1	4.8	5.5	5.8
2F	1	7.9	8.7	9.1
2G	1	7.5	8.4	8.9
2G_E	1	7.1	8	8.5
2G_E_F	1	6.9	8	8.4
2G_E_R	1	5.4	6.5	7.0
2G_F	1	7.4	8.3	8.8
2G_R	1	5.9	7	7.6
2G_S	1	6.9	8	8.5

2G_S1	1	6.7	8.4	8.9
2G_S1_F	1	5.4	8.4	8.7
2G_S1_F1	1	7.5	8.4	8.7
2G_S1_R	1	7.4	7	7.5
2G_S_F	1	7.4	7.9	8.3
2G_S_R	1	5.9	6.6	7.2
2G_W	1	6.8	7.9	8.2
2G_W_F	1	6.4	7.6	7.9
2G_W_R	1	5.2	6.3	6.8
2H	1	6.4	7.4	7.7
3A	1	6.9	7.9	8.3
3A_P	1	6.2	7.3	7.7
3B	1	8.3	8.8	9.0
3B_P	1	8.1	8.6	8.9
3B_W	1	7.8	8.3	8.4
3B_W1	1	6.4	7.3	7.3
3B_W1_R	1	6.8	6	6.1
3B_W_R	1	5.4	7.1	7.3
3C	1	7.6	8.4	8.7
3C_P	1	7.3	8.1	8.4
3D	1	6.1	7.2	7.5
3D_P	1	4.9	6	6.3
3E	1	8.3	8.9	9.1
3E_E	1	8.1	8.6	8.9
3E_E_F	1	8.1	8.6	8.9
3E_E_R	1	6.6	7.3	7.6
3E_F	1	8.2	8.8	9.1
3E_R	1	6.5	7.3	7.7
3E_W	1	7.7	8.3	8.4
3E_W_F	1	7.4	8.1	8.2
3E_W_R	1	5.9	6.6	6.8
3F	1	7.7	8.5	8.9
3F_F	1	7.6	8.4	8.7
3F_R	1	6.1	7	7.5
3G	1	6.6	7.8	8.3
3G_F	1	6.6	7.8	8.2
3G_R	1	4.9	5.9	6.5
3H	1	7.6	8.4	8.8
3H_F	1	7.6	8.4	8.7
3H_R	1	6.0	6.9	7.4
3I	1	7.4	8.2	8.4
3I_F	1	7.2	8.1	8.3
3I_R	1	5.6	6.6	6.9
Studio 1	1	8.4	8.4	8.5
Studio 2	1	7.2	7.8	8.0
Studio 2_P	1	6.9	7.5	7.8
TH1	1	7.3	7.5	7.6

## 4.3 Conclusion

The modelling results indicate that for commercial and common use areas, the proposed building with the reference services (case 2) will perform better than the reference (DTS) scenario.

Therefore, it can be confirmed that the proposed building with the design specification outlined within this report meets the requirements of the NCC Volume One Section J1 to J2 utilising the “JV3 – Verification using a Reference Building” method.

In regards to the Residential areas, thermal simulations have been conducted with several glazing variations iteratively modelled. All apartments can be made compliant with a single glazed low-e glass with clear with aluminium frame.

### Professional Engineer / Appropriately Qualified Person



**Name: Prasanna Suraweera**

**Date: 17/10/2018**

# APPENDIX A Insulation Mark-ups



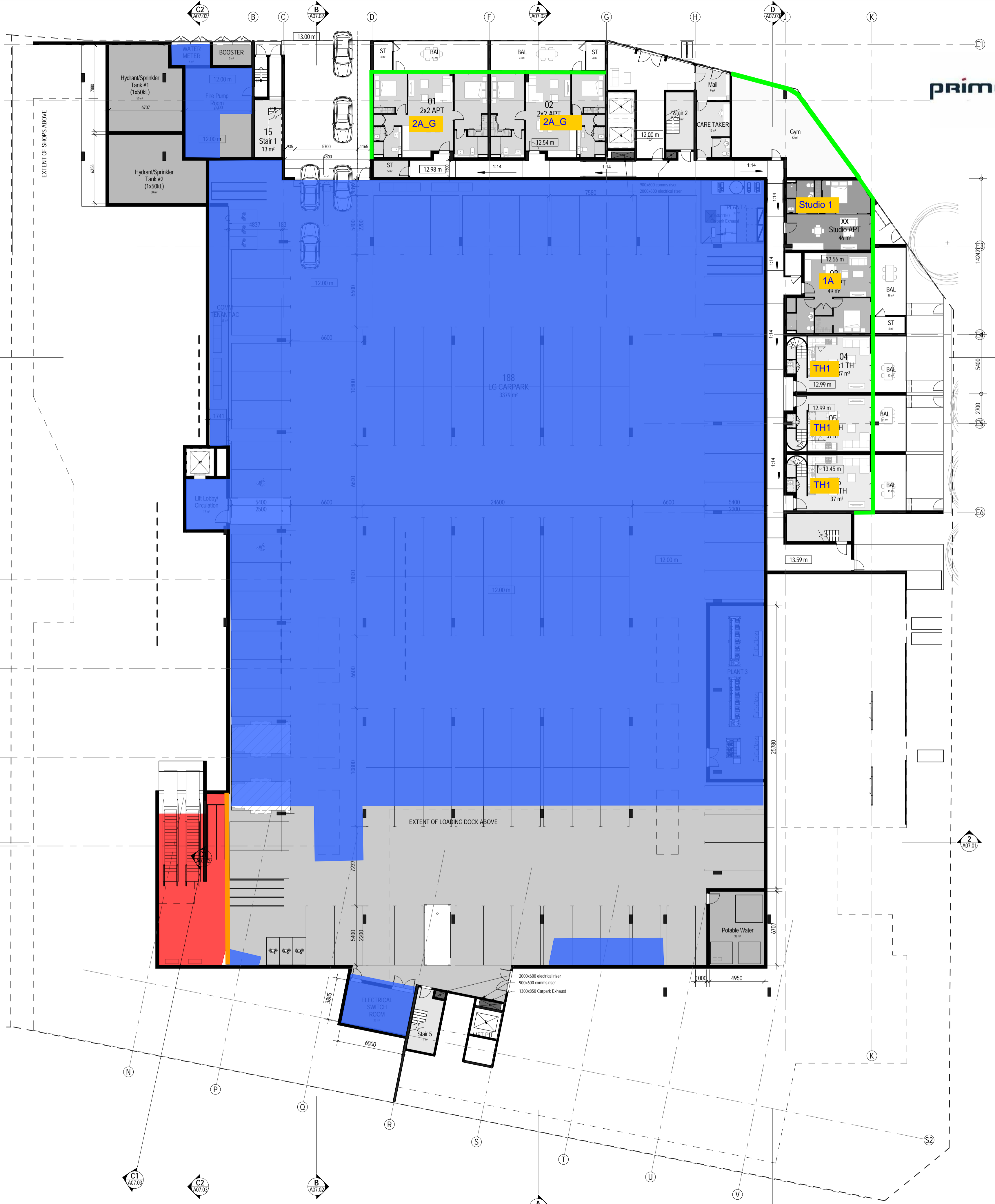
Parking Schedule - Lower Ground	
Family and Type	Description
-01 Lower Ground	
Bike Rack - Double (AS 2890.3)_CCN: Type	Resi Bicycle Bay
Bike Rack - Double (AS 2890.3)_CCN: Type: 1	
Motorcycle Parking (AS 2890.1)_CCN: 1200 x 2500 Motorcycle	Resi Motorcycle Bay
Motorcycle Parking (AS 2890.1)_CCN: 1200 x 2500 Motorcycle: 6	
Parking Space (AS 2890.1)_CCN1: 2600 x 5400 SHORT TERM BAY	Standard Car Bay
Parking Space (AS 2890.1)_CCN1: 2600 x 5400 SHORT TERM BAY: 108	
Parking Space (AS 2890.1)_CCN: 2400 x 5400 Disabled Shared Area	Small Car Bay
Parking Space (AS 2890.1)_CCN: 2400 x 5400 Disabled Shared Area: 2	
Parking Space (AS 2890.1)_CCN: 2600 x 5400 Disabled Bay 2600	Accessible Compliant Bay
Parking Space (AS 2890.1)_CCN: 2600 x 5400 Disabled Bay 2600: 2	

