BUILDING & ENERGY
CONSULTANTS AUSTRALIA

BUILDING CODE OF AUSTRALIA

Section "J" ASSESSMENT REPORT

For DA Lodgement Only

Description	**Proposed Alts & Adds to Existing Building**
Address	**2A Cooper St Double Bay, NSW**
Client	**Brooklyn Lane Investment Pty Ltd**
Report No	**BC20/201**
Date issued	**1 November 2021**
Revision	**B**

Contents

1.0 Introduction

B.E.C.A (Building Energy Consultants Australia) Pty, Ltd, have been commissioned to produce a Building Code of Australia (2019) clause-by-clause Section J assessment report (Excluding Part J5 & J6) of the subject development, in order to assess the level of development compliance.

This report only deals with the relevant provisions of section J and does not deal with the following:

- Consideration of the remainder parts of the Building Code of Australia (BCA) 2019, other than Section J (excluding Part J5 & J6).
- Consideration of Council's local planning policies.
- Other documentation forming part of the Development application.
- Impact of FRL's by use of insulation

The proposal is to be located at 2A Cooper St Double Bay, NSW. This report has been prepared, subject to the referenced documents, in accordance with the provisions of the Building Code of Australia (**BCA 2019**).

The following document references have been relied upon as prepared by :
Lawton Hurley

Job No: J316
Sheets: DA01 Iss B, DA02 Iss C, DA03 Iss D, DA04 Iss D, DA05 Iss D, DA06 Iss D, DA07 Iss D, DA08 Iss C, DA09 Iss D, DA13 Iss C, DA14 Iss A, DA16 Iss A, DA40 Iss B, DA49 Iss A, DA50 Iss A.

1.1 Climate Zone

National Construction Code Series – Volume 1- BCA 2019 **Climate Zone 5**

1.2 Modeled Building Elements – refer to recommendations

Suspended Floor of conditioned space	Concrete Suspended slab without in-slab heating system
Internal Walls of conditioned space	Concrete Insulated
External walls of conditioned space	Concrete Insulated / Lightweight Insulated
Roof	Concrete – Insulated

2.0 Recommendations

JV 3 (b) Onsite Renewable Energy Source

1. **JV3 Solar Panel System to be installed. Photo Voltaic Panels require to produce a minimum of 2,000 kWh / Year for each Building allowing for Panel tilt, orientation, onsite shading and all of the System Parameters including System Efficiency.**

Part J1 – Building fabric :

CONTACT BUILDING & ENERGY CONSULTANTS AUSTRALIA PRIOR TO PURCHASING INSULATION TO ENSURE PRODUCTS COMPLY

Ensure Total systems R-Value specification is provided from whoever supplies the insulation

2. Builder to ensure Insulation manufacturer supplies Total system R-Value of product and installation procedures. Certification required from installer when applying for an occupation certificate.

3. Insulation must be installed to comply with the requirements set out in Section J1.2 of this report. An installation certificate must be provided by the installer to state compliance with **Section J1.2** of this report & **AS/NZ 4859.1**.

4. **Roof/Ceiling of the conditioned spaces** must be insulated as Per Section J1.2 and J1.3 of this report. Ensure compliant total systems R-Values are provided and installation procedures from manufacturer supplying insulation

5. External Walls of the conditioned spaces must be insulated as per Section J1.2 and J1.5 of this report. Ensure compliant total systems R-Values are provided and installation procedures from manufacturer supplying insulation

CONTACT BUILDING & ENERGY CONSULTANTS AUSTRALIA PRIOR TO PURCHASING WINDOWS TO ENSURE WERS RATING COMPLIANCE

6. **Glazing and supporting frames** for this building must achieve a **U-Value and SHGC value (AFRC) as per Section J1.5**. **Glazing Certificate** to be provided at completion of job from the glazing supplier stating compliance with the nominated figures

Refer to **"Attachment G"** for outline of conditioned space.

***Note 1:** The principal designer, building contractor and insulation installers are to ensure all insulation materials, reflective foils, thermal breaks and installation componentry utilised as "linings or attachments" to achieve compliance with the thermal comfort criteria of this report, take into careful consideration the Fire Hazard Property requirements nominated under BCA Clause and Specification C1.10 and comply with AS1530.2 and AS1530.3 accordingly.*

***Note 2:** The principal designer, building contractor and insulation installers are to ensure all insulation, thermal breaks and installation componentry "associated with the external walls, internal common walls, bounding construction walls, fire resisting walls and services, lifts and stair shaft walls in a Building of Type B Construction or Type A Construction" utilised to achieve compliance with the thermal comfort criteria of this report, take into careful consideration the non-combustible criteria requirements nominated under BCA Clause C1.9 and AS1530.1 accordingly.*

***Note 3:** BECA dissolves itself from any responsibility associated with the selection of insulation, sarking type materials, thermal breaks and other componentry which fail to comply with the fire safety requirements provisions under Part C of the BCA.*

***Note 4:** Condensation issues have not been dealt with in this report.*

Part J3 – Building Sealing :

The recommendations below do not apply if to a ventilation opening that is necessary for the safe operation of a gas appliance & to a building where mechanical ventilation required by Part F4 provides sufficient pressurization to prevent infiltration.

