EAGERS AUTOMOTIVE LIMITED

NCC SECTION J-J1V3 REPORT

Bungaree Street, Maitland – Newcastle Heritage Mazda

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Jensen Hughes Australia

Providing building regulations, fire engineering, accessibility, and energy consulting services to NSW for over 25 years

Our story begins in 1997 with the founding of BCA Logic to fulfill the demand of a consultancy company whose expertise expanded across the entire life cycle of a building, from consulting on the initial planning through to construction and occupation.

BCA Logic, SGA Fire and BCA Energy joined Jensen Hughes in 2021, a leading global, multi-disciplinary engineering, consulting and technology firm focused on safety, security and resiliency. We continue to be at the forefront of our industry and work thoroughly to preserve our position by ensuring the successful delivery of projects.

Jensen Hughes was launched in 2014 through the historic merger of Hughes Associates and Rolf Jensen & Associates (RJA), two of the most experienced and respected fire protection engineering companies at the time. Since then, we have gained market leadership in nuclear risk consulting and established commanding positions in areas like forensic engineering, security risk consulting and emergency management. Over the past 22 years, our integration of more than 30 privately held engineering and consulting firms has dramatically expanded our global footprint, giving us a powerful market presence ten times larger than our nearest competitor in some of our markets and extending our historical lineage back to 1939.

With more than 90 offices and 1500 employees worldwide supporting clients globally across all markets, we utilise our geographic reach to help better serve the needs of our local, regional, and multinational clients. In every market, our teams are deeply entrenched in local communities, which is important to establishing trust and delivering on our promises.

Glossary & Definition

Term	Definition
Conditioned space	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.
Display glazing	Glazing used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant.
DTS	Deemed-to-satisfy
GHG	Greenhouse Gas
Lumens	Luminous flux, equal to the amount of light emitted per second from a uniform source of 1 candela
Lux	Light intensity in a specific area (1 lux = 1 Lumen/m^2)
PMV	Predictive Mean Vote
PS	Performance solution
PV	Photovoltaic
Rt	Total R-value for the system
R-value (m^2.K/W)	The thermal resistance of a component calculated by dividing its thickness by its thermal conductivity
SA	Solar absorptance
SHGC	Solar heat gain coefficient
U-value (W/m^2K)	The thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances
VLT	Visible Light Transmission

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Executive Summary

Jensen Hughes Pty Limited (Jensen Hughes) has been engaged by Eagers Automotive Limited to provide an assessment to meet the Section J requirements of the National Construction Code (NCC) 2022, Volume 1 for the proposed project at Bungaree Street, Maitland – Newcastle Heritage Mazda. The report outlines and nominates the minimum prescriptive requirements for the proposed project to achieve Deemed-to-satisfy (DTS) compliance. Should the DTS pathway be proven to be impractical, a J1V3 performance-based design solution can be adopted as an alternative section J compliance pathway.

Table 1: Building Fabric Requirements

Building Element	DTS Compliance Requirements	Compliance Recommendation	Building Fabric Total R-Value	Comply
Roof – Metal Roof	Rt3.70 (downwards) SA < 0.45	+ R1.30 Anticon 60 + R1.50 ceiling batts + 20mm reflective airgap	Rt4.07	To show on drawings
External Wall – Steel Stud Wall	Rt1.40	+ R2.00 bulk insulation + R0.2 thermal break on steel stud	Rt1.55	To show on drawings
Floor – Slab on Ground (Showroom)	Rt2.00	+ No insulation required	Rt2.06	Yes
Floor – Slab on Ground (Workshop)	~~Rt2.00~~	+ No insulation required (Removed via J1V3)	Rt1.46	Yes

Note: For non-compliance building elements, refer to recommended design to achieve DTS compliance OR J1V3 performance solution for alternative compliance pathway.

Table 2: Glazing Requirements

Location	Max System U-Value	Max System SHGC	Compliance Recommendation
Showroom	5.80	0.80	Single, low-e, clear, Al frame
Workshop	8.00	0.77	Single, clear, Al frame

The intention of J1V3 verification method is to enable design flexibility exceeds the DTS provisions, which primarily beneficial to the following components of the proposed project:

+ Remove floor insulation for workshop area;
+ Increase roof solar absorptance;
+ Utilise an on-site solar PV system to offset GHG emissions;

- Ensure buildability and availability of materials in the Australian market;
- Allow 'trade-offs' in improving the building envelope as a system;
- Allow innovation and better interaction of building fabric.