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
 DATE: 15-Nov-2018  
 FILE: 4-10-18-2018-08-2018-1

primewest

Iris Residential

CAMERON CHISHOLM NICOL



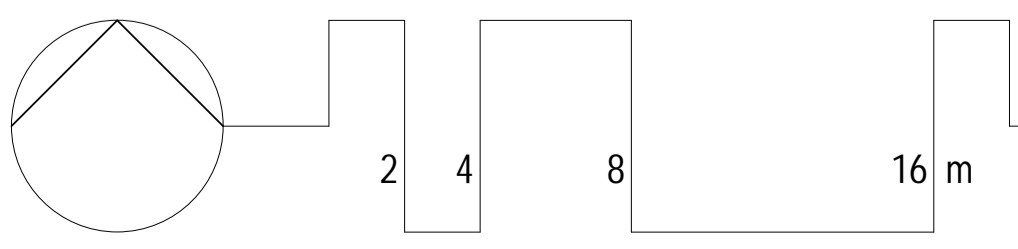
- 1x1 APT
- 1x1 TERR GR
- 2x2 APT
- AMENITIES
- CIRCULATION
- GYM
- PARKING
- SERVICES
- SERVICES
- STORES
- Studio APT

### Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GRIEVE ENGINEERS**  
 PROJECT : Lot 37 - Montario Quarter  
 PROJECT NUMBER : 33380-PER-G  
 SKETCH TITLE : Insulation Mark-up  
 AUTHOR : KPEN  
 DATE : 29/05/2018

PRELIMINARY



GENERAL ARRANGEMENT - LOWER GROUND

SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

**A03.01**  
SK

27-04-2018

Parking Schedule - Ground

Family and Type	Description
00 Ground	
Bike Rack - Single sided (AS 2890.3)_CCN: Type	Resi Bicycle Bay
Bike Rack - Single sided (AS 2890.3)_CCN: Type: 11	
Parking Space (AS 2890.1)_CCN1: 2600 x 5400 SHORT TERM BAY	Standard Car Bay
Parking Space (AS 2890.1)_CCN1: 2600 x 5400 SHORT TERM BAY: 36	
Parking Space (AS 2890.1)_CCN: 2400 x 5400 Disabled Shared Area	Small Car Bay
Parking Space (AS 2890.1)_CCN: 2400 x 5400 Disabled Shared Area: 1	
Parking Space (AS 2890.1)_CCN: 2600 x 5400 Disabled Bay 2600	Accessible Compliant Bay
Parking Space (AS 2890.1)_CCN: 2600 x 5400 Disabled Bay 2600: 1	

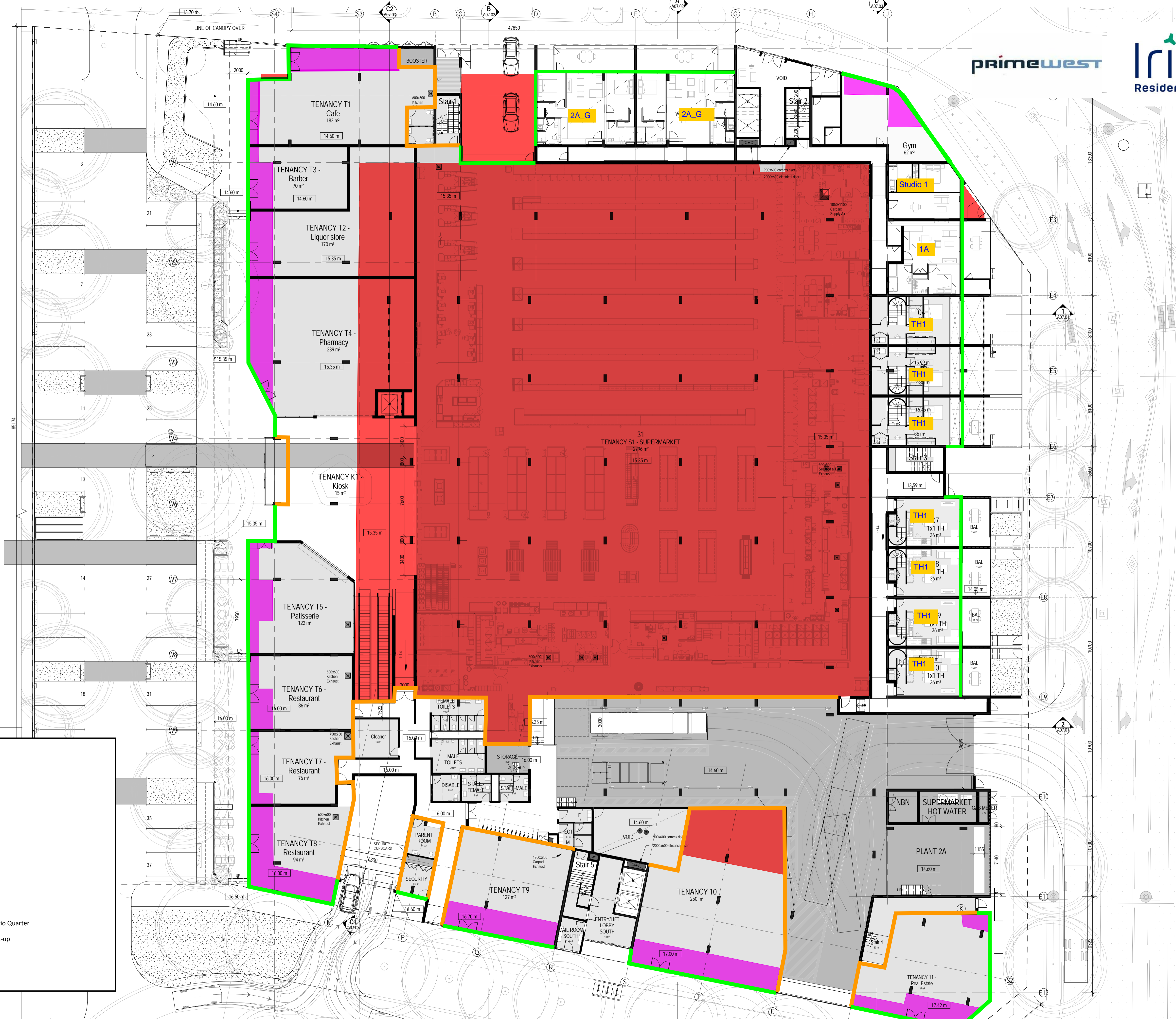
DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
FILE: 16-049-2018-08-0000-1

1 A03.01

**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GRIEVE ENGINEERS**  
PROJECT: Lot 37 - Montario Quarter  
PROJECT NUMBER: 33380-PER-G  
SKETCH TITLE: Insulation Mark-up  
AUTHOR: KPEN  
DATE: 29/05/2018



primewest

Iris Residential

CAMERON CHISHOLM NICOL

- 1x1 TERR GR
- 1x1 TERR MEZZ
- AMENITIES
- CIRCULATION
- COMMERCIAL
- GYM
- SERVICES
- SERVICES
- SUPERMARKET

TREE RETENTION / PLANTING LEGEND

- EXISTING TREE
- NEW TREE
- TREE TO BE REMOVED

GENERAL ARRANGEMENT - GROUND

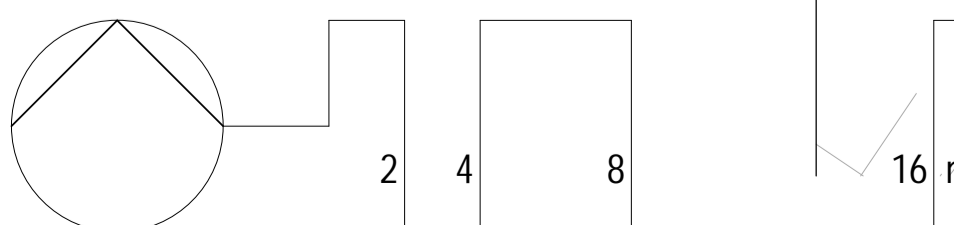
SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

PRELIMINARY

**A03.02**  
SK

27-04-2018





- 1x1 APT
- 1x1 TERR MEZZ
- 1x1+S APT
- 2x1 APT
- 2x2 APT
- AMENITIES
- CIRCULATION
- COMMERCIAL
- SERVICES
- SERVICES
- STORES
- Studio APT
- SUPERMARKET

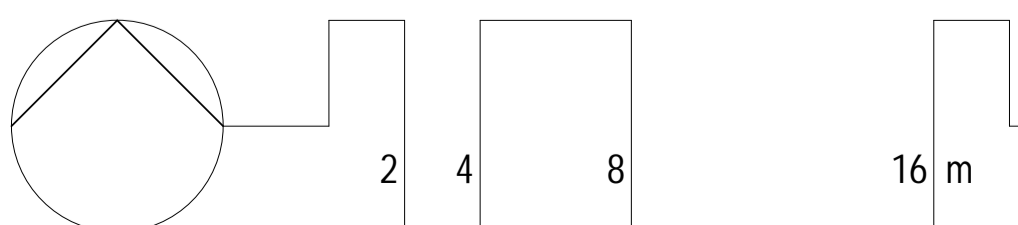
DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
DATE: 15-04-2018  
FILE: 08-2018-71

