



**NCC BCA 2022 SECTION J J1V3 ASSESSMENT**

**61 SYDNEY ROAD, GOULBURN  
NSW**



**PREPARED FOR  
NDCO GOULBURN PTY LTD**

**DATE: 15<sup>TH</sup> FEBRUARY 2024**

**OUR REFERENCE: 230887**

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## INTRODUCTION

### GENERAL

The objective of NCC BCA 2022 Volume 1 Section J is to reduce greenhouse gas emissions by efficiently using energy. This report has been prepared to show how the proposed development of Motel or Hotel at 61 Sydney Road, Goulburn, can meet the requirements of the NCC BCA 2022 Volume 1 Section J.

By incorporating the recommendations of this report, the building and its services can be capable of efficiently using energy. This report shall be read in conjunction with the Australian Building Codes Board (ABCB) National Construction Code (NCC) 2022 Volume 1.

### PROJECT DESCRIPTION

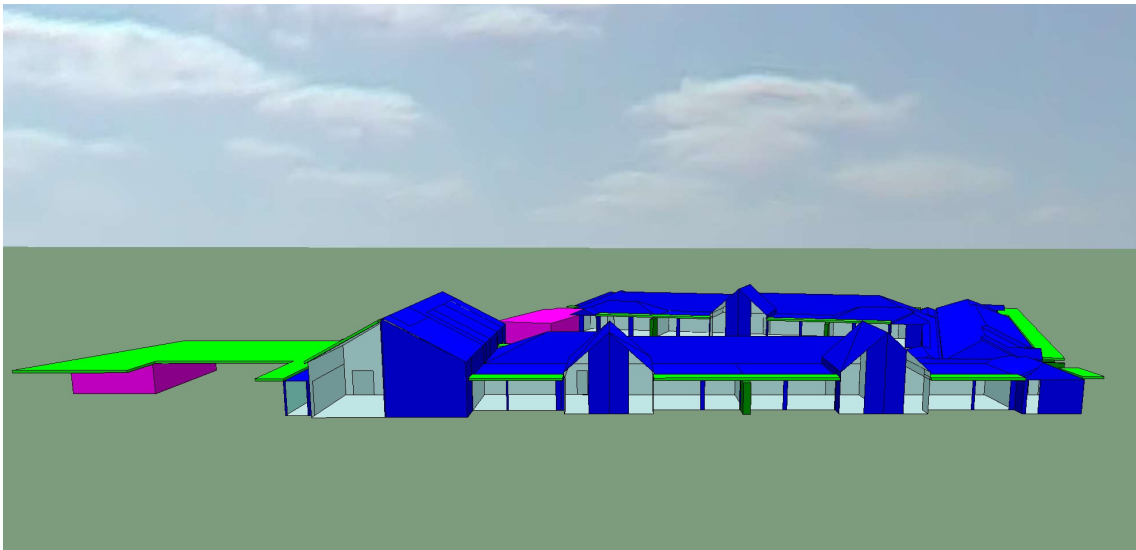
The proposed building is a single storey 42 room hotel or motel accommodation.

### BUILDING CLASSIFICATION

Class 3 – Hotel or motel accommodation

### CLIMATE ZONE

Zone 7



IES Model of Hotel/Motel

## ARCHITECTURAL DOCUMENTATION

The following architectural documentation from **ADM Architects** was used for this assessment;

Job No.	Drawing No.	Drawing Title	Rev	Date
2023-22	A-101	Site plan	P1	18-01-2024
2023-22	A-102	Ground floor plan	P1	18-01-2024
2023-22	A-103	Roof plan	P1	18-01-2024
2023-22	A-201	Elevations 01/ Section 01	P1	18-01-2024
2023-22	A-202	Elevations 02/ Section 02	P1	18-01-2024
2023-22	A-203	Sections 03	P1	18-01-2024
2023-22	A-301	Typical rooms layout	P1	18-01-2024
2023-22	A-302	Accessible Rooms Layout	P1	18-01-2024
2023-22	A-501	Colours and Materials schedule	P1	18-01-2024
2023-22	A-101	Demolition and Site Management plan	P1	18-01-2024

## PERFORMANCE REQUIREMENTS

### J1P1 ENERGY USE

A building, including its services, must have features that facilitate the efficient use of energy appropriate to—