To satisfy the J1V3 verification methodology, the annual energy consumption & greenhouse gas (GHG) emission of the proposed building design must not more than reference building design which comprised of all the DTS requirements; AND the proposed building must also comply to the minimum thermal comfort provision. The following simulations have been conducted to demonstrate J1V3 compliance:

- Model 1 - Reference building + Reference services (Building fabrics and building services requirement as per DTS provision)
- Model 2 - Proposed Building + Reference services (Building fabrics as per design intent, and building services as per DTS provision)

Based on the modelling results and analysis, the proposed building achieves the following items:

J1V3 Results Summary	
Proposed Building GHG Emission Reduction	0.33%
Thermal Comfort PMV level	100% of floor areas during 100% of occupancy hours

This is deemed compliant under the NCC2022 Section J Energy Efficiency J1V3 verification method.

Based on the project nominated design specification, the proposed development complies or can comply with the Code under NCC2022 Section J DTS pathway.

1.0 Introduction

1.1 THE PROJECT

The building development, the subject of this report, is located at Bungaree Street, Maitland – Newcastle Heritage Mazda and consists of car showroom and workshop.

1.2 BUILDING CLASSIFICATION

The building has been classified as follows:

Table 3: Building Classifications

Class	Level	Description
6	Ground	Car showroom and workshop

1.3 CLIMATE ZONE

The location of the project is set within the following climate zones:

Table 4: Climate Zones

Location	Climate Zone & Description
Maitland	Climate Zone 5 - Warm temperature

1.4 BUILDING CODE OF AUSTRALIA

The Building Code of Australia currently applicable to this project is the National Construction Code Series Volume 1 - Building Code of Australia 2022. Please note that the version of the NCC applicable is the version applicable at the time of the Construction Certificate Application is dated as received by the certifying authority.

1.5 REPORT SCOPE

Section J Part	DTS	J1V3	Comment
Part J4 – Building Fabric	Yes	Yes	Performance requirements outlined in this report will achieve compliance with J1V3 alternative solution.
Part J5 – Building Sealing	Yes	No	DTS compliance to be documented by Architect
Part J6 – Air Conditioning and Ventilation	No	No	DTS compliance to be documented by Services Engineer

Part J7 – Artificial Lighting and Power	No	No	DTS compliance to be documented by Electrical Engineer
Part J8 – Hot Water Supply and Swimming Pool and Spa Pool Plant	Yes	No	DTS compliance to be documented by Hydraulics Engineer
Part J9 – Energy Monitoring and On-site Distributed Energy Resources	Yes	No	DTS compliance to be documented by Electrical Engineer

1.6 LIMITATIONS

This report does not include nor imply any detailed assessment for design, compliance or upgrading for:

1. Sections B, C, D, E, F, G, H and I of the NCC;
2. The structural adequacy or design of the building;
3. The inherent derived fire-resistance ratings of any proposed structural elements of the building (unless specifically referred to); and
4. The design basis and/or operating capabilities of any proposed electrical, mechanical or hydraulic fire protection services.

The report does not include, or imply compliance with:

5. The National Construction Code - Plumbing Code of Australia Volume 3
6. The Disability Discrimination Act;
7. The Premises Standard;
8. Demolition Standards not referred to by the NCC;
9. Occupational Health and Safety Act;
10. Requirements of other Regulatory Authorities including, but not limited to, Telstra, Sydney Water, Electricity Supply Authority, WorkCover, RMS, Council and the like; and
11. Conditions of Development Consent
12. For fire hazard properties and non-combustibility requirements of insulation and/ or sarking, refer to the relevant parts of the NCC.

For the J1V3 assessment:

13. The building has been modelled to the current J1V3 Specifications set out in the NCC 2022. This includes J1V3 verification using a reference building design criteria J1V3 (1) to (3) along with Specification 33 to 35 for greenhouse gas (GHG) emission factor, occupancy, A/C, appliances and lighting profiles.
14. This J1V3 does not give the actual annual energy consumption/GHG emission for the building; rather it gives an estimate of the expected annual energy consumption/greenhouse gas emission of the building with the chosen fabric and services provided in co-ordination with Specification 33 to 35.