**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GRIEVE ENGINEERS**

PROJECT : Lot 37 - Montario Quarter  
PROJECT NUMBER : 33380-PER-G  
SKETCH TITLE : Insulation Mark-up  
AUTHOR : KPEN  
DATE : 29/05/2018



GENERAL ARRANGEMENT - MEZZANINE

SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

**A03.03**  
SK

RESI PARKING - LEVEL 01	
Resi Bicycle Bay	32
Resi Motorcycle Bay	16
Resi Standard Car Bay	112
Resi Tandem Car Bay	20

RESI PARKING - LEVEL 02	
Resi Bicycle Bay	32
Resi Motorcycle Bay	16
Resi Standard Car Bay	117
Resi Tandem Car Bay	18

RESI STORE - LEVEL 01	
BALCONY	12
CARPARK	9
CORRIDOR	9

RESI STORE - LEVEL 02	
BALCONY	12
CARPARK	9
CORRIDOR	10

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
DATE: 14-05-2018  
FILE: 08-2018-7-1

primewest

Iris Residential

CAMERON CHISHOLM NICOL

- 1x1 APT
- 2x1 APT
- 2x2 APT
- 2x2 APT
- 3x2 APT
- AMENITIES
- CIRCULATION
- PARKING
- STORES
- Studio APT



**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

WOOD & GREVE ENGINEERS  
PROJECT: Lot 37 - Montario Quarter  
PROJECT NUMBER: 33380-PER-G  
SKETCH TITLE: Insulation Mark-up  
AUTHOR: KPEN  
DATE: 29/05/2018

GENERAL ARRANGEMENT - LEVEL 1

SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

A03.04

27-04-2018

SK

RESI PARKING - LEVEL 01	
Resi Bicycle Bay	32
Resi Motorcycle Bay	16
Resi Standard Car Bay	112
Resi Tandem Car Bay	20

RESI PARKING - LEVEL 02	
Resi Bicycle Bay	32
Resi Motorcycle Bay	16
Resi Standard Car Bay	117
Resi Tandem Car Bay	18

RESI STORE - LEVEL 01	
BALCONY	12
CARPARK	9
CORRIDOR	9

RESI STORE - LEVEL 02	
BALCONY	12
CARPARK	9
CORRIDOR	10

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
FILE # 15-049-2018 08/20/2018

primewest

Iris Residential

CAMERON CHISHOLM NICOL

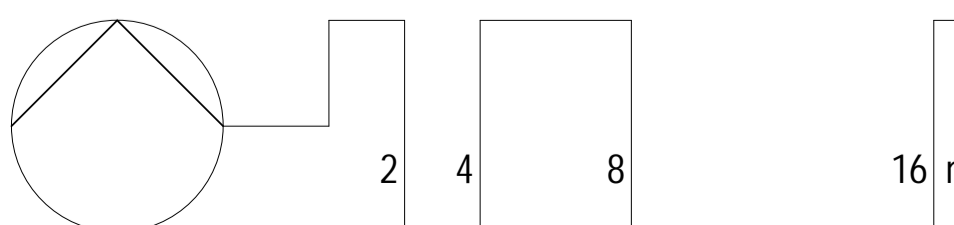


- 1x1 APT
- 2x1 APT
- 2x2 APT
- 2x2 APT
- 3x2 APT
- CIRCULATION
- PARKING
- SERVICES
- STORES
- Studio APT

**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GREVE ENGINEERS**  
PROJECT : Lot 37 - Montario Quarter  
PROJECT NUMBER : 33380-PER-G  
SKETCH TITLE : Insulation Mark-up  
AUTHOR : KPEN  
DATE : 29/05/2018



**GENERAL ARRANGEMENT - LEVEL 2**

SCALE 1:200 (A1)

**LOT 37 - MONTARIO QUARTER**

**A03.05**  
SK

27-04-2018

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
DATE: 14-Nov-2018  
FILE: 08-2018-71

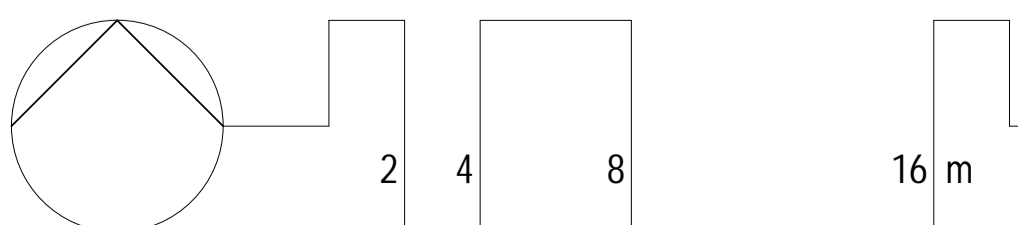


- 2x2 APT
  - 3x2 APT
  - AMENITIES
  - CIRCULATION
  - STORES
- |                       |    |
|-----------------------|----|
| RESI STORE - LEVEL 03 |    |
| CORRIDOR              | 16 |

### Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**PROJECT :** Lot 37 - Montario Quarter  
**PROJECT NUMBER :** 33380-PER-G  
**SKETCH TITLE :** Insulation Mark-up  
**AUTHOR :** KPEN  
**DATE :** 29/05/2018



GENERAL ARRANGEMENT - LEVEL 3

SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

**A03.06**  
SK

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
DATE: 15-04-2018  
FILE: 08-2018-71



- 2x2 APT
- 3x2 APT
- AMENITIES
- CIRCULATION

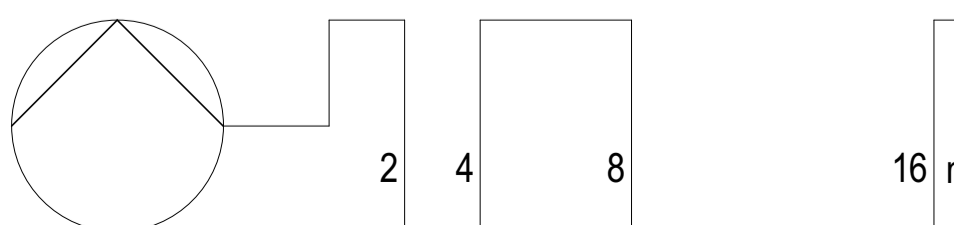
RESI STORE - LEVEL 04	
CORRIDOR	17

**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GREVE ENGINEERS**

PROJECT : Lot 37 - Montario Quarter  
 PROJECT NUMBER : 33380-PER-G  
 SKETCH TITLE : Insulation Mark-up  
 AUTHOR : KPEN  
 DATE : 29/05/2018



GENERAL ARRANGEMENT - LEVEL 4

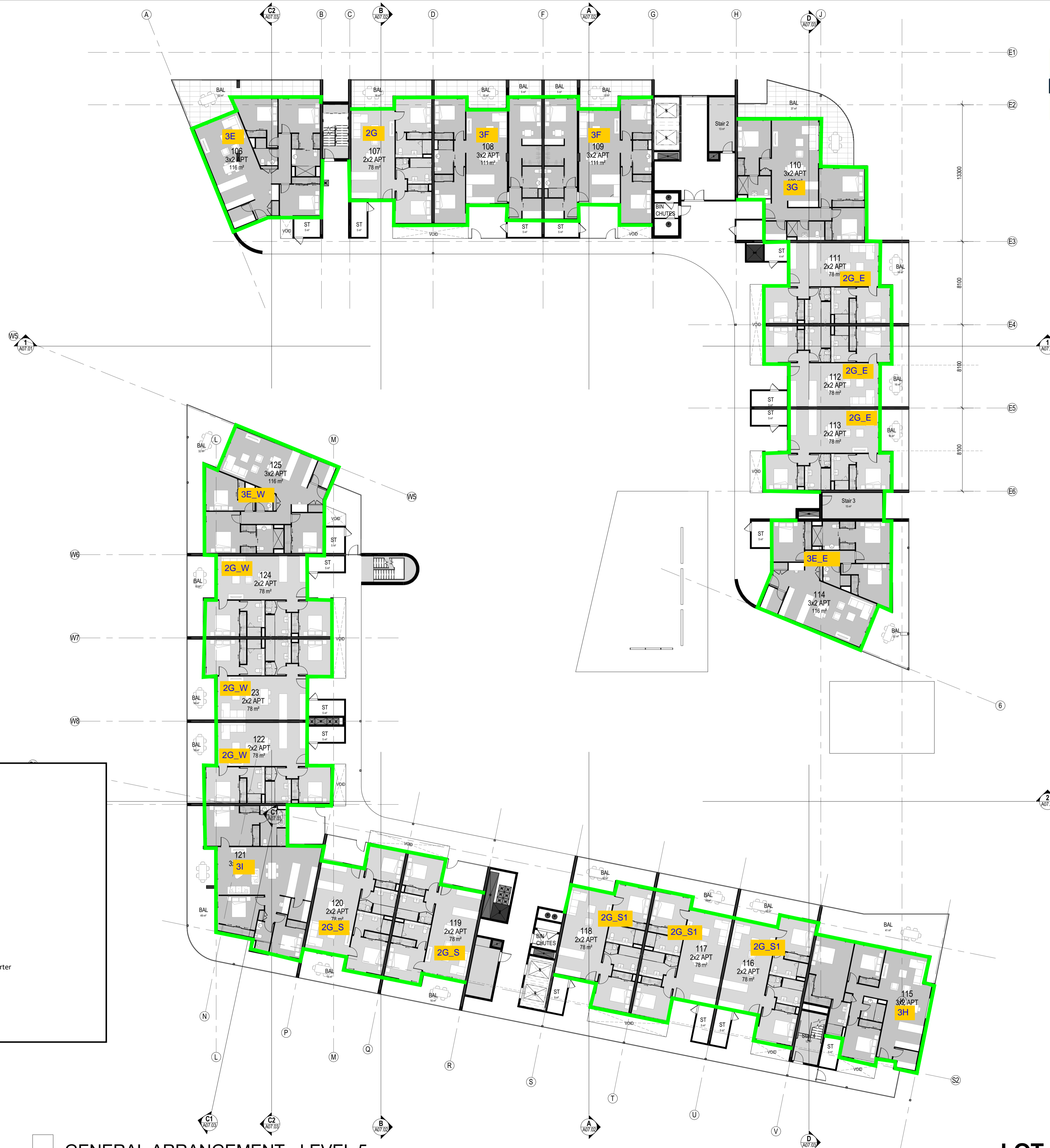
SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