7. A seal to restrict air infiltration— for the bottom edge of a 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

8. An entrance door to the conditioned areas must have an air-lock, self closing door, rapid roller door, revolving door or the like .

9. Miscellaneous exhaust fans located in the conditioned space must have self closing dampers installed.

10. Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope. these requirements do not apply to openings, grilles and the like required for smoke hazard management)

Part J5 – Air Conditioning & Ventilation System :

11. Air Conditioning & Ventilation systems to be certified by Mechanical Engineer / Consultant

Part J6 – Artificial Lighting & Power :

12. Electrical System to be certified by Electrical Engineer or Contractor.

Part J7 – Hot Water Supply:

Certification to be provided from a licensed plumber. Documentation to be provided on the Construction certificate plans.

13. A heated water supply system for food preparation and sanity purposes must be designed and installed in accordance with Part B2 of NCC Volume Three – Plumbing Code of Australia

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Part J8 – Facilities for Energy Monitoring:

Documentation to be provided on the construction certificate plans.

14. Facilities for energy monitoring must be provided as per Section J8.3 of this report.

3.0 BCA Compliance Assessment Section J – Energy Efficiency

The following provides an assessment of the subject design against the relevant 'Deemed To Satisfy (DTS) provisions of the BCA.

JV 3 (b) Onsite Renewable Energy Source

JV3 (b)	The annual Energy Consumption of a Building may be reduced by the amount of energy obtained by (i) An onsite renewable energy Source:	
	JV3 Solar Panel System to be installed. **Photo Voltaic Panels require to produce a minimum of 2,000 kWh / Year for each Building allowing for Panel tilt, orientation, onsite shading and all of the System Parameters including System Efficiency.**	Readily achievable

Part J1 Building Fabric

Section	Description	Requirements
J 1.1 Application of Part	The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of the conditioned areas. Refer to **"Attachment B"** for outline of conditioned space	Required to comply
J 1.2 Thermal construction general	(a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it— (i) 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 members; and (ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and (iii) does not affect the safe or effective operation of a service or fitting. (b) Where required, reflective insulation must be installed with— (i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and (ii) the reflective insulation closely fitted against any penetration, door or window opening; and (iii) the reflective insulation adequately supported by framing members; and (iv) each adjoining sheet of roll membrane being— (A) overlapped not less than 50 mm; or (B) taped together. (c) Where required, bulk insulation must be installed so that—	Readily achievable. Must be installed and certified to this section

	(i) 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 (ii) 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. (d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2. (e) 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 a roof or floor; or (ii) determined in accordance with Specification J1.5a for wall-glazing construction; or (iii) determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.	
J 1.3 Roof and ceiling construction	• The **roof/Ceiling** that is part of the envelope (exposed to the external environment) of the conditioned areas must achieve a minimum **Total R-Value of R3.7.** • **Ensure the insulation is not compressed to the point where the R-Value is reduced.** • Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of required ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling accordingly Refer to **"Attachment B"** for outline of conditioned space	Readily achievable
J 1.4 Roof lights	Not Applicable	Not Applicable

<table>
<tr>
<td>J 1.5 Walls</td>
<td>The total System U Value of wall-glazing must be calculated in accordance with SpecificationJ1.5a

DTS Values
<table>
<tr><th></th><th>North</th><th>East</th><th>Internal</th><th>West</th></tr>
<tr><td>Wall R-Value</td><td>1.00</td><td>1.00</td><td><s>1.4</s></td><td>1.00</td></tr>
<tr><td>Glazing U Value</td><td><s>2.50</s></td><td><s>2.50</s></td><td><s>5.60</s></td><td><s>2.50</s></td></tr>
<tr><td>Glazing SHGC</td><td><s>0.47</s></td><td><s>0.15</s></td><td><s>0.81</s></td><td><s>0.55</s></td></tr>
</table>
See Façade Calculator report “Attachment E”

<u>All Wall calculations need to allow for thermal Bridging in the calculation process.</u>

• Insulation to each part of an external wall of the conditioned areas must achieve a minimum Total R-Value of R1.0.

