Northern Environmental Design

NCC PART J REPORT

Proposed Warehouse/Office

39 Ceres Drive
Thurgoona

FOR

VINCENT JARVIS STUDIO

6 November 2024

File 461O

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Issue	Date	Prepared by	Checked by	Status
A	6 November 2024	MD	Jonathan Duverge (Mechanical Engineer)	Draft

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1. INTRODUCTION

Northern Environmental Design has been engaged by Vincent Jarvis Studio to undertake NCC Part J Assessment on the proposed warehouse/office at 39 Ceres Drive Thurgoona with the objective of demonstrating compliance with Part J of the Building Code of Australia 2022.

Climate Zone: 4

Building Class: 5 (Office) and 7b (Warehouse)

This report was based on plans provided by Vincent Jarvis Studio:

Drawing No.	Description	Revision	Date
001	Cover page	WD01	26 Jul 2024
002	Project information	WD01	26 Jul 2024
003	Cover Page	WD01	26 Jul 2024
101	General notes	WD01	26 Jul 2024
102	Survey	WD01	26 Jul 2024
103	Site plan	WD01	26 Jul 2024
104	Subfloor plan	WD01	26 Jul 2024
105	Level G plan	WD01	26 Jul 2024
106	Roof plan	WD01	26 Jul 2024
107	RCP	WD01	26 Jul 2024
201-202	Elevation	WD01	26 Jul 2024
203	Section	WD01	26 Jul 2024
204-205	Wall section	WD01	26 Jul 2024
301	Plan details	WD01	26 Jul 2024
400-404	Interiors	WD01	26 Jul 2024
601	Perspectives	WD01	26 Jul 2024
701	Door schedule	WD01	26 Jul 2024
702	Window schedule	WD01	26 Jul 2024
801	Back cover	WD01	26 Jul 2024

- Discussions and correspondence with:
    - Vincent Jarvis Studio

2. PART J4 Building Fabric

Part J4D3 – General Thermal Construction

Section	Requirements	Required	Compliance Action required
J4D3- **Insulation**	(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; (c) does not affect the safe or effective operation of a service or fitting	**Yes**	**To be complied with**
	(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.	**Yes**	**To be complied with**
	(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.	**Yes**	**To be complied with**

Section	Requirements	Required	Compliance Action required
J4D3 (5)- **Thermal bridging**	The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be— (a) calculated in accordance with AS/NZS 4859.2 for a roof or floor; or (b) determined in accordance with Specification 37 for wall-glazing construction; or (c) determined in accordance with Specification 39 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces	**Yes**	**Thermal bridging has been included in building envelope R-Value and U Value calculation**

Part J4D4 – Roof and Ceiling Construction

Section	Requirements	Required	Compliance Action required
J4D4 (1) - **Roof insulation**	A roof or ceiling must achieve Total R-Value greater than or equal to— (a) climate zones 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow (b) climate zone 6, R3.2 for a downward direction of heat flow; and (c) climate zone 7, R3.7 for an upward direction of heat flow; (d) climate zone 8, R4.8 for an upward direction of heat flow.	**Yes** **R 3.7 total require in downward direction. (Office ceiling only)**	**Complies** **R 5.0 insulation specified** **Refer to Appendix 1 for calculation.**
J4D4 (2)- **Solar Absorptance**	In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.	**Yes**	**Complies** **Surfmist colour with a SA 0.33 specified.** **Roof colour must have a solar absorptance value of no more than 0.45 to comply.** **Example of colours is listed in Appendix 2**

Part J4D5 – Roof Lights

Section	Requirements	Required	Compliance Action required
J4D5 - **Roof insulation**	Roof lights must have— (a) a total area of not more than 5% of the floor area of the room or space served; and (b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of— (i)Total system SHGC, in accordance with Table J4D5; and (ii)Total system U-Value, not more than U3.9.	N/A	N/A

Part J4D6 – Walls and Glazing

Section	Requirements	Required	Compliance Action required
J4D6 (1) -	The Total System U-Value of wall-glazing construction, including wall-glazing construction which wholly or partly forms the envelope internally, must not be greater than— (a) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, U2.0; and (b) for a Class 3 or 9c building or a Class 9a ward area— (i) in climate zones 1, 3, 4, 6 or 7, U1.1; or (ii) in climate zones 2 or 5, U2.0; or (iii) in climate zone 8, U0.9	**Yes** **U 2.0**	**U 1.47 achieved** **Refer Appendix 3 for façade calculator**
J4D6 (2) – Display glazing	The Total System U-Value of display glazing must not be greater than U5.8	N/A	N/A