**A03.07**  
SK

- 2x2 APT
- 3x2 APT
- AMENITIES
- CIRCULATION

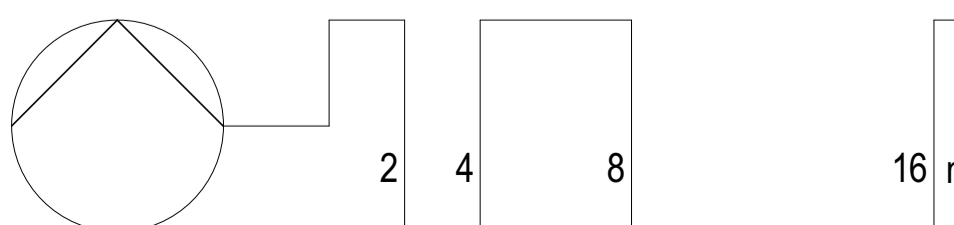
RESI STORE - LEVEL 05	
CORRIDOR	17



**Legend**

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GRIEVE ENGINEERS**  
 PROJECT : Lot 37 - Montario Quarter  
 PROJECT NUMBER : 33380-PER-G  
 SKETCH TITLE : Insulation Mark-up  
 AUTHOR : KPEN  
 DATE : 29/05/2018



**GENERAL ARRANGEMENT - LEVEL 5**

SCALE 1:200 (A1)

**LOT 37 - MONTARIO QUARTER**

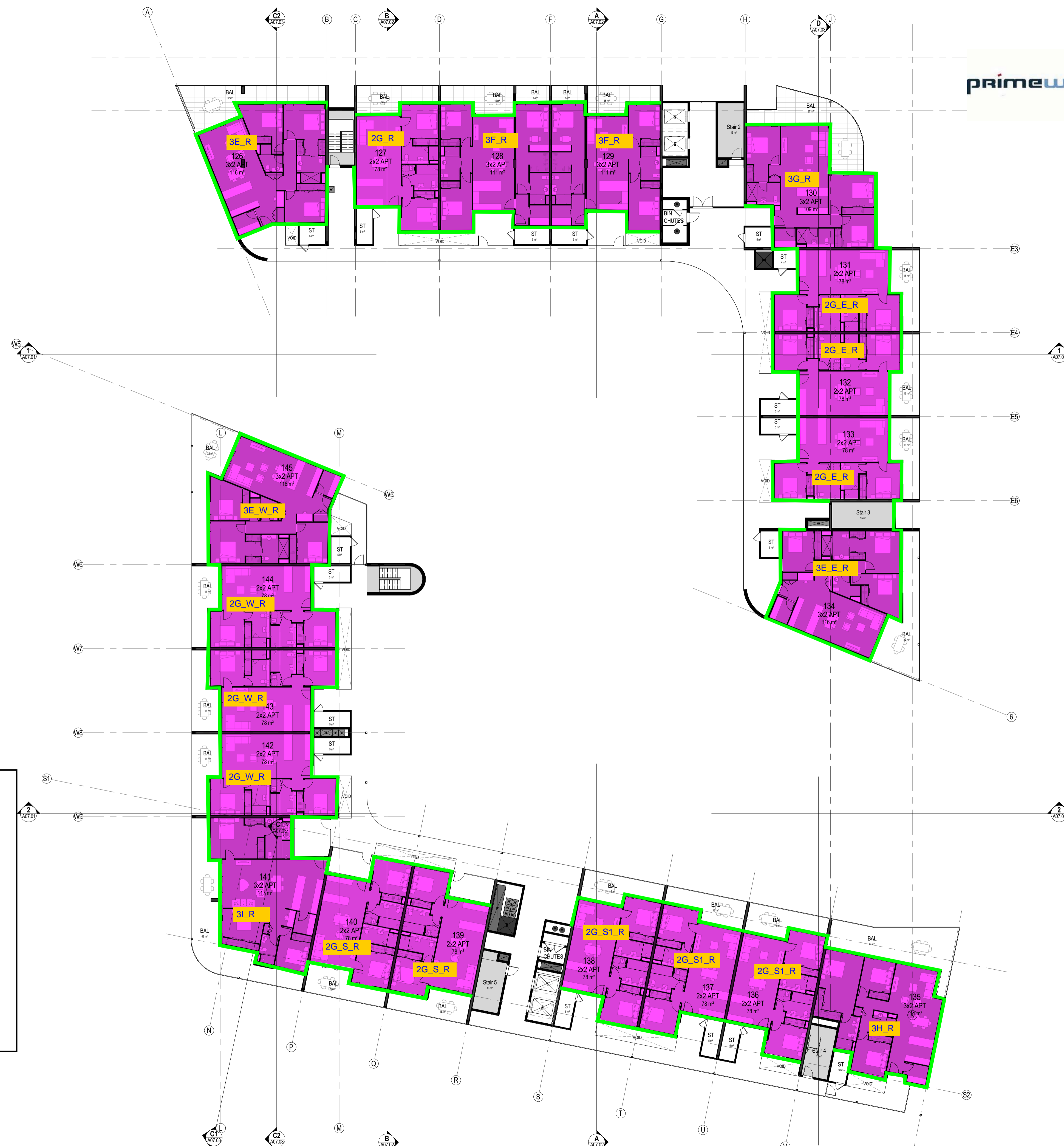
**A03.08**  
SK

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
 DATE: 15-04-2018  
 FILE: 08-2018-71



- 2x2 APT
- 3x2 APT
- CIRCULATION

RESI STORE - LEVEL 06	
CORRIDOR	17

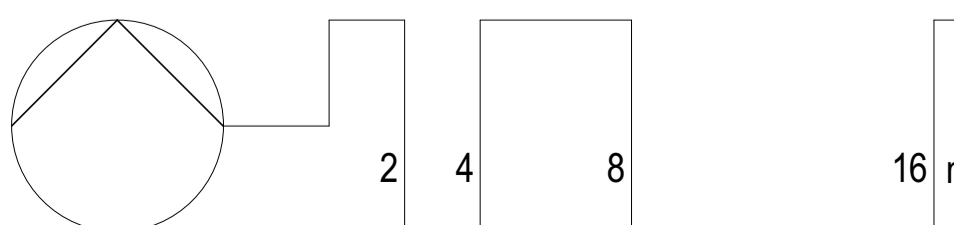


DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
 DATE: 15-04-2018  
 FILE: 08-2018-71

### Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**PROJECT :** Lot 37 - Montario Quarter  
**PROJECT NUMBER :** 33380-PER-G  
**SKETCH TITLE :** Insulation Mark-up  
**AUTHOR :** KPEN  
**DATE :** 29/05/2018