• <s>Insulation to each part of an Internal wall of the conditioned areas must achieve a minimum Total R-Value of R1.4.</s>

• Insulation to each part of an Internal wall of the conditioned areas has been removed in the JV3 model

• Double Glazed Clear Glass with Aluminium Frame has been used instead of Various Glass types used for calculating DTS Values. Total U Value 3.4 SHGC 0.63 in the JV 3 Model.

• Insulation to extend to the underside of the concrete floors and roof.

• Shading as per drawings.

• Fixed Shading devices as per drawings need to shade a minimum of 80% of the Summer Solar Radiation.

Contact Building & Energy Consultants Australia if you need assistance with the selection of insulation.

Refer to “Attachment B” for conditioned space</td>
<td>Readily achievable

Does not comply –

Alternative Solution to be provided – Refer to Section 4.0 of this report</td>
</tr>
<tr>
<td>J 1.6 Floors</td>
<td>No Applicable</td>
<td>Not Applicable</td>
</tr>
</table>

Part J3 Building Sealing

Section	Description	Requirements
J 3.1 Application of Part	The Deemed-to-Satisfy Provisions of this Part apply to the conditioned areas other than- • A permanent ventilation opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or • A building or space where the mechanical ventilation required by Part F4 provides sufficient pressurization to prevent infiltration.	Required to comply subject to compliance with application
J 3.2 Chimneys and flues	Not applicable	Not Applicable
J 3.3 Roof lights	Not Applicable	Not Applicable
J 3.4 windows and doors	• A door, openable window or the like must be sealed when forming part of the envelope • The requirements of above do not apply to— (i) a window complying with AS 2047; or (ii) a fire door or smoke door; or (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security. • A seal to restrict air infiltration— (i) for the bottom edge of a door, must be a draft protection device; and (ii) 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. An 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	Readily achievable
J 3.5 Exhaust fans	• An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.	Readily achievable
J 3.6 Construction of roofs, walls and floors	• Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of the envelope. • Construction required above must be— (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or (ii) sealed at junctions and penetrations with— (A) close fitting architrave, skirting or cornice; or (B) expanding foam, rubber compressible strip, caulking or the like. • The requirements above do not apply to openings, grilles or the like required for smoke hazard management.	Readily achievable

J 3.7 Evaporative Coolers	Not applicable	Not applicable

Part J5.0 Air-conditioning & Ventilation Systems

Part J 5 to be certified by Mechanical Engineer

Part J6 Artificial Lighting & Power

Part J 6 to be certified by Electrical Engineer

Part J7 Heated Water Supply And Swimming Pool And Spa Pool Plant

Section	Description	Requirements
J 7.2 Hot water supply	A heated water supply system for food preparation and sanitary purposes, must be designed and installed in accordance with Part B2 of NCC Volume Three Plumbing Code of Australia	Readily achievable. Must be installed and certified to this section
J 7.3 Swimming pool heating and pumping	Not Applicable	Not Applicable
J 7.4 Spa pool heating and pumping	Not Applicable	Not Applicable

Part J8 Facilities For Energy Monitoring

Section	Description	RequirementS
J 8.1 Application of Part	The *Deemed-to-Satisfy Provisions* of this Part do not apply within a sole occupancy unit of a Class 2 building or a class 4 part of a building.	Required to comply
J8.3 Facilities for energy monitoring	A building with a floor area of more than 500 m^2 must have an energy meter configured to record the time-of-use consumption of gas and electricity.	Readily achievable. Must be designed and certified to this section

4.0 Alternative Solution Assessment

Summary: An alternative solution has been developed to address the DTS non-compliances identified in Section 2.0 above.

BCA DTS Requirement	J1.5
Non-Compliance with BCA DTS Provision	• J1.5 – Double Glazed Clear glazing is to be used in lieu of various types of glazing
Relevant Performance Requirements	Pursuant to BCA Clause A2.2(3), all relevant performance requirements from within the same section and any other section must be identified and considered. The following performance requirements are identified as being the only relevant performance requirements JP 1 Energy Use
Assessment Methodology	BCA Clause A2.2(1)(a) complies with the Performance Requirements • BCA Clause A2.2(2)(b)(i) verification methods in the NCC 2019
Assessment & Analysis	**Assessment Method** ***Assessment Method – BCA Volume 1, Part* A2.2(1)(a)** This Building has been assessed using the JV3 Verification method using a "reference building" which is a NCC Alternative Solution to the Deemed to Satisfy (DTS) provisions. Simulations were conducted with EnergyPlus software which complies with the ABCB Protocol for Energy Analysis Software. This is in accordance with the requirements of the Verification Method JV3. Parameters for the energy simulation were taken from Specification JV – Annual Energy Consumption Criteria. Refer to **"Attachment H"** for a Simulation inputs "**Attachment E"** for Façade Calculator Report "**Attachment F"** for PMV Check **<u>Compliance Summary</u>** **JP1** This Development has been assessed using energy modeling under Verification method JV3. This method uses the Deemed to Satisfy (DTS) requirements to create a **"Reference Building"** and set a target for annual energy consumption .