External Wall Construction

Section	Requirements	Required	Compliance Action required
J4D6 (4) -	Wall components of a wall-glazing construction must achieve a minimum Total R-Value of (a) where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or (b) where the wall is 80% or more of the area of the wall-glazing construction, the value specified in Table J4D6a.	**Yes** **All external walls of the offices and internal walls of office shared with warehouse**	**Complies** **R 2.5 insulation specified to external lightweight & internal walls of office** **Refer to Appendix 4 for wall calculation**

Glazing

Section	Requirements	Glazing Specification
	Specification of glazing used for compliance	**All windows to be Aluminium Single Glazed Grey.** ***All Glazing*** **Aluminium Frame Single Glazed Grey** **U value: 5.8** **SHGC: 0.31**

Part J4D7 – Floors

Section	Requirements	Required	Compliance Action required
J4D7 -	(1) A floor must achieve the Total R-Value specified in Table J4D7. (2) For the purposes of (1), a slab-on-ground that does not have an in-slab heating or cooling system is considered to achieve a Total R-Value of R2.0, except— (a) in climate zone 8; or (b) a Class 3, Class 9a ward area or Class 9b building in climate zone 7 that has a floor area to floor perimeter ratio of less than or equal to 2.	**Yes** **R 2.0 total achieved for slab-on-ground** **(Climate 4 and no in-slab heating or cooling)**	**No insulation required for slab-on-ground.**

3. PART J5 Building Seal

Section	Requirements	Required	Compliance Actions Required
J5D3 – **Chimneys and flues**	The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.	N/A	N/A

Section	Requirements	Required	Compliance Actions Required
J5D4 – **Roof lights**	(1) A roof light must be sealed, or capable of being sealed, when serving— (a) a conditioned space; or (b) a habitable room in climate zones 4, 5, 6, 7 or 8. (2) A roof light required by (1) to be sealed, or capable of being sealed, must be constructed with— (a) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level or (b) weatherproof seal; or a shutter system readily operated either manually, mechanically or electronically by the occupant.	N/A	N/A
J5D5 – **Windows and doors**	(1) A door, openable window or the like must be sealed— (a) when forming part of envelope or (b) in climate zones 4, 5, 6, 7 or 8. (2) Do not apply to window compying with AS 2047, a fire door or smoke door or a roler shutter grill or other security door. (3) A seal to restrict air infiltration— (a) for the bottom edge of a door, must be a draft protection device; and (b) 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) 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, other than— (a)where conditioned space has a floor area of not more than 50 m^2; 5)A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.	**Yes**	**Will comply**
J5D6 – **Exhaust fans**	A miscellaneous exhaust fan 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 in zones 4, 5, 6, 7 or 8.	**Yes**	**All exhaust fans will be sealed**

Section	Requirements	Required	Compliance Actions Required
J5D7 – **Construction of roofs, walls and floors**	Roofs, 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 or the external fabric of a habitable room or a public area.	**Yes**	**Construction gaps & cracks sealed in accordance with J5D7**
J5D8 – **Evaporative coolers**	An evaporative cooler must be fitted with a self-closing damper when serving a heated space or in climate zones 4, 5, 6, 7 or 8	N/A	N/A

4. PART J6 Air Conditioning & Ventilation Systems

Section	Requirements	Required	Compliance Action Required
J6D3	Air-conditioning systems		
	(1) An air-conditioning unit or system must:	**TBC**	
	(i)must be capable of being deactivated when the building or part of a building served by that system is not occupied;	**Yes**	**Adopt as report condition**
	(ii) when serving more than one air-conditioning zone or area with different heating or cooling needs, must— (A) thermostatically control the temperature of each zone or area;	**Yes**	**Adopt as report condition**
	(iii) which provides the required mechanical ventilation, other than in climate zone 1 or where dehumidification control is needed, must have an outdoor air economy cycle if the total air flow rate of any airside component of an air-conditioning system is greater than or equal to the figures in Table J5.2;	N/A	N/A
	(iv) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating	N/A	N/A
	(vi) with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied;	N/A	N/A

Section	Requirements	Required	Compliance Action Required
	(vii) when serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole occupancy unit that opens to a balcony or the like, is open for more than one minute;	N/A	N/A
	(b) When two or more air-conditioning systems serve the same space they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.	N/A	N/A
Time Switch	(a)A time switch must be provided to control (i) an air-con.system of more than 2 kWr and (ii) a heater of more than 1 kWHeating used for air conditioning. (b) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.	**Yes**	**Adopt as report condition**
J6D4	**Mechanical Ventilation Systems**		
	(1) A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must— (a) be capable of being deactivated when the building or part of the building served by that system is not occupied	N/A	N/A
	(2) Exhaust systems — An exhaust system with an air flow rate of more than 1000 L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a sole-occupancy unit in a Class 2, 3 or 9c building.	N/A	N/A
	(3) Carpark exhaust systems — Carpark exhaust systems must have a control system in accordance with— (i) 4.11.2 of AS 1668.2; or (ii) 4.11.3 of AS 1668.2.	N/A	N/A
	(4) A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.	N/A	N/A