- a. the function and use of the building and services; and
- b. the level of human comfort required for the building use; and
- c. solar radiation being –
  - i. utilized for heating; and
  - ii. controlled to minimise energy for cooling; and
- d. the energy source of the services; and
- e. the sealing of the building envelope against air leakage; and
- f. for a conditioned space, achieving an hourly regulated energy consumption, averaged over the annual hours of operation, of not more than –
  - i. for a Class 6 building, 80 kJ/m<sup>2</sup>.hr; and
  - ii. for a Class 5, 7b, 8 or 9a building other than a ward area, or a Class 9b school, 43 kJ/m<sup>2</sup>.hr; and
  - iii. for all other building classifications, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, 15kJ/m<sup>2</sup>.hr

**J1P1 is verified using verification method J1V3 – Verification using a reference building.**

## INTERPRETATION

The following are some useful explanations of terms used throughout this report. These descriptions are taken from the NCC BCA.

**Envelope** , for the purposes of Section J, means the parts of a building's fabric that separate a conditioned space or habitable room from—

- a. the exterior of the building; or
- b. a non- conditioned space including—
  - i. the floor of a rooftop plant room, lift-machine room or the like; and
  - ii. the floor above a carpark or warehouse; and
  - iii. the common wall with a carpark, warehouse or the like.

**Conditioned space** means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning.

**Air-conditioning** means a service that actively cools or heats the air within a space, but does not include a service that directly

- a. cools or heat cold or hot rooms; or
- b. maintains specialized conditioned for equipment or processes, where this is the main purposed of the service.

**Habitable Room** means a room used for normal domestic activities, and—

- a. includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but
- b. excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialized nature occupied neither frequently nor for extended periods.

**Total R-Value ( $m^2.K/W$ )**, for the purposes of Volume One, means the sum of the R-Values of the individual component layers in a composite element including any building material, insulating material, airspace, thermal bridging and associated surface resistances.

**Total System Solar Heat Gain Coefficient (SHGC)**, for the purposes of Volume One, means the fraction of incident irradiance on a wall-glazing construction or a roof light that adds heat to a building's space.

**Total System U-Value ( $W/m^2.K$ )**, for the purposes of Volume One, means the thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances.

## BUILDING ENVELOPE

The building envelope is shaded in blue as per Figure 1 below.



Figure 1 – Ground floor envelope



## COMPLIANCE SUMMARY

Performance Requirements J1P1 is verified when it is determined that the annual greenhouse gas emission of the proposed building with its services is not more than the annual greenhouse gas emission of a reference building when—

- (i) the proposed building is modelled with the proposed services
- (ii) the proposed building is modelled with the same services as the reference building

Compliance is achieved when Criteria 1 and 2 are both met.

**J1V3 Criteria 1** – Result A < Result C

**J1V3 Criteria 2** – Result B < Result C

**A** – Energy Consumption of Proposed Building Fabric and Proposed Services

**B** – Energy Consumption of Proposed Building Fabric and Deemed to Satisfy Services

**C** – Energy Consumption of Deemed to Satisfy Fabric and Deemed to Satisfy Services

## RESULTS

Scenarios	Annual Electrical Energy Consumption (MWh)	Annual GHG Emission (kgCO <sub>2</sub> )
A	201.51	171208.07
B	201.51	171208.07
C	201.72	171,385.05
Criteria 1	A < C	✓
Criteria 2	B < C	✓
<b>J1V3 Compliance Achieved</b>		

In accordance with Table S34C3 of Section J in BCA 2022 Volume 1, the greenhouse gas emission factors for electricity energy source in NSW is given as 236 kgCO<sub>2</sub>-e /GJ. Using this factor, the amount of greenhouse gas emission annually is calculated.

The reference building modelled with DTS fabric and services as per JV specification is simulated to consume total electrical energy of **201.72 MWh** annually which is equivalent to emission of **148,589 kg CO<sub>2</sub>** annually.

A **7kW PV system** has also been incorporated in the modelling to help offset the energy consumption of the building. The PV system is calculated to generate **10.644 MWh** of electricity annually. The PV panel will be installed on the metal roof above the motel/hotel rooms.

The proposed building design shall include services that are at least as efficient as the BCA DTS services. The computer simulation has assumed worst case scenario where the proposed services perform as efficient as the DTS services. The proposed building modelled with the same DTS services consume total electrical energy of **201.51 MWh** annually which is equivalent to emission of **171208.07 kgCO<sub>2</sub>** annually.