	The calculated energy consumption for this building is **181120.61** kWh. Compliance 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 the **"Reference Building"** The **"Proposed Building"** specification was assessed to achieve an annual energy consumption for the building envelope of **182251.26** kWh. **JV 3 (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** **Proposed Building Photo Voltaic Panels require to produce a minimum of 2,000 kWh / Year allowing for Panel tilt, orientation, onsite shading and all of the System Parameters including System Efficiency.** The Deemed to Satisfy services are to be used for the proposed building. No changes to DTS Services. **With a Minimum of 2,000 kWh / Year for each Building, the energy consumption of the Proposed Buildings are less than the Reference Building so compliance with JV3 and JP1 is achieved.**

5.0 Conclusion

This assessment was based on drawings (as stated on page 3) of this report) for the Development Application lodgment.

The proposed design was assessed against the DTS provisions of Section J of the BCA (refer to Section 2.0 of this report).

The assessment revealed that while the proposed design is generally capable of satisfying the DTS provisions of the BCA (subject compliance with recommendations in Section 4.0), that Clause J1.5 are proposed to be addressed by alternative solution.

An alternative solution to address the relevant Performance Requirement JP1has been developed using the verification methods in the BCA (namely JV3). Refer to Section 3.0 of this report.

In summary, subject to the implementation of the recommendations of this report (as contained in Section 4.0, the Performance Requirements of Section J of the Building Code of Australia 2019, will be met.

Prepared by

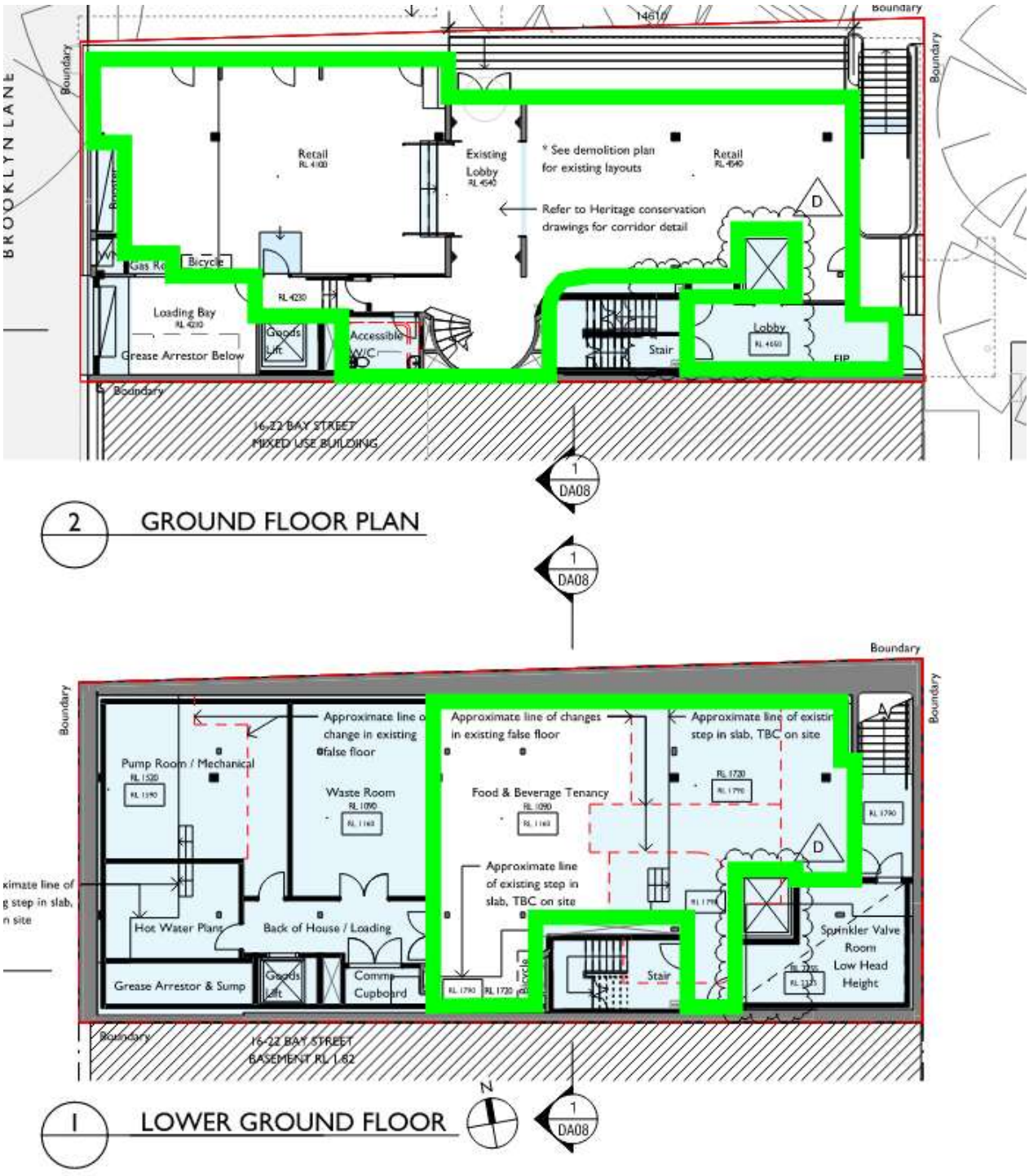
Thomas Ruck
Grad.Cert.Des.Sc.(Build Serv)
DMN / 20 / 1999