Section	Requirements	Required	Compliance Action Required
J6D5	**Fan System**		
	(1) Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must— (a) separately comply with (2), (3), (4) and (5); or (b) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (2), (3), (4) and (5) together.	N/A	N/A
J6D6	**Ductwork Insulation**		
	Ductwork and fittings in an air-conditioning system must be provided with insulation— (a) complying with AS/NZS 4859.1; and (b) having an insulation R-Value greater than or equal to— (i) for flexible ductwork, 1.0; or (ii) for cushion boxes, that of the connecting ductwork; or (iii) that specified in Table J6D6.	**Yes**	**Adopt as report condition**
J6D12	**Unitary air-conditioning equipment**		
	Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr— (a) where water cooled, have a minimum energy efficiency ratio of 4.0 W_r / W_{input} power for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or (b) where air cooled, have a minimum energy efficiency ratio of 2.9 W /W_{input} power for cooling when r tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.	**Yes**	**All air-conditioning systems will comply with MEPS**

5. PART J7 Artificial Lighting & Power

Section	Requirements	Required	Compliance Actions Required
J7D3	Artificial lighting		
	In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building— (i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in Table J7D3a	**Yes**	**The lighting design complies based on the following assumptions:** **LT01: 15W** **LT03: 200W** **Refer to Appendix 5 for lighting calculation**
J7D4	Interior artificial lighting and power control		
	(1) All artificial lighting of a room or space must be individually operated by– (a) a switch; or (b) other control device (c) a combination of (a) and (b)	**Yes**	**Complies**
	(2) An occupant activated device, such as a room security device, a motion detector in accordance with Specification 40, or the like, must be provided in the sole-occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the sole-occupancy unit is unoccupied.	NA	N/A
	(3) An artificial lighting switch or other control device in (1) must— (a) if an artificial lighting switch, be located in a visible and easily accessed position— (i) in the room or space being switched; or (ii) in an adjacent room or space from where 90% of the lighting being switched is visible; and	N/A	N/A

Section	Requirements	Required	Compliance Actions Required
	(4) 95% of the light fittings in a building or storey of a building, other than a Class 2 or 3 building or a Class 4 part of a building, of more than 250 m^2 must be controlled by— (a) a time switch in accordance with Specification 40; or (b) an occupant sensing device such as— (i) a security key card reader that registers a person entering and leaving the building; or (ii) a motion detector in accordance with Specification 40.	N/A	N/A
	(5) In a Class 5, 6 or 8 building of more than 250 m^2, artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where	**Yes**	**Adopt as report condition**
	(6) Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector in accordance with Specification J6.	N/A	N/A
	(7) Artificial lighting in a foyer, corridor and other circulation spaces— (a) of more than 250 W within a single zone; and (b) adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification 40.	N/A	N/A
J7D5	Interior decorative and display lighting		
	(1) Interior decorative and display lighting such as foyer must be controlled separately, by manual switch or time switch in accordance to specification 40.	N/A	N/A
	(2)Window display lighting must be controlled separately	N/A	N/A

Section	Requirements	Required	Compliance Actions Required
J7D6	Exterior Artificial Light		
	Exterior artificial lighting attached to or directed at the facade of a building, must— (a) be controlled by— (i) a daylight sensor; or (ii) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; (b) when the total lighting load exceeds 100 W— (i) use LED luminaires for 90% of the total lighting load; or (ii) be controlled by a motion detector in accordance with Specification J6; or (ii) when used for decorative purposes, such as façade lighting or signage lighting, have a separate time.	**Yes**	**Adopt as report condition**
J7D7	Boiling water and chilled water storage units		
	Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification 40.	**Yes**	**Adopt as report condition**
J7D8	Lifts		
	Lifts must— (a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and (b) achieve the idle and standby energy performance level in Table J7D8a; and (c) achieve the energy efficiency class in Table J7D8b	N/A	N/A

6. PART J8 Hot Water Supply & Swimming Pool / Spa Pool Plant

J8D2 Heated 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

J8D3 Swimming pool heating and pumping, and J8D4 Spa pool heating and pumping is not applicable to this project.