GENERAL ARRANGEMENT - LEVEL 6

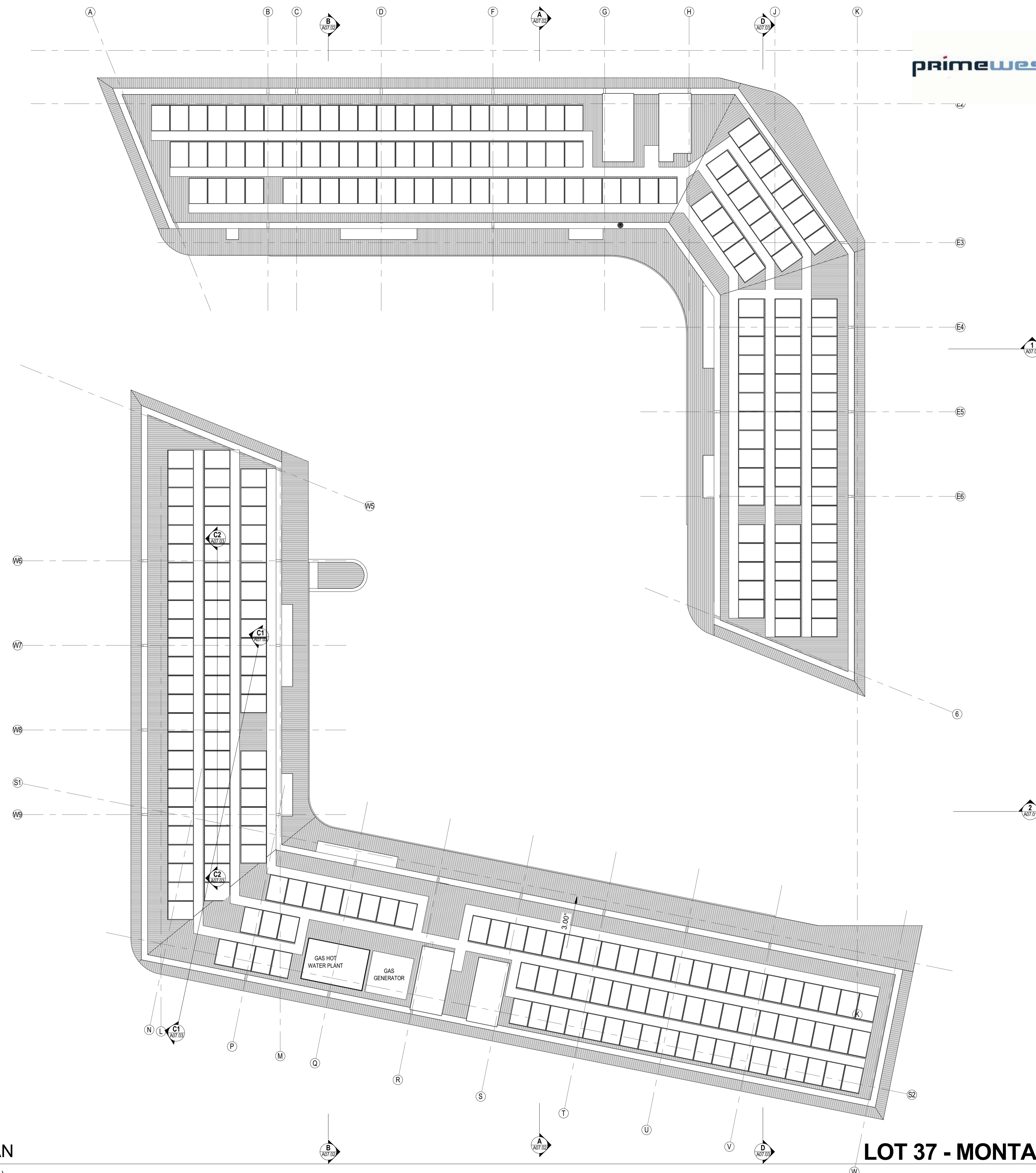
SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

A03.09

SK

DEPARTMENT OF PLANNING, LANDS AND HERITAGE  
DATE: 15-04-2018  
FILE: 08-2018-71

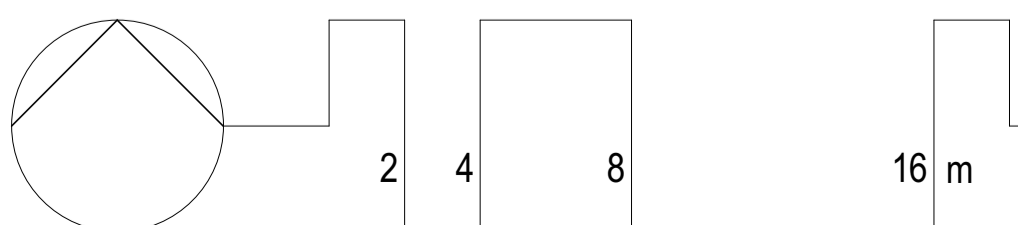


### Legend

- Total R4.2 to Roof and ceiling
- Total R2.0 to Soffit
- Total R1.0 to Soffit
- Total R2.8 to External Walls
- Total R1.8 to Internal Walls

**WOOD & GRIEVE ENGINEERS**

PROJECT : Lot 37 - Montario Quarter  
 PROJECT NUMBER : 33380-PER-G  
 SKETCH TITLE: Insulation Mark-up  
 AUTHOR : KPEN  
 DATE : 29/05/2018



ROOF PLAN  
SCALE 1:200 (A1)

LOT 37 - MONTARIO QUARTER

**A05.01**  
SK

# APPENDIX B Reference Glazing Calculations

DEPARTMENT OF PLANNING, LANDS AND HERITAGE	
DATE	FILE
16-Nov-2018	08-50167-1

# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description

**Lot 37 - Montario Quarter**

Application

**shop display**

Climate zone

**5**

Storey

**Lower Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A									<b>49m<sup>2</sup></b>
Option B									n/a

Option A

Option B

Glazing area (A) ..... **48m<sup>2</sup>**

Number of rows preferred in table below **1** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)						
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m <sup>2</sup> )	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m <sup>2</sup> )	Element share of % of allowance used
<b>1</b>	<b>Wint</b>	<b>internal</b>		<b>3.07</b>	<b>15.60</b>		<b>4.6</b>	<b>0.80</b>			<b>2.00</b>	0.00	0.64	0.54	47.89	<b>100% of 98%</b>

**IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR**

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

*if inputs are valid*



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# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description

**Lot 37 - Montario Quarter-Gym**

Application

**Class 3**

Climate zone

**5**

Storey

**Lower Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	<b>30m<sup>2</sup></b>	<b>61.3m<sup>2</sup></b>							
Option B									n/a

Option A

Option B

Glazing area (A) **18.3m<sup>2</sup>** **37.3m<sup>2</sup>**

Number of rows preferred in table below

**2** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS							SHADING		CALCULATED OUTCOMES OK (if inputs are valid)							
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m <sup>2</sup> )	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m <sup>2</sup> )	Element share of % of allowance used
1	<b>Wn01</b>	<b>N</b>		<b>3.50</b>	<b>5.22</b>		<b>8.0</b>	<b>0.64</b>	<b>2.900</b>	<b>3.500</b>	0.83	0.00	0.26	0.34	18.27	100% of 98%
2	<b>Wne01</b>	<b>NE</b>		<b>3.50</b>	<b>10.65</b>		<b>8.0</b>	<b>0.15</b>				0.00	1.00	1.00	37.28	100% of 92%

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Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

*if inputs are valid*



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# NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description

**Lot 37 - Montario Quarter**

Application

**shop display**

Climate zone

**5**

Storey

**Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	91.2m <sup>2</sup>		43.7m <sup>2</sup>	15.3m <sup>2</sup>	207m <sup>2</sup>	34.2m <sup>2</sup>	383m <sup>2</sup>		118m <sup>2</sup>
Option B									n/a
Glazing area (A)	72.5m <sup>2</sup>	.....	31.9m <sup>2</sup>	15.3m <sup>2</sup>	198m <sup>2</sup>	15.2m <sup>2</sup>	286m <sup>2</sup>	.....	48m <sup>2</sup>