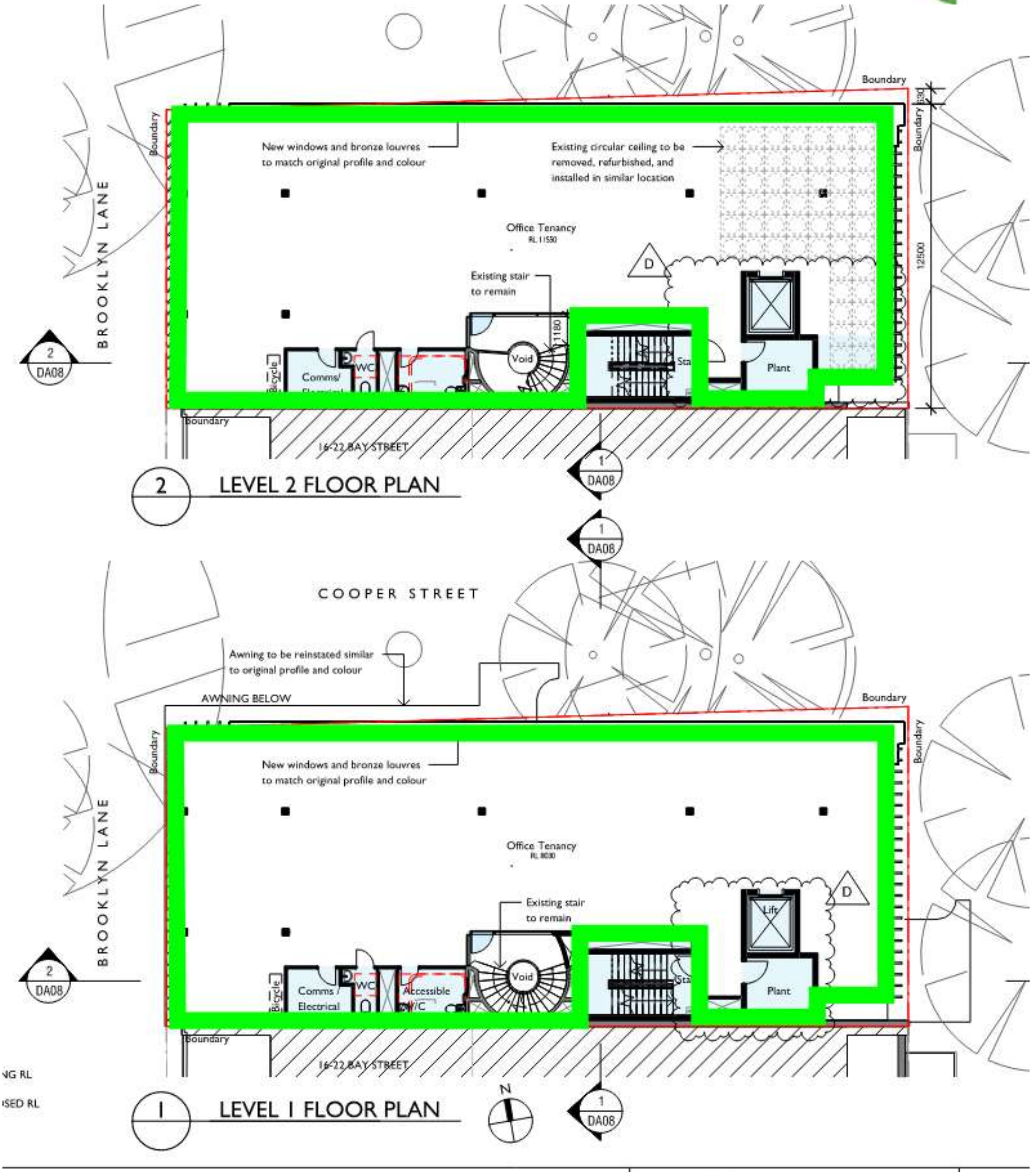
Approved by

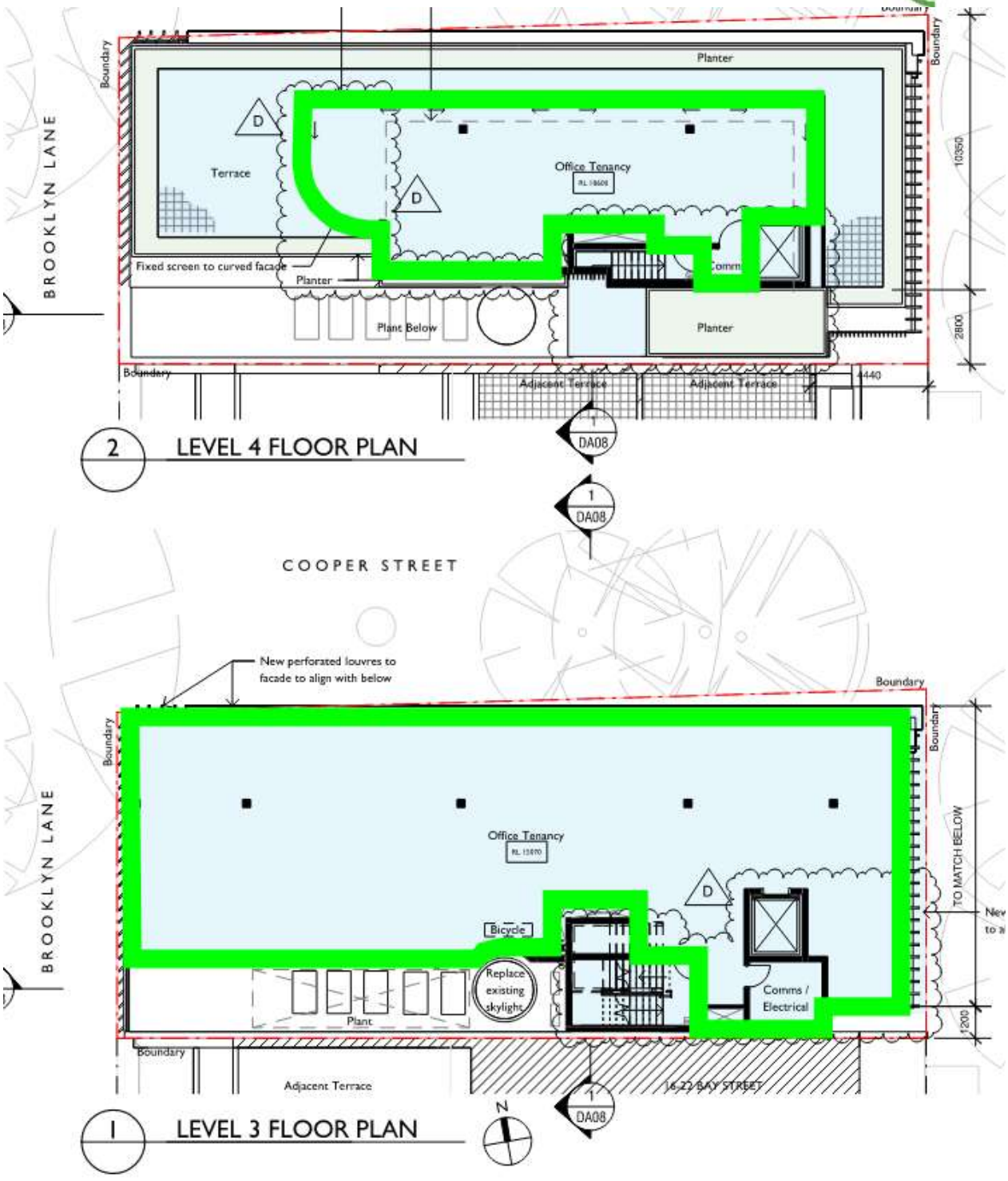
Paul Kouklidis
Grad.Dip.Build.Serv
Dip. Health & Building Surveying