The proposed building has achieved compliance with Performance Requirements J1P1 as the values for A and B are less than C.

## COMPLIANCE REQUIREMENTS

Building Element	Proposed Building
Roof and Ceiling	<b>Total R4.2</b> –Metal Roof with R1.8 Anticon roof blanket & R1.7 bulk insulation
Roof Colour (Solar Absorptance)	<b>SA</b> ≤ 0.45 – Roof
Roof Lights	<b>N/A</b>
External Walls	<b>Total R3.37</b> – Double Brick with R2.78 continuous insulation <b>Total R3.56</b> – Metal Clad with R3.25 insulated plasterboard (See Appendix B for details)
External Walls (Solar Absorptance)	<b>SA</b> ≤ 0.6 – New external walls
Internal Walls	<b>Total R2.9</b> – Concrete walls adjacent to unconditioned space with R2.3 framing board insulation (See Appendix B for details) <b>Total R2.9</b> – Concrete lobby walls with R2.3 framing board insulation (See Appendix B for details)
Floors	<b>Total R2.0</b> – Waffle slab on ground (No additional insulation)
Glazing (all)	<b>U-Value 3.6, SHGC – 0.35</b> (Double Glazed Tinted Aluminium frame)  <b>Note:</b> U-Value must be less than or equal to the above
PV system size	<b>7 kW</b>
Services	DTS compliant systems

## FABRIC R-VALUE ASSESSMENT

Roof and Ceiling – Metal Roof with Flat Ceiling		
Layer	Layer Description	R Value
1	Outdoor Air Film (7m/s)	0.04
2	Metal Sheet	0.00
3	*55mm Foil Faced Blanket under Roof Sheeting	1.30
4	Unventilated Reflective Airspace	1.06
5	**75mm Glasswool Insulation Batts	1.70
6	10mm Plasterboard Ceiling	0.06
7	Indoor Air Film (still air)	0.16
Roof and Ceiling Construction Total		<b>4.3</b>
Minimum Total R-Value required		<b>4.2</b>

\*Possible Insulation: R1.8 Knauf Space Blanket, R1.8 Bradford Anticon Blanket, or approved equivalent

\*\*Possible Insulation: R1.7 Bradford Batts, or R1.7 Knauf Earthwool Batts approved equivalent

External Wall – Double brick wall		
Layer	Layer Description	R Value
1	Outdoor Air Film	0.03
2	110mm Brick	0.14
3	Vapour permeable membrane	0.00
4	Unventilated Non-Reflective Airspace (28mm Furring channel)	0.16
5	R2.78 continuous rigid insulation	2.78
6	110mm Brick	0.14
7	Indoor Air Film (still air)	0.12
Wall Construction Total		<b>3.37</b>
Minimum Total R-Value required		<b>3.3</b>

\*Possible Insulation: 100mm IROCK Rockwool Board, K8 Kingspan Cavity Insulation Board or approved equivalent.

<b>External Wall – Metal clad wall</b>		
<b>Layer</b>	<b>Layer Description</b>	<b>R Value</b>
1	Outdoor Air Film	0.03
2	Metal sheet	0.00
3	Vapour permeable membrane`	0.00
4	Unventilated Non-Reflective Airspace	0.16
5	80mm insulated plasterboard	3.25
6	Indoor Air Film (still air)	0.12
<b>Wall Construction Total</b>		<b>3.56</b>
<b>Minimum Total R-Value required</b>		<b>3.3</b>

\*Possible Insulation: 80mm K17 Kooltherm insulated plasterboard or approved equivalent.

<b>Internal Wall – Walls adjacent to Unconditioned Space &amp; internal lobby walls</b>		
<b>Layer</b>	<b>Layer Description</b>	<b>R Value</b>
1	Indoor Air Film (still air)	0.12
2	150mm Concrete	0.13
3	Unventilated Non-Reflective Airspace	0.16
4	50mm framing board insulation	2.30
5	13mm Plasterboard	0.08
6	Indoor Air Film (still air)	0.12
<b>Wall Construction Total</b>		<b>2.91</b>
<b>Minimum Total R-Value required</b>		<b>2.8</b>

\*Possible Insulation: R2.3 K12 Kooltherm framing board or approved equivalent.