7. PART J9 Access for Maintenance & Facilities Monitoring

Section	Requirements	Required	Compliance Action Required
J9D3	Facilities for energy monitoring		
	(1) A building or sole-occupancy unit with a floor area of more than 500m^2 must have the facility to record the consumption of gas and electricity	**Yes**	**Adopt as report condition**
	(2) A building with a floor area of more than 2 500 m2 must have energy meters configured to enable individual time-of use energy consumption data recording, in accordance with (c), 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	N/A	N/A

Section	Requirements	Required	Compliance Action Required
	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 stored, analysed and reviewed.	N/A	N/A
J9D4	Facilities for electric vehicle charging equipment		
	(1) Subject to (2), a carpark associated with a Class 2, 3, 5, 6, 7b, 8 or 9 building must be provided with electrical distribution boards dedicated to electric vehicle charging— (a)in accordance with Table J9D4 in each storey of the carpark; and labelled to indicate use for electric vehicle charging equipment.	**Yes**	**Adopt as report condition**
J9D5	Facilities for solar photovoltaic and battery systems		
	(1) The main electrical switchboard of a building must— (a) contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for— (i)a solar photovoltaic system; and (ii)a battery system; and (b) be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical outputon at least 20% of the building roof area. (2) At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, exceptfor buildings— (a) with installed solar photovoltaic panels on— (i)at least 20% of the roof area; or (ii)an equivalent generation capacity elsewhere on-site; or (b) where 100% of the roof area is shaded for more than 70% of daylight hours; or	**Yes**	**Adopt as report condition**

Appendix 1: Roof and Ceiling R Value Calculation

Roof & Ceiling R Value Calculation	
Air Film (Outdoor)	0.04
Roof Sheeting	0
Insulation under roof sheeting allowing for thermal bridging	0.00
Space above office	0.3
Ceiling Insulation allowing for Thermal Bridging	3.44
Plasterboard	0.06
Air Film (Indoor)	0.11
Total	3.95
Required R Value	3.70
Thermal Bridging - CEILING	
R_1 Insulation R-Value	5
R_2 Framing R-Value	0.90
Wall Height (mm)	200
Stud width (mm)	45
Stud breadth (mm)	90
Stud spacing (mm)	900
Top Plate thickness (mm)	0
Nogging (mm)	0
Bottom Plate thickness (mm)	0
f_1	0.900
f_2	0.100
$1/R_b$	0.291
R_b R-Value of ceiling (incl Thermal bridging)	3.44

Appendix 2: Solar Absorptance Values for Roof Colours

Colour	Solar Absorptance
Whitehaven®	0.23
Classic Cream™	0.32
Surfmist®	0.32
Galactic®	0.34
Cosmic®	0.39
Paperbark®	0.42
Evening Haze®	0.43
Shale Grey™	0.43

Appendix 3: Façade Calculator

Façade
Report

Calculator

Project Summary

Date
6/11/2024

Name
Jonathan Duverge

Company
Northern Environmental Design

Position
Director

Building Name / Address
39 Ceres Drive Thurgoona
Proposed Warehouse/Office

Building State
VIC

Climate Zone
Climate Zone 4 - Hot dry summer, cool winter

Building Classification
Class 5 - office building

Storeys Above Ground
1

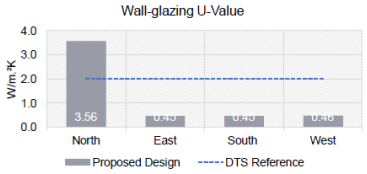
Tool Version
1.5 (May 2024)

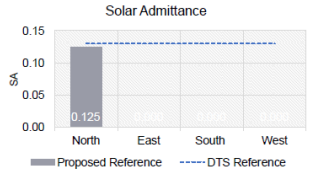
The summary below provides an overview of where compliance has been achieved for Specification S37 - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

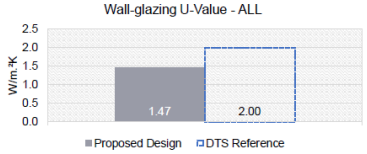
	Method 1 North	East	South	West	Method 2 All
Wall-glazing U-Value (W/m².K)	3.56	0.45	0.45	0.46	1.47
Solar Admittance	0.13				
AC Energy Value					15