Attachments

Attachment “B” Conditioned Space




Boundary
New windows and bronze louvres to match original profile and colour
Existing circular ceiling to be removed, refurbished, and installed in similar location
Office Tenancy
BROOKLYN LANE
Existing stair to remain
Void
Comms/ Electrical
WC
Bicycle
Plant
12500
16-22 BAY STREET
DA08
LEVEL 2 FLOOR PLAN
COOPER STREET
Awning to be reinstated similar to original profile and colour
AWNING BELOW
Lift
Accessible WC
LEVEL 1 FLOOR PLAN
N


BROOKLYN LANE
Boundary
Planter
D
Terrace
Office Tenancy
Fixed screen to curved facade
Planter
Plant Below
Planter
Boundary
Adjacent Terrace
Adjacent Terrace
4440
10350
2800
2 LEVEL 4 FLOOR PLAN
1 DA08
COOPER STREET
New perforated louvres to facade to align with below
Boundary
Office Tenancy
D
Bicycle
Replace existing skylight
Plant
Comms / Electrical
TO MATCH BELOW
1200
Boundary
Adjacent Terrace
16-22 BAY STREET
1 DA08
1 LEVEL 3 FLOOR PLAN
N

Attachment "C" Simulation Inputs

Weather file	Mascot Airport
External Shading	As per Drawings Supplied
Conditioned space temperature range	21° CDB to 24° CDB for 98% of plant operation times As per Table 2b, Specification JV
Occupancy and Operation Profiles	
Heat Gain per occupant	130 Watts / person (plus hot meals, 30 W/person)
Internal gains from appliances	As per table 2h, Specification JV
Ventilation	Modeled as mechanical ventilation in accordance with Part F4
Infiltration rate	1.5 Air changes /hour to conditioned areas of building
Domestic Hot Water	Omitted from the calculations of both the proposed building and reference building as per JV3 (e)

	Reference Building	Proposed Building
Roof Total R Value	R3.7	R3.7
Roof Surface Solar absorptance	0.45	As per plans
External Wall Total R Value -	R1.0	R1.0
Internal Wall Total R Value	R1.4	N/A
Suspended Floor	N/A	N/A
External Wall Surface Solar absorptance	0.60	As per drawing
Lighting Load	DTS Part J6	DTS Part J6
Air - Conditioning	DTS Part J5	DTS Part J5

Attachment “D” Simulation Outputs / Results

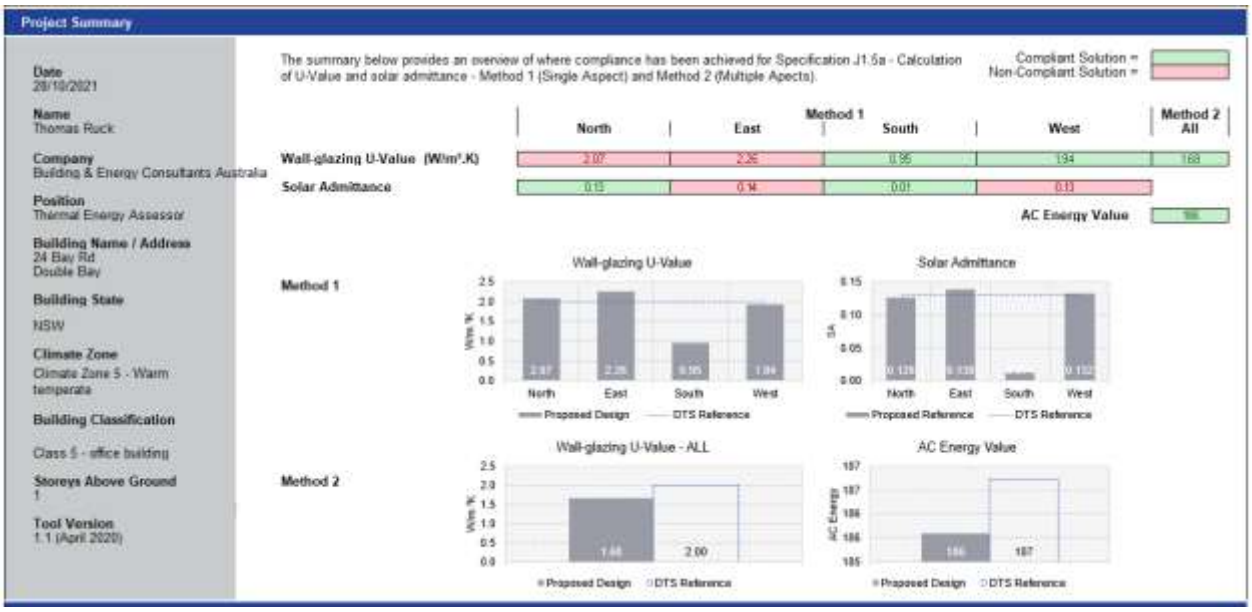
	Total Energy [kWh]
Reference Building	181120.61
Proposed Building	182251.26
Savings in energy	-1130.65