## ENERGY SIMULATION INPUTS

### GENERAL

The annual energy consumption in MWh has been calculated using the BCA 2022 J1V3 Verification using a reference building method. The simulation software used was IES Virtual Environment version 2019.0.1.0 in accordance with Australian Building Codes Board (ABCB) Protocol for Building Energy Analysis Software.

The inputs used for the proposed and deemed to satisfy fabric and services is as per the following and JV3 (d). Further data inputs and resultant outputs from the IES simulation are available upon request.

### DEEMED TO SATISFY FABRIC

Building Element	Reference Building Deemed-to-Satisfy
Roof and Ceiling	<b>Total R3.7</b> – Metal
Roof (Solar Absorptance)	SA ≤ 0.45
Roof Lights	<b>N/A</b>
External Walls	<b>Total R2.8</b> – All external walls
External Walls (Solar Absorptance)	SA ≤ 0.6 –External walls
Internal Walls	<b>Total R2.8</b> –Internal walls to unconditioned space
Floors	<b>Total R2.0</b> – Waffle slab
Glazing (all)	Refer to Appendix A for DTS 2022 Façade Results

### DEEMED TO SATISFY SERVICES

#### AIR CONDITIONING

The air conditioning systems used in the energy simulation calculation follow the Deemed to Satisfy requirements of BCA 2022 Section J6;

##### Full Load

Cooling EER: 3.05 (minimum MEPS)

Heating EER: 3.05 (minimum MEPS)

##### Internal Design Conditions

Summer: 24.0°C

Winter: 21.0°C

#### LIGHTING

The lighting density used in the energy simulation calculation follows the Deemed to Satisfy requirements of BCA 2022 Section J7.

#### OCCUPANCY AND EQUIPMENT

As per JV Specification requirements for Class 3 buildings.

## PROPOSED FABRIC

Building Element	Proposed Building
Roof and Ceiling	<b>Total R4.2</b> –Metal Roof
Roof Colour (Solar Absorptance)	<b>SA ≤ 0.45</b> – Roof
Roof Lights	<b>N/A</b>
External Walls	<b>Total R3.37</b> – Double Brick with R2.78 continuous insulation (See Appendix B for details) <b>Total R3.56</b> – Metal Clad with R3.25 insulated plasterboard (See Appendix B for details)
External Walls (Solar Absorptance)	<b>SA ≤ 0.6</b> – New external walls
Internal Walls	<b>Total 2.9</b> – Concrete walls adjacent to unconditioned space <b>Total 2.9</b> – Concrete internal lobby walls (See Appendix B for details)
Floors	<b>No insulation required</b> – Waffle slab on ground
Glazing (all)	<b>U-Value 3.6, SHGC – 0.35</b> (Double Glazed tinted Aluminium frame) <b>Note:</b> U-Value must be less than or equal to the above
Services	DTS compliant systems

## PROPOSED SERVICES

### AIR CONDITIONING

The air conditioning systems used in the energy simulation calculation follow the Deemed to Satisfy requirements of BCA 2022 Section J6;

#### Full Load

Cooling EER: 3.05 (minimum MEPS)

Heating EER: 3.05 (minimum MEPS)

#### Internal Design Conditions

Summer: 24.0°C

Winter: 21.0°C

### LIGHTING

The lighting density used in the energy simulation calculation follows the Deemed to Satisfy requirements of BCA 2022 Section J7.

### OCCUPANCY AND EQUIPMENT

As per JV Specification requirements for Class 3 buildings.

## ENERGY SIMULATION RESULTS

Result	Heating (MWh)	Cooling (MWh)	Fans (MWh)	Lighting (MWh)	Equipment (MWh)	PV Watts (MWh)	Total (MWh)
<b>A</b> – Annual Energy Consumption of <b>Proposed</b> Building Fabric and <b>Proposed</b> Services	120.2019	36.7684	5.1476	16.1055	33.9327	10.644	201.5161
<b>B</b> – Annual Energy Consumption of <b>Proposed</b> Building Fabric and <b>Deemed to Satisfy</b> Services	120.2019	36.7684	5.1476	16.1055	33.9327	10.644	201.5161
<b>C</b> – Annual Energy Consumption of <b>Deemed to Satisfy</b> Fabric and <b>Deemed to Satisfy</b> Services	123.5218	24.7056	3.4588	16.1055	33.9327	0.0	201.7244

## FURTHER COMPLIANCE REQUIREMENTS

As part of the J1V3 compliance, the following Deemed to Satisfy requirements are still applicable.