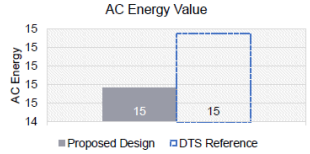
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	33.372	0	0	0
Glazing to Façade Ratio	58%	0%	0%	0%
Glazing References	W W1			
Glazing System Types	Fixed			
Glass Types	Single Glazing - low-E coating			
Frame Types	Aluminium			
Average Glazing U-Value (W/m².K)	5.80			
Average Glazing SHGC	0.31	0.00	0.00	0.00
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	24.228	30.69	57.6	30.69
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	Lightweight Wall + Timber stud R2.5	Internal (Timber stud) + R 2.5	Internal (Timber stud) + R 2.5	Internal (Timber stud) + R 2.5
Wall Thickness	150	120	120	150
Average Wall R-value (m².K/W)	2.16	2.22	2.22	2.16
Solar Absorptance	0.7 0.5	0.7 0.5	0.7 0.5	0.7 0.5

Appendix 4: Wall R-Value Calculation

LIghtweight timber stud wall - R Value Calculation	
Air Film (Outdoor)	0.04
Metal cladding	0
Insulation allowing for Thermal Bridging	1.94
Plasterboard	0.06
Air Film (Indoor)	0.12
Total	2.16
Thermal Bridging - Timber stud wall	
R_1 Insulation R-Value	**2.5**
R_2 Framing R-Value	0.75
Wall Height (mm)	3100
Stud width (mm)	90
Stud breadth (mm)	45
Stud spacing (mm)	600
Top Plate thickness (mm)	90
Nogging (mm)	35
Bottom Plate thickness (mm)	35
f_1	0.877
f_2	0.123
$1/R_b$	0.515
R_b R-Value of wall (incl Thermal bridging)	1.94

Internal timber stud wall - R Value Calculation	
Air Film (Outdoor)	0.04
Plasterboard	0.06
Insulation allowing for Thermal Bridging	1.94
Plasterboard	0.06
Air Film (Indoor)	0.12
Total	2.22
Thermal Bridging - Timber stud wall	
R_1 Insulation R-Value	**2.5**
R_2 Framing R-Value	0.75
Wall Height (mm)	3100
Stud width (mm)	90
Stud breadth (mm)	45
Stud spacing (mm)	600
Top Plate thickness (mm)	90
Nogging (mm)	35
Bottom Plate thickness (mm)	35
f_1	0.877
f_2	0.123
$1/R_b$	0.515
R_b R-Value of wall (incl Thermal bridging)	1.94

Appendix 5: Lighting Calculation

ABCB

Non-residential Lighting

National Construction Code

Calculator

Building name/description	Classification
5	Class 5

Number of rows preferred in table below: 8 *(as currently displayed)*

ID	Description	Floor area of the space	Perimeter of the space	Floor to ceiling height	Design illumination power load	Space	Illuminance: Designed lux level	Illuminance: Recommended lux level	Adjustment factor 1	Adjustment factor 1: Dimming % area	Adjustment factor 1: Illuminance turndown	Adjustment factor 2	Adjustment factor 2: Dimming % area	Adjustment factor 2: Illuminance turndown	Light colour adjustment factors: Light colour adjustment factor 1	Light colour adjustment factors: Light colour adjustment factor 2	SATISFIES PART J7D3: System illumination power load allowance	SATISFIES PART J7D3: Lighting system share of % of aggregate allowance used
							These columns do not represent a requirement of the NCC and are suggestions only.		Adjustment factors			Adjustment factors						
1	Warehouse	735.0 m²	122 m	5.7 m	2800 W	Wholesale storage area with a vertical illuminance target of 160 lx									a) CRI ≥ 90	c) CCT ≥ 4500 K	3453 W	85% of 72%
2	Reception	65.0 m²	33 m	3.1 m	135 W	Office - artificially lit to an ambient level of 200 lx or more											413 W	4% of 72%
3	Office	51.5 m²	29 m	3.1 m	120 W	Office - artificially lit to an ambient level of 200 lx or more											336 W	4% of 72%
4	Meeting	13.4 m²	15 m	3.1 m	45 W	Office - artificially lit to an ambient level of 200 lx or more											100 W	1% of 72%
5	PO	8.6 m²	12 m	3.1 m	30 W	Office - artificially lit to an ambient level of 200 lx or more											67 W	1% of 72%
6	Kitchen	14.0 m²	15 m	3.1 m	60 W	Kitchen and food preparation area											93 W	2% of 72%
7	Store	9.2 m²	12 m	3.1 m	30 W	Storage											*24 W*	1% of 72%
8	WC	18.0 m²	18 m	3.1 m	90 W	Toilet, locker room, staff room, rest room and the like											*89 W*	3% of 72%

Total	3310 W

Total	4575 W

if inputs are valid ✓

Appendix 6: Insulation Diagram