Proposed Building PV Panel System required to generate a minimum of 2,000 kWh / Year

Savings in energy	869.35
Savings in GHG	801.19

The energy loads stated in the above table are generated using design conditions and assumptions specified by Verification Method JV3 (BCA Section J, 2019), and will not reflect the actual operation of the building. This is in order to compare only the performance of the building fabric and services against the minimum DTS requirements of Section J. As such data listed should not be taken as predictive of realistic energy consumption.

Attachment “E” Facade Calculator



Attachment “F” PMV Check

Temperature Range Check and Thermal Comfort Report
Section J Temperature Range Check. Target temperature range: 21 - 24 degrees (occupied zones). 18 - 25 degrees (transitory occupancy (TO) zones).

All zones pass temperature check - **Building : PASS**

Block	Zone	Floor Area (m^2)	Fraction Total Floor Area	Building Class	Operation Hours	Operation Hours T below target	Operation Hours T in target range	Operation Hours T above target	Fraction Operation Hours T in target range	Zone temperature meets Section J target (T in target range ≥ 98 % Operation Hours)
1 Lower Ground	Retail	145.5	0.11	Class 6 shop/retail	1460	0	1454	6	0.996	PASS
2 Ground Floor	Retail 1	20.7	0.02	Class 6 shop/retail	1460	0	1453	7	0.995	PASS
2 Ground Floor	Retail 2	122.1	0.09	Class 6 shop/retail	1460	0	1451	9	0.994	PASS
2 Ground Floor	Retail 3	96.5	0.07	Class 6 shop/retail	1460	0	1458	2	0.999	PASS
3 Level 1	Commercial 1	300.2	0.22	Class 5	2610	0	2598	12	0.995	PASS
4 Level 2	Commercial 1	300.2	0.22	Class 5	2610	0	2600	10	0.996	PASS
5 Level 3	Commercial 1	237.4	0.18	Class 5	2610	0	2604	6	0.998	PASS
6 Level 4	Commercial 1	116.0	0.09	Class 5	2610	0	2599	11	0.996	PASS

Section J PMV Thermal Comfort Check. Target PMV range: -1.0 to +1.0

More than 95% (100.0%) of floor area passes PMV check - **Building : PASS**

Block	Zone	Floor Area (m²)	Fraction Total Floor Area	Building Class	Operation Hours	Operation Hours PMV below -1	Operation Hours PMV between -1 and 1	Operation Hours PMV above 1	Fraction Operation Hours PMV between -1 and 1	Zone PMV meets Section J target (greater than 98 % Operation Hours between -1 and 1)
1 Lower Ground	Retail	145.5	0.11	Class 6 shop/retail	1460	0	1460	0	1.000	PASS
2 Ground Floor	Retail 1	20.7	0.02	Class 6 shop/retail	1460	0	1460	0	1.000	PASS
2 Ground Floor	Retail 2	122.1	0.09	Class 6 shop/retail	1460	0	1460	0	1.000	PASS
2 Ground Floor	Retail 3	96.5	0.07	Class 6 shop/retail	1460	0	1455	5	0.997	PASS
3 Level 1	Commercial 1	300.2	0.22	Class 5	2610	0	2610	0	1.000	PASS
4 Level 2	Commercial 1	300.2	0.22	Class 5	2610	26	2584	0	0.990	PASS
5 Level 3	Commercial 1	237.4	0.18	Class 5	2610	0	2608	2	0.999	PASS
6 Level 4	Commercial 1	116.0	0.09	Class 5	2610	0	2593	17	0.993	PASS

Attachment “G” Disclaimer

Although great care has been taken to prepare this report, Building & Energy Consultants Australia Pty Ltd does not make any representation or give any warranties or assurances as to the accuracy or completeness of the information contained in the Report or the Report is free from errors or omission.

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