### PART J4 - BUILDING FABRIC

#### J4D2 APPLICATION OF PART

The Deemed to Satisfy provisions of Part J1 Building Fabric apply to building elements forming the envelope of the building.

#### J4D3 THERMAL CONSTRUCTION - GENERAL

1. Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it—
  - a) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
  - b) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
  - c) does not affect the safe or effective operation of a service or fitting.
2. Where required, reflective insulation must be installed with—
  - a) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
  - b) the reflective insulation closely fitted against any penetration, door or window opening; and
  - c) the reflective insulation adequately supported by framing members; and
  - d) each adjoining sheet of roll membrane being—
    - (i) overlapped not less than 50 mm; or
    - (ii) taped together.

3. Where required, bulk insulation must be installed so that—
  - a) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
  - b) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.
4. Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification 36.
5. The required Total R-value and Total System U-value, including allowance for thermal bridging, must be—
  - i. calculated in accordance with AS/NZS 4859.2 for roof or floor; or
  - i. determined in accordance with Specification 37 for wall-glazing construction; or
  - ii. determined in accordance with Specification 39 or Section 3.5 CIBSE Guide A for soil or sub-floor spaces.

## PART J5 – BUILDING SEALING

### J5D2 APPLICATION OF PART

If the air conditioning or ventilation system provides sufficient outside air to pressurize the space and prevent infiltration, then **Part J5 is not applicable**.

By not applying Part J5 outside air infiltration will occur whenever the ventilation systems are not operating and will put additional load on the air conditioning systems during start up. It is our recommendation to apply the deemed to satisfy provisions of Part J5 to satisfy the intent of Section J.

The deemed to satisfy provisions of Part J5 Building Sealing apply to building elements forming the envelope of the building. The envelope of the building is the fabric and elements that separate the conditioned spaces to the exterior of the building. See Figure 1 for building envelope details.

### J5D3 CHIMNEYS AND FLUES

Not applicable

### J5D4 ROOF LIGHTS

Not applicable

### J5D2 WINDOWS AND DOORS

- 1) A door, openable window or the list must be sealed when forming part of the envelope.
- 2) The requirements of (a) do not apply to a window complying with AS2047, a fire door or smoke door, or a roller shutter, roller shutter grille or other security door or device installed only for out-of-hours security.
- 3) A seal to restrict air filtration for the bottom edge of door, must be a draft protection device and for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.
- 4) Any entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than—
  - a) where the conditioned space has a floor area of not more than 50m<sup>2</sup>; or
  - b) where a café, restaurant, open front shop or the like has—



- (i) a 3m deep unconditioned zone between the main entrance, including an open front, and the conditioned space; and
  - (ii) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.
- 5) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.

### **J5D6 EXHAUST FANS**

All exhaust fans must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or a habitable room.

### **J5D7 CONSTRUCTION OF CEILINGS, WALLS AND FLOORS**

- 1) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimize air leakage in accordance with (b) when forming part of the envelope
- 2) Construction required by (a) must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed at junctions and penetrations with close fitting architrave, skirting, or cornice or expanding form, rubber compressible strip, caulking or the like.
- 3) The requirements of (a) do not apply to openings, grilles and the like required for smoke hazard management.

## **PART J9 – FACILITIES FOR ENERGY MONITORING**

### **J9D2 APPLICATION OF PART**

The deemed to satisfy provisions of Part J9 Facilities for Energy Monitoring apply to this building.

### **J9D3 FACILITIES FOR ENERGY MONITORING**

- 1) Not applicable
- 2) The building must have energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (3), of the energy consumption of—
  - a) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and
  - b) artificial lighting; and
  - c) appliance power; and
  - d) central hot water supply; and
  - e) internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and
  - f) On-site renewable energy equipment; and
  - g) On-site electric vehicle charging equipment; and
  - h) On-site battery systems; and
  - i) other ancillary plant.
- 3) Energy meters required by (2) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be sorted, analyzed and reviewed.
- 4) Not applicable

#### **J9D4 FACILITIES FOR ELECTRIC VEHICLE CHARGING EQUIPMENT**

The facilities for electric vehicle charging equipment compliance with this part shall be demonstrated by a design statement from the electrical services consultant.