Number of rows preferred in table below

**20** (as currently displayed)

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m <sup>2</sup> )	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m <sup>2</sup> )	Element share of % of allowance used
1	Wn01	N		5.40	2.70		8.0	0.80	device		2.00	0.00	0.00	0.19	14.58	11% of 36%
2	Wn02	N		3.15	4.20		8.0	0.80	6.200	3.150	1.97	0.00	0.00	0.19	13.23	10% of 36%
3	Wn03	N		3.15	8.00		8.0	0.80	2.700	3.150	0.86	0.00	0.21	0.33	25.20	65% of 36%
4	Wn04	N		2.50	7.80		8.0	0.80	9.750	2.500	3.90	0.00	0.00	0.19	19.50	14% of 36%
5	We01	E		3.38	9.45		8.0	0.61	2.700	3.380	0.80	0.00	0.43	0.49	31.94	100% of 99%
6	Wse01	SE		3.38	4.54		4.0	0.40	2.800	3.380	0.83	0.00	0.61	0.52	15.34	100% of 100%
7	Ws01	S		4.75	8.00		4.7	0.80	2.700	4.750	0.57	0.00	0.82	0.75	38.00	19% of 99%
8	Ws02	S		4.15	3.00		4.7	0.80	5.100	4.150	1.23	0.00	0.71	0.62	12.45	6% of 99%
9	Ws03	S		4.05	12.00		4.7	0.80	2.600	4.050	0.64	0.00	0.80	0.73	48.60	25% of 99%
10	Ws04	S		3.75	15.85		4.7	0.80	2.500	3.750	0.67	0.00	0.80	0.72	59.44	30% of 99%
11	Ws05	S		3.38	11.72		4.7	0.80	2.300	3.380	0.68	0.00	0.79	0.72	39.61	20% of 99%
12	Wsw01	SW		2.40	6.33		8.0	0.70	3.700	5.400	0.00	3.00	1.00	1.00	15.19	100% of 100%
13	Ww01	W		3.15	2.73		8.0	0.36	9.050	3.150	2.87	0.00	0.00	0.26	8.60	2% of 100%
14	Ww02	W		3.15	7.05		8.0	0.36	3.750	3.150	1.19	0.00	0.22	0.38	22.21	7% of 100%
15	Ww03	W		3.15	6.00		8.0	0.36	3.750	4.500	0.83	1.35	0.94	0.87	18.90	8% of 100%
16	Ww04	W		2.40	15.30		8.0	0.36	3.750	4.500	0.00	2.10	1.00	1.00	36.72	17% of 100%
17	Ww05	W		5.40	6.00		8.0	0.36	5.100	5.400	0.94	0.00	0.39	0.46	32.40	10% of 100%
18	Ww06	W		5.40	12.00		8.0	0.36	3.600	5.400	0.67	0.00	0.61	0.57	64.80	22% of 100%
19	Ww07	W		4.75	21.46		8.0	0.36	3.600	4.750	0.76	0.00	0.53	0.53	#####	33% of 100%
20	Wint	internal		5.40	8.80		8.0	0.80			2.00	0.00	0.64	0.54	47.52	100% of 78%

**IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR**

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*if inputs are valid*

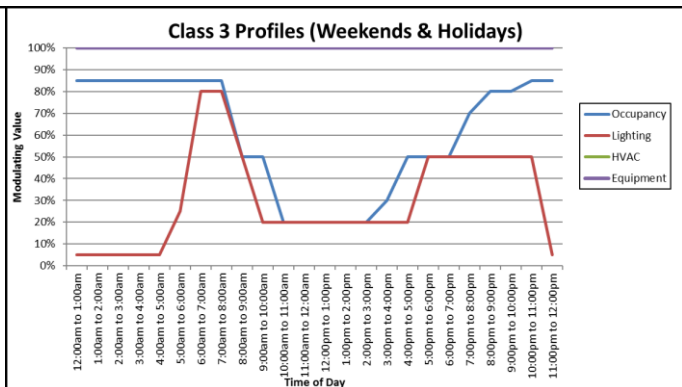
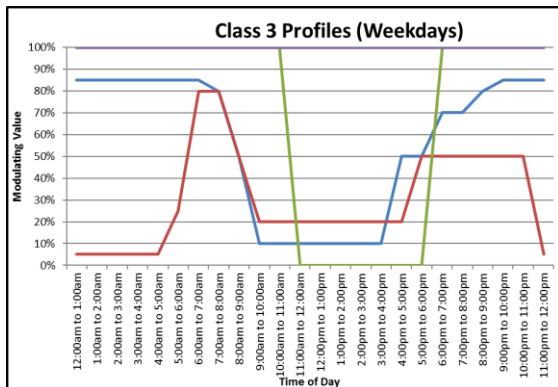


# APPENDIX C Occupancy and Operational Profiles

The below tables are an extract from NCC Volume One Section J, Specification JV, Occupancy and Operational profiles.

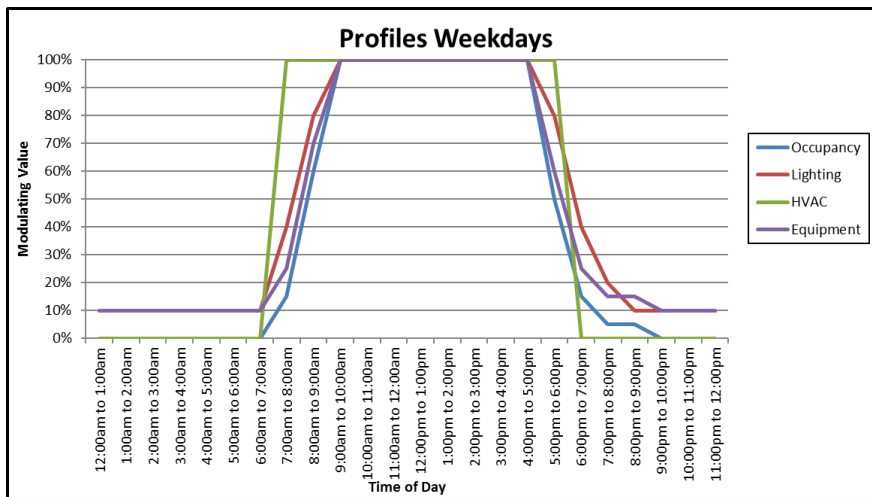
## Class 3 Profiles

Hours of Day (Local Standard Time)	Occupancy (Monday – Friday)	Occupancy (Saturday, Sunday and holidays)	Lighting (Daily)	Lighting (Daily)	HVAC (Monday – Friday)	HVAC (Saturday, Sunday and holidays)
12:00am to 1:00am	85%	85%	5%	100%	On	On
1:00am to 2:00am	85%	85%	5%	100%	On	On
2:00am to 3:00am	85%	85%	5%	100%	On	On
3:00am to 4:00am	85%	85%	5%	100%	On	On
4:00am to 5:00am	85%	85%	5%	100%	On	On
5:00am to 6:00am	85%	85%	25%	100%	On	On
6:00am to 7:00am	85%	85%	80%	100%	On	On
7:00am to 8:00am	80%	85%	80%	100%	On	On
8:00am to 9:00am	50%	50%	50%	100%	On	On
9:00am to 10:00am	10%	50%	20%	100%	Off	On
10:00am to 11:00am	10%	20%	20%	100%	Off	Off
11:00am to 12:00am	10%	20%	20%	100%	Off	Off
12:00pm to 1:00pm	10%	20%	20%	100%	Off	Off
1:00pm to 2:00pm	10%	20%	20%	100%	Off	Off
2:00pm to 3:00pm	10%	20%	20%	100%	Off	Off
3:00pm to 4:00pm	10%	30%	20%	100%	Off	Off
4:00pm to 5:00pm	50%	50%	20%	100%	On	On
5:00pm to 6:00pm	50%	50%	50%	100%	On	On
6:00pm to 7:00pm	70%	50%	50%	100%	On	Off
7:00pm to 8:00pm	70%	70%	50%	100%	On	Off
8:00pm to 9:00pm	80%	80%	50%	100%	On	Off
9:00pm to 10:00pm	85%	80%	50%	100%	On	Off
10:00pm to 11:00pm	85%	85%	50%	100%	On	Off
11:00pm to 12:00pm	85%	85%	5%	100%	On	Off
<b>Equivalent Peak Hours</b>	<b>13.7</b>	<b>14.6</b>	<b>7.3</b>	<b>24.0</b>	<b>17</b>	<b>12</b>