1.7 DESIGN DOCUMENTATION

This report has been based on the Design plan and specification listed in Annexure A.

2.0 J1V3 Assessment – to be assessed

2.1 OVERVIEW

The intent of carrying out a J1V3 Verification Method is to allow flexibility in achieving the following outcomes:

- Remove floor insulation for workshop area;
- Increase roof solar absorptance;
- Utilise an on-site solar PV system to offset GHG emissions;
- Ensure buildability and availability of materials in the Australian market;
- Allow 'trade-offs' in improving the building envelope as a system;
- Allow innovation and better interaction of building fabric.

2.2 ASSESSMENT PROCESS

- Building Energy Modelling
    a. Reference building - DTS Reference building fabrics + DTS reference building services
    b. Proposed building 1 - Proposed building fabrics + DTS reference building services
    c. Proposed building 2 - Proposed building fabrics + Proposed building services
- Include renewable energy offset where applicable
- Convert annual energy consumption to annual greenhouse gas emission
- Assess thermal comfort level as per Predicted Mean Vote (PMV) criteria
- Compare annual greenhouse gas emission vs. thermal comfort level outcomes AND verify compliance status

Note: The project is committed to achieving proposed building services equal or better than DTS provision, hence the proposed building 2 is deemed to comply when the proposed building 1 achieves compliance requirement.

2.3 J1V3 INPUT SUMMARY

The following tables contain the input data used in the J1V3 assessment:

Table 5: Input data summary

Input Data Summary	
Energy Simulation Software	IES VE 2023
Weather Data	Sydney Airport
Occupant Density	Refer to Table D2D18 *Area per person according to use*

Input Data Summary	
Maximum Illumination Power Density	Refer to Table J7D3a *Maximum illumination power density*
Internal Heat Gains for Appliances	Refer to *Specification 35*; Table S35C2l
Operation Profiles	Refer to *Specification 35*; Table S35C2a to S35C2k

Note: The area input in the model is only related to the relevant areas for the energy simulation purpose which covers the Section J scope and may not reflect the actual building floor areas of the proposed development.

Table 6: Building fabric summary – Reference and proposed model

Building Fabric Summary – Reference and Proposed Model		
Building Element	**Reference Model (DTS)**	**Proposed Model**
Roof	Rt 3.70, SA < 0.45	As per Section J
External Wall	Rt 1.40	As per Section J
Concrete Floor Slab	Rt 2.00	Removed through J1V3 assessment
External Glazing	Workshop: + Total System U-value: 8.00 + Total System SHGC: 0.77	

Note: Building fabric R-value that differ from DTS may impact thermal loads of air conditioning and ventilation systems

Table 7: Onsite energy generation

Onsite Energy Generation			
Energy Type	**Reference Model (DTS)**	**Proposed Model**	**Annual Energy Offset (MWh)**
Solar PV Panels	N/A	No Provision	N/A

Note: The PV system installed must achieve the annual energy offset at minimum. A CEC Accredited professional must be consulted for the design and install of a solar PV System

Table 8: Thermal comfort standard variables

Thermal Comfort Standard Variables	
Metabolic Rate, MET	MET Type: Seated at rest MET Value: 1.00
Occupant Clothing, CLO	Min: 0.6 (Summer clothing) Max: 1.2 (Winter clothing)
Indoor Air Speed	Nominal Air Speed: 0.15 m/s Elevated Air Speed: 0.30 m/s
Air Conditioning System Design Conditions	Transitionary Occupancy Conditioned Spaces: 18 – 25 °C All Other Conditioned Spaces: 21 – 24 °C
Internal Loads	As per Table 5: Input data summary

2.4 J1V3 RESULTS

The comparison of annual energy and GHG emissions of the Reference and Proposed Model is shown in Table 10. The greenhouse gas emissions is calculated based on the greenhouse gas emission factors in *NCC2022, Specification 34 Modelling parameters for J1V3,* Table S34C3. The GHG factor for NSW is 236 kgCO2-e/GJ. The itemized GHG emissions is shown in Table 9.