#### **J9D5 FACILITIES FOR SOLAR PHOTOVOLTAIC AND BATTERY SYSTEMS**

The facilities for solar photovoltaic and battery systems compliance with this part shall be demonstrated by a design statement from the electrical services consultant.

## CONCLUSION

This report demonstrates an assessment based on the J1V3 Verification using a reference building. Compliance with J1P1 is confirmed by demonstrating that the annual greenhouse gas emissions of the proposed building do not exceed the reference building.

The reference building modelled with DTS fabric and services as per JV specification is simulated to consume total electrical energy of **201.72 MWh** annually which is equivalent to emission of **148,589 kgCO<sub>2</sub>** annually.

A **7kW PV system** has also been incorporated in the modelling to help offset the energy consumption of the building. The PV system is calculated to generate **10.644 MWh** of electricity annually. The PV panel will be installed on the metal roof above the hotel/motel rooms.

The proposed building design shall include services that are at least as efficient as the BCA DTS services. The computer simulation has assumed worst case scenario where the proposed services perform as efficiently as the DTS services. The proposed building modelled with the same DTS services consume total electrical energy of **201.51 MWh** annually which is equivalent to emission of **171208.07 kgCO<sub>2</sub>** annually.

The proposed building has achieved compliance with Performance Requirements J1P1 as annual greenhouse gas emission is less than the DTS reference building.

By incorporating the recommendations of this report, 61 Sydney Road, Goulburn, can achieve compliance with the NCC BCA 2022 Volume 1 Section J Verification method.