**Class 5 Profiles**

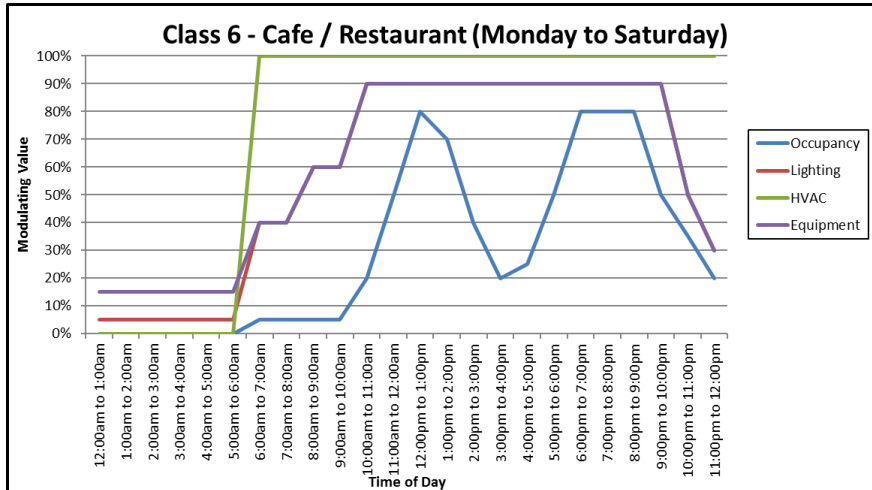
Hours of Day (Local Standard Time)	Occupancy (Monday – Friday)	Lighting (Monday – Friday)	Equipment (Monday – Friday)	HVAC (Monday – Friday)
12:00am to 1:00am	0%	10%	10%	Off
1:00am to 2:00am	0%	10%	10%	Off
2:00am to 3:00am	0%	10%	10%	Off
3:00am to 4:00am	0%	10%	10%	Off
4:00am to 5:00am	0%	10%	10%	Off
5:00am to 6:00am	0%	10%	10%	Off
6:00am to 7:00am	0%	10%	10%	Off
7:00am to 8:00am	15%	40%	25%	On
8:00am to 9:00am	60%	80%	70%	On
9:00am to 10:00am	100%	100%	100%	On
10:00am to 11:00am	100%	100%	100%	On
11:00am to 12:00am	100%	100%	100%	On
12:00pm to 1:00pm	100%	100%	100%	On
1:00pm to 2:00pm	100%	100%	100%	On
2:00pm to 3:00pm	100%	100%	100%	On
3:00pm to 4:00pm	100%	100%	100%	On
4:00pm to 5:00pm	100%	100%	100%	On
5:00pm to 6:00pm	50%	80%	60%	On
6:00pm to 7:00pm	15%	40%	25%	Off
7:00pm to 8:00pm	5%	20%	15%	Off
8:00pm to 9:00pm	5%	10%	15%	Off
9:00pm to 10:00pm	0%	10%	10%	Off
10:00pm to 11:00pm	0%	10%	10%	Off
11:00pm to 12:00pm	0%	10%	10%	Off
<b>Equivalent Peak Hours</b>	<b>9.5</b>	<b>11.7</b>	<b>11.1</b>	<b>11</b>





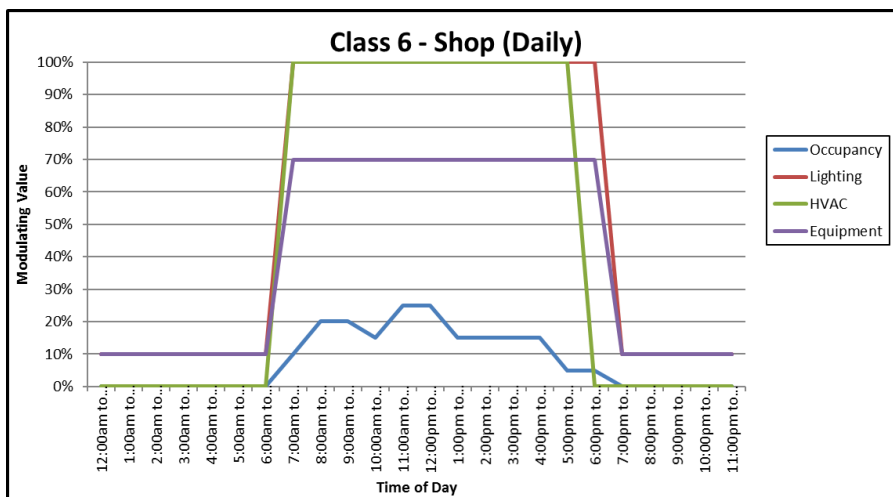
**Class 6 (Café/Restaurant) Profiles**

Hours of Day (Local Standard Time)	Occupancy (Monday – Saturday)	Lighting (Monday – Saturday)	Equipment (Monday – Saturday)	HVAC (Monday – Saturday)
12:00am to 1:00am	0%	5%	15%	Off
1:00am to 2:00am	0%	5%	15%	Off
2:00am to 3:00am	0%	5%	15%	Off
3:00am to 4:00am	0%	5%	15%	Off
4:00am to 5:00am	0%	5%	15%	Off
5:00am to 6:00am	0%	5%	15%	Off
6:00am to 7:00am	5%	40%	40%	On
7:00am to 8:00am	5%	40%	40%	On
8:00am to 9:00am	5%	60%	60%	On
9:00am to 10:00am	5%	60%	60%	On
10:00am to 11:00am	20%	90%	90%	On
11:00am to 12:00am	50%	90%	90%	On
12:00pm to 1:00pm	80%	90%	90%	On
1:00pm to 2:00pm	70%	90%	90%	On
2:00pm to 3:00pm	40%	90%	90%	On
3:00pm to 4:00pm	20%	90%	90%	On
4:00pm to 5:00pm	25%	90%	90%	On
5:00pm to 6:00pm	50%	90%	90%	On
6:00pm to 7:00pm	80%	90%	90%	On
7:00pm to 8:00pm	80%	90%	90%	On
8:00pm to 9:00pm	80%	90%	90%	On
9:00pm to 10:00pm	50%	90%	90%	On
10:00pm to 11:00pm	35%	50%	50%	On
11:00pm to 12:00pm	20%	30%	30%	On
<b>Equivalent Peak Hours</b>	<b>7.2</b>	<b>13.9</b>	<b>14.5</b>	<b>18</b>



**Class 6 (Shop) Profiles**

Hours of Day (Local Standard Time)	Occupancy (Daily)	Lighting (Daily)	Equipment (Daily)	HVAC (Daily)
12:00am to 1:00am	0%	10%	10%	Off
1:00am to 2:00am	0%	10%	10%	Off
2:00am to 3:00am	0%	10%	10%	Off
3:00am to 4:00am	0%	10%	10%	Off
4:00am to 5:00am	0%	10%	10%	Off
5:00am to 6:00am	0%	10%	10%	Off
6:00am to 7:00am	0%	10%	10%	Off
7:00am to 8:00am	10%	100%	70%	On
8:00am to 9:00am	20%	100%	70%	On
9:00am to 10:00am	20%	100%	70%	On
10:00am to 11:00am	15%	100%	70%	On
11:00am to 12:00am	25%	100%	70%	On
12:00pm to 1:00pm	25%	100%	70%	On
1:00pm to 2:00pm	15%	100%	70%	On
2:00pm to 3:00pm	15%	100%	70%	On
3:00pm to 4:00pm	15%	100%	70%	On
4:00pm to 5:00pm	15%	100%	70%	On
5:00pm to 6:00pm	5%	100%	70%	On
6:00pm to 7:00pm	5%	100%	70%	Off
7:00pm to 8:00pm	0%	10%	10%	Off
8:00pm to 9:00pm	0%	10%	10%	Off
9:00pm to 10:00pm	0%	10%	10%	Off
10:00pm to 11:00pm	0%	10%	10%	Off
11:00pm to 12:00pm	0%	10%	10%	Off
<b>Equivalent Peak Hours</b>	<b>1.9</b>	<b>13.2</b>	<b>9.6</b>	<b>11</b>



# APPENDIX D JV3 Verification Using a Reference Building

- (a) For a Class 3, 5, 6, 7, 8 or 9 building, compliance with JP1 is verified when it is determined that the annual energy consumption of the proposed building with its services is not more than the annual energy consumption of a reference building when—
  - (i) the proposed building is modelled with the proposed services; and
  - (ii) the proposed building is modelled with the same services as the reference building.
- (b) The annual energy consumption of the proposed building in (a) may be reduced by the amount of energy obtained from—
  - (i) an on-site renewable energy source; or
  - (ii) another process as reclaimed energy.
- (c) The annual energy consumption calculation method must comply with the ABCB Protocol for Building Energy Analysis Software.
- (d) The annual energy consumption in (a) must be calculated—
  - (i) for the reference building, using—
    - (A) the Deemed-to-Satisfy Provisions for Parts J1 to J7 but including only the minimum amount of mechanical ventilation required by Part F4; and
    - (B) a solar absorptance of 0.6 for external walls and 0.7 for roofs; and
    - (C) the maximum illumination power density without any increase for a control device illumination power density adjustment factor; and
    - (D) air-conditioning with the conditioned space temperature within the range of 18° CDB to 26° CDB for 98% of the plant operation time; and
    - (E) the profiles for occupancy, air-conditioning, lighting and internal heat gains from people, hot meals, appliances, equipment and heated water supply systems—
      - (aa) of the actual building—
        - (AA) if the operating hours per year are not less than 2 500; or
        - (BB) if the daily operating profiles are not listed in Specification JV; or
      - (bb) of Specification JV; and
    - (F) infiltration values—
      - (aa) for a perimeter zone of depth equal to the floor-to-ceiling height, when pressurising plant is operating, 1.0 air change per hour; and
      - (bb) for the whole building, when pressurising plant is not operating, 1.5 air change per hour; and
  - (ii) for both the proposed building and the reference building using the same—
    - (A) annual energy consumption calculation method; and
    - (B) location, being either the location where the building is to be constructed if appropriate climatic data is available, or the nearest location with similar climatic conditions, for which climatic data is available; and
    - (C) adjacent structures and features; and
    - (D) environmental conditions such as ground reflectivity, sky and ground form factors, temperature of external bounding surfaces, air velocities across external surfaces and the like; and
    - (E) orientation; and
    - (F) building form, including—
      - (aa) the roof geometry; and
      - (bb) the floor plan; and
      - (cc) the number of storeys; and
      - (dd) the ground to lowest floor arrangements; and (ee) the size and location of glazing; and