Table 9: Itemised GHG emissions for the Reference and Proposed Models

Itemised GHG Emissions (tonCO_2-e/kWh)	Reference Model (DTS)	Proposed Model	Improvement
Onsite renewables (offset)	0	0	-
Artificial Lighting	31.57	31.57	-
Equipment	5.55	5.55	-
Heating	1.13	2.46	-
Cooling	4.59	3.53	-
System Auxiliary	9.50	9.50	-
Heat Rejection Fans/ Pumps	1.93	1.48	-
Total GHG Emissions	**54.27**	**54.09**	**0.33%**

Table 10: Annual energy and GHG emissions comparison for the Reference and Proposed Models

Annual Total	Reference Model (DTS)	Proposed Model	Improvement
Energy without PV (MWh)	68.88	63.66	-
GHG Emissions (tonCO_2-e/kWh)	54.27	54.09	-0.33%

As illustrated in Table 9 and Table 10, the Proposed Building has a lower GHG emission with changes within the building fabric only. Therefore, the Proposed building complies to the energy consumption/ GHG emission criteria set under J1V3 provisions.

2.5 THERMAL COMFORT PMV RESULTS

The HVAC areas of the proposed building are assessed based on the parameters and methodology described in Table 8 and yielded the following output:

The PMV range to meet the requirements must be within -1.0 to 1.0;

- The indicated hours where PMV > 1.0 represents space that is too warm;
- The indicated hours where PMV > -1.0 represents space that is too cold.

Table 11: Thermal comfort PMV results

PMV Results & Analysis	
Total Occupied Area	336 m^2
Total Annual AC Hours	20,075 hours
Area Weighted Hours Outside of PMV Range	0 hours
Area Weighted Hours Inside PMV Range	4,015 hours
Percentage of Time Within PMV Range	100%
Percentage of Area of Occupied Zones	100%

As illustrated in Table 11, the Proposed Building achieved PMV levels between -1.0 and 1.0 during standard hours of occupancy for 100% of the year for 100% of its occupied/ conditioned areas. Therefore, the proposed building complies to the thermal comfort level set under J1V3 provision.

3.0 Section J Assessment

The DTS provisions of this part apply to building elements forming the envelope of a Class 2 to 9 building.

Envelope, for the purpose of the Section J assessment, means the parts of a building's fabric that separate a conditioned space or habitable room from–

1. the exterior of the building; or
2. a non-conditioned space including–
    a. the floor of a rooftop plant room, lift-machine room or the like; and
    b. the floor above a carpark or warehouse; and
    c. the common wall with a carpark, warehouse or the like

3.1 J1 BUILDING FABRIC

The following requirements must be implemented in design and to be ensured compliance by the builder during construction. *Refer to Annexure B for building envelope and insulation mark-up.*

J4D3 Thermal Construction - General

+ Where required, 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 be 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.
+ Where required, 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 must either overlap not less than 50 mm or be taped together.
+ Where required, bulk insulation must be installed so that:
    - 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
    - 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.
+ Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification 36.
+ The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be:

- calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
- determined in accordance with Specification 37 for wall-glazing construction; or
- determined in accordance with Specification 39 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

J4D4 Roof and Ceiling Construction

For roof DTS requirements, refer to Annexure C.

Roof & Ceiling Type 1: Metal Roof

Roof & Ceiling Element	R-Value
Outside air film	0.03
Metal Roof (Solar Absorption <0.45)	0
Additional bulk insulation E(0.9-0.05)(<10º)	*1.30*
20mm Reflective Airspace	1.06
Ceiling Batts	*1.50*
Plasterboard	0.06
Internal air film	0.12
Total R-value	**4.07**

Recommended compliance:

+ R1.30 Anticon 60, R1.50 ceiling batts & 20mm reflective air gap

Colour	Solar Absorptance
Classic Cream™	0.32
Surfmist®	0.32
Paperbark®	0.42
Evening Haze®	0.43
Shale Grey™	0.43
Sandbank®	0.46
Dune®	0.47
Windspray®	0.58
Pale Eucalypt®	0.60
Bushland®	0.62
Headland®	0.63
Wilderness®	0.65
Jasper®	0.68
Manor Red®	0.69
Woodland Grey®	0.71
Loft®	0.71
Monument®	0.73
Ironstone®	0.74
Cottage Green®	0.75
Deep Ocean®	0.75

Figure 1: Examples of upper surface roof colour compliance range

J4D5 Roof Lights

There are no roof lights proposed to conditioned space.