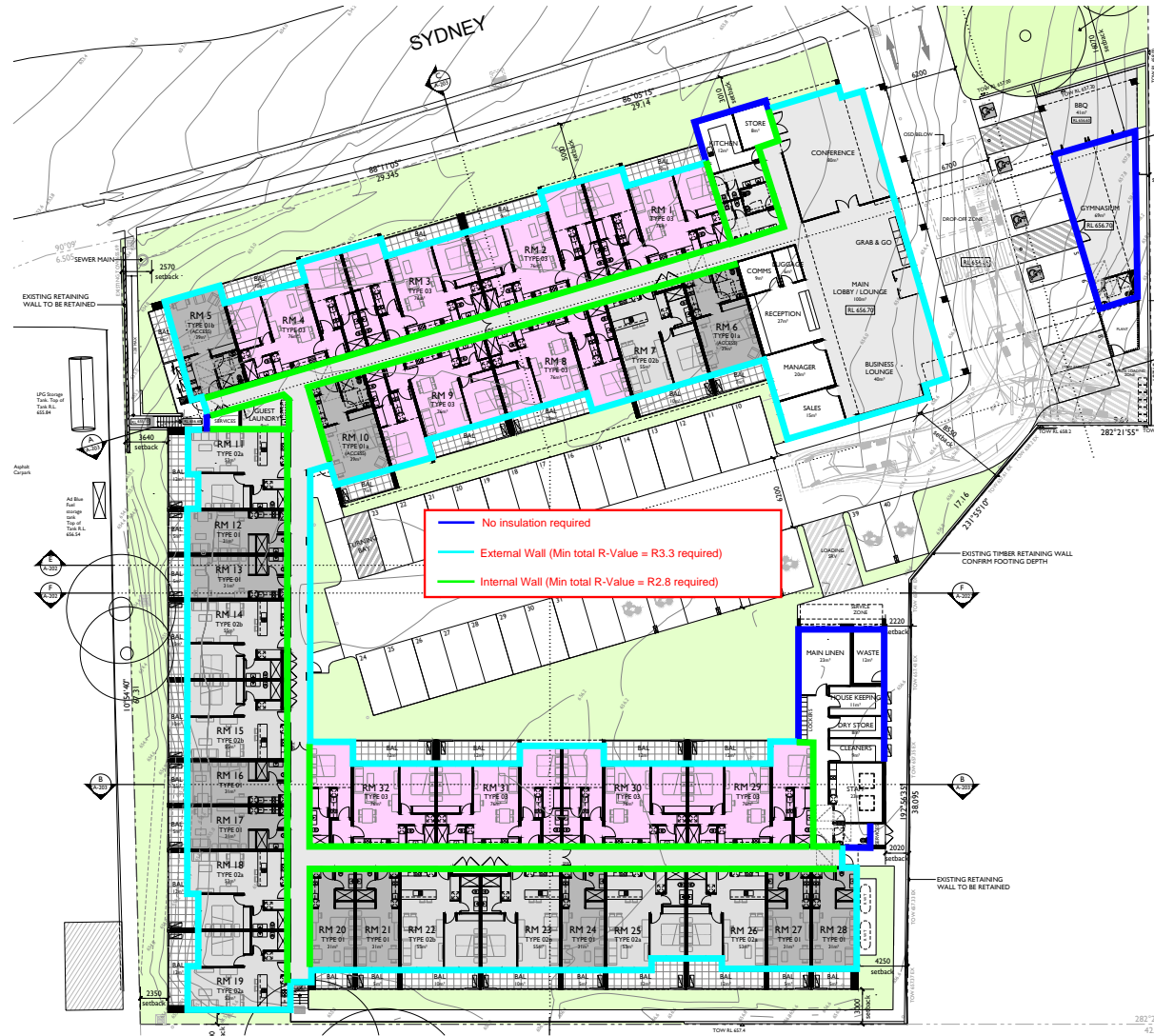
## APPENDIX A – DTS 2022 FACADE RESULT



Project Details

	North	East	South	West
<b>Glazing Area (m<sup>2</sup>)</b>	235,599	135,726	236,329	137,9403
<b>Glazing to Façade Ratio</b>	72%	57%	67%	63%
<b>Glazing References</b>	N door lvl angled N Full ht N Top N Conf 1 N Conf 2	E1 E2 Lounge Conference E3 E4 Lobby	S1 S intl S lobby S B Lounge	W 1 W 2 Lobby W 3 Sales/mgr
<b>Glazing System Types</b>	Sliding Door Fixed	Sliding Door Fixed	Sliding Door Fixed	Sliding Door Fixed
<b>Glass Types</b>	Double Glazed Unit - double low-E coating	Double Glazed Unit - double low-E coating	Double Glazed Unit - double low-E coating	Double Glazed Unit - double low-E coating
<b>Frame Types</b>	Aluminium	Aluminium	Aluminium	Aluminium
<b>Average Glazing U-Value (W/m<sup>2</sup>.K)</b>	1.50	1.50	1.50	1.50
<b>Average Glazing SHGC</b>	0.17	0.17	0.17	0.17
<b>Shading Systems</b>	Horizontal	Horizontal	Horizontal	Horizontal
<b>Wall Area (m<sup>2</sup>)</b>	92,5624	101,0475	117,854	81,8847
<b>Wall Types</b>	Wall	Wall	Wall	Wall
<b>Methodology</b>	Wall			
<b>Wall Construction</b>	R3.3 Wall	R3.3 Wall	R3.3 Wall	R3.3 Wall
<b>Wall Thickness</b>	250	250	250	250
<b>Average Wall R-value (m<sup>2</sup>.K/W)</b>	3.30	3.30	3.30	3.30
<b>Solar Absorbance</b>	0.6	0.6	0.6	0.6

### APPENDIX B – PROPOSED BUILDING INSULATION MARKUP



## APPENDIX C – PV ENERGY GENERATION

PVWatts Calculator

### RESULTS

**10,644 kWh/Year\***

Month	Solar Radiation ( kWh / m <sup>2</sup> / day )	AC Energy ( kWh )
January	6.93	1,094
February	6.44	917
March	5.74	936
April	4.93	793
May	4.62	789
June	3.70	627
July	4.24	739
August	4.49	780
September	5.92	956
October	6.63	1,070
November	6.56	1,002
December	6.02	939
<b>Annual</b>	<b>5.52</b>	<b>10,642</b>

#### Location and Station Identification

Requested Location	61 sydney road goulburn
Weather Data Source	Lat, Lng: -34.75, 149.74 0.6 mi
Latitude	34.75° S
Longitude	149.74° E

#### PV System Specifications

DC System Size	7 kW
Module Type	Standard
Array Type	Fixed (roof mount)
System Losses	14,08%
Array Tilt	23°
Array Azimuth	0°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4
Albedo	From weather file
Bifacial	No (0)
Monthly Irradiance Loss	Jan Feb Mar Apr May June 0% 0% 0% 0% 0% 0%
	July Aug Sept Oct Nov Dec 0% 0% 0% 0% 0% 0%

#### Performance Metrics

DC Capacity Factor	17.4%
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