- (G) external doors; and
  - (H) testing standards including for insulation, glazing, water heater and package air-conditioning equipment; and
  - (I) thermal resistance of air films including any adjustment factors, moisture content of materials and the like; and
  - (J) dimensions of external, internal and separating walls; and
  - (K) surface density of envelope walls over 220 kg/m<sup>2</sup>; and
  - (L) quality of insulation installation; and
  - (M) assumptions and means of calculating the temperature difference across air-conditioning zone boundaries; and
  - (N) floor coverings and furniture and fittings density; and
  - (O) internal shading devices, their colour and their criteria for operation; and
  - (P) number, sizes and floors served by lifts and escalators; and
  - (Q) range and type of services and energy sources other than energy generated on-site from sources that do not emit greenhouse gases such as solar and wind power; and
  - (R) internal artificial lighting levels; and
  - (S) internal heat gains including people, lighting, appliances, meals and other electric power loads; and
  - (T) air-conditioning system configuration and zones; and
  - (U) daily and annual profiles of the—
    - (aa) building occupancy; and
    - (bb) operation of services; and
  - (V) range of internal temperatures and plant operating times; and
  - (W) supply heated water temperature and rate of use; and
  - (X) infiltration values unless there are specific additional sealing provisions or pressure testing to be undertaken; and
  - (Y) unit capacity and sequencing for water heaters, refrigeration chillers and heat rejection equipment such as cooling towers; and
  - (Z) metabolic rate for people; and
- (iii) for the proposed building using a solar absorptance for the roof and walls 0.05 higher than that proposed; and
- (e) Where the annual energy consumption of the heated water supply or the lifts and escalators are the same in the proposed building and the reference building, they may be omitted from the calculation of both the proposed building and the reference building.
- (f) A lift in a building with more than one classification may be proportioned according to the number of storeys of the part for which the annual energy consumption is being calculated.
- (g) The design must include—
- (i) the ability to achieve all the criteria used in the annual energy consumption calculation method such as having an automatic operation controlling device capable of turning lighting, and air-conditioning plant on and off in accordance with the occupancy and operating profiles used; and
  - (ii) compliance with—
    - (A) J1.2 for general thermal construction; and
    - (B) J1.3(c) for compensation for a loss of ceiling insulation; and
    - (C) J1.6(a)(ii), J1.6(c), J1.6(d) and J1.6(e) for floor edge insulation; and
    - (D) BS 7190 for testing a water heater; and
    - (E) AS/NZS 3823.1.2 at test condition T1 for testing package air-conditioning equipment not less than 65 kW<sub>r</sub>; and
    - (F) AHRI 550/590 for testing a refrigeration chiller; and
    - (G) Part J8 for facilities for energy monitoring.

## APPENDIX E Section J JV3 Modelling Parameters

Parameter	Verification Reference	Value	Comment
Thermostat Setpoint	<b>JV3 (d)(i)(D)</b>	18°C to 26°C (98% of time)	Confirmed. See Section 0: Model Verification
Daily Occupancy	<b>JV2 (a)(i)</b>	Profiles per BCA	As per BCA Class specification
Operating Profiles	<b>JV2 (a)(i)</b>	Profiles per BCA	As per BCA Class specification
Illumination power density	<b>Table J6.2b</b>	As per BCA provisions	See Section 2: Modelling Inputs
Ventilation	<b>JV (2)(a)(iv)</b>	As per BCA provisions	NCC BCA Part F4, and AS1668.2
Internal Heat Gains	<b>JV (2)(a)(i)(iii)-A,B,C</b>	As per BCA provisions	See Section 2: Modelling Inputs
Infiltration (perimeter)	<b>JV3 (d)(i)(F)</b>	1.0 Air Changes per Hour (ACH)	Plant on
		1.5 ACH	Plant off
Operation of blinds		Excluded from assessment	Reference and Proposed Models
Furniture and fittings		Excluded from assessment	Reference and Proposed Models
R-Value of air films		As per J1.2	As per Calculation methodology
Heat Migration		Migration across HVAC zones - On.	As per Calculation methodology
Artificial Lighting		As per BCA provisions	See Section 3: Modelling Inputs
Lifts		Excluded from assessment	Reference and Proposed Models
Hot Water		Excluded from assessment	Reference and Proposed Models
Non-Greenhouse Gas emitting energy sources		Excluded from assessment	Reference and Proposed Models
Thermal Calculation Method	<b>JV3 (c), (d) (ii) (B)</b>	IES-VE, ASHRAE Perth TRY	Complies with the ABCB Protocol for Building Modelling and Analysis (Software).

# APPENDIX F Part J1 – Building Fabric

The following prescriptive performance requirements for the façade must be adhered to, as per the NCC:

## J1.2 – Thermal Construction General

Insulation must comply with AS/NZS 4859.1 and be installed so that it:

- Abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and
- Forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
- Does not affect the safe or effective operation of a service or fitting.
- Reflective insulation must be installed with:
  - The necessary airspace to achieve the required R-value between a reflective side of the reflective insulation and a building lining or cladding; and
  - The reflective insulation closely fitted against any penetration, door or window opening; and
  - The reflective insulation adequately supported by framing members; and
  - Each adjoining sheet of roll membrane being:
    - Overlapped not less than 50mm; or
    - Taped together

Bulk insulation must be installed so that:

- It maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
- In a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50mm

## J1.3 (d) – Roof and ceiling construction

- A roof that –
  - Is required to achieve a minimum Total R-Value; and
  - has a metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
  - does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens

must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the metal sheet roofing and its supporting purlins, metal rafters or metal battens.

## J1.5 (c) – Walls

- A wall that –
  - Is required to achieve a minimum Total R-Value; and
  - has a lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame; and
  - does not have a wall lining or has a wall lining fixed directly to the same metal frame

must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the metal sheet roofing and its supporting purlins, metal rafters or metal battens.

## J1.6 (a) – Floors

A floor that is part of the envelope of a building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, including a floor above or below a carpark or a plant room –

- Must achieve the total R-Value specified in table J1.6; and
- With an in-slab or in-screed heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an R-Value of not less than 1.0.

### **J1.6 (b) – Floors**

In climate zones 1 to 6, the minimum Total R-Value required in (a) may be reduced by R0.5 provided R0.75 is added to the Total R-Value required for the roof and ceiling construction.

### **J1.6 (c) – Floors**

A concrete slab-on-ground-

- With an in-slab or in-screed heating or cooling system; or
- Located in climate zone 8,

Must have insulation installed around the vertical edge of its perimeter.

### **J1.6 (d) – Floors**

Insulation required by (c) must-

- Have an R-Value of not less than 1.0; and
- Be water resistant; and
- Be continuous from the adjacent finished ground level-
  - To a depth of not less than 300mm; or
  - For the full depth of the vertical edge of the concrete slab-on-ground.

### **J1.6 (e) – Floors**

The requirements of (a)(ii) and (c)(i) do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.

# APPENDIX G Part J3 – Building Sealing

The following prescriptive performance requirements for the façade must be adhered to, as per the NCC:

## **J3.4 – External Windows and Doors**

A seal to restrict air infiltration must be fitted to each edge of all external doors, openable external windows or the like. A seal may be a foam or rubber compressible strip, fibrous seal or the like.

These requirements do not apply to:

- A window complying with AS 2047; or
- An external louvre door, louvre window, or other such opening; or
- A fire door; or
- A roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security

All doors to the conditioned zone must have a self-closing device.

## **J3.5 – Exhaust Fans**

Any miscellaneous exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditional space. This requirement will be documented by the Mechanical Services consultant.

## **J3.6 – Construction of roofs, walls and floors**

Roofs, external walls, external floors and any opening such as a window, door or the like must be constructed to minimise air leakage. All Constructions must be:

- Enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
- Sealed by caulking, skirting, architraves, cornices or the like.

These requirements do not apply to openings, grilles and the like required for smoke hazard management.