For roof lights DTS requirements, refer to Annexure C.

J4D6 Walls and Glazing

For walls and glazing DTS requirements, refer to Annexure C.

Façade Systems

All awnings and shading structures are to be installed as per plans and elevations referenced. Should there be any changes to the glazing or shading configuration, the new layouts will need to be reassessed to ensure compliance with Section J.

Nominated compliance pathway: Display Glazing (Showroom) & Method-2 Combined Façade (Workshop)

Table 12: Total Façade System Calculations

	METHOD 1				METHOD 2
	North	East	South	West	Combined
Wall Area (m^2)	66.9	208.2	71.1	150.6	496.8
Glazing Area (m^2)	13.2	0.0	9.0	57.6	79.9
Total Wall-Glazing Area (m^2)	80.1	208.2	80.1	208.2	576.7
Glazing to Façade Ratio	16.5%	0.0%	11.3%	27.7%	13.9%
Wall R-Value	1.40	1.40	1.40	1.40	1.40
Proposed Wall-Glazing U-Value	1.92	0.71	1.54	2.73	**1.72**
Solar Admittance	0.127	0.000	0.087	0.129	-

Table 13: Method 2 – AC Energy Value Calculations

	North	East	South	West	Total
Solar Admittance Weighting Coefficient, α	0.00	0.00	0.00	2.28	–
Wall Solar Admittance Limit	0.13	0.13	0.13	0.13	–
Proposed AC Energy Value	**0.00**	**0.00**	**0.00**	**61.34**	**61.34**
DTS Reference AC Energy Value	**0.00**	**0.00**	**0.00**	**61.71**	**61.71**

Glazing Elements

Table 14: Total system glazing performance requirements

Location	Max System U-Value	Max System SHGC	Compliance Recommendation
Showroom	5.80	0.80	Single, low-e, clear, Al frame
Workshop	8.00	0.77	Single, clear, Al frame

Wall Elements

Wall Type 1: Steel Stud Wall

Layer	Material	Fractional Area	R-Value	Thermal Bridging R-Value
1	Ext. air film	100%	0.03	0.03
2	External cladding/ Plasterboard	100%	0.03	0.03
3	Insulation	87%	2.00	1.30
3	Steel Stud with Thermal Break	13%	0.37	
4	Plasterboard	100%	0.07	0.07
5	Int. air film	100%	0.12	0.12
			Wall Total R-Value	**1.55**

Recommended compliance:

+ R2.00 bulk insulation, R0.2 thermal break on steel stud

J4D7 Floors

For floors DTS requirements, refer to Annexure C.

Floor Type 1: Slab-on-ground (Showroom)

Floor Element	R-Value
Ground offset calculated	1.80 minimum
Concrete Slab	0.14
Additional insulation layer	*Not required*
Indoor air film	0.12
Total R-value	**2.06**

Recommended compliance:

+ No additional thermal insulation requirements

Floor Type 2: Slab-on-ground (Workshop)

Floor Element	R-Value
Ground offset calculated	1.30
Concrete Slab	0.14
~~*Additional insulation layer (Kingspan K3 or equivalent)*~~	~~*1.10*~~
Indoor air film	0.12
Total R-value	~~**2.56**~~ **1.46**

Recommended compliance:

~~+ R1.10 rigid board insulation (25mm Kingspan K3 or equivalent)~~

Thermal insulation requirements removed via J1V3 alternative solution.

3.2 J5 BUILDING SEALING

The following requirements relating to building sealing must be included in the design. The requirements shall be verified, if required, by the architect or builder.

Part J	Requirements
J5D2 Application	The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 to 9 building, other than + building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or + a permanent building 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 F6 provides sufficient pressurisation to prevent infiltration.
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.
J5D4 Roof lights	A roof light must be sealed, or capable of being sealed, and must be constructed with + an imperforate ceiling diffuser installed at the ceiling or internal lining level; or + a weatherproof seal; or + a shutter system readily operated either manually, mechanically or electronically by the occupant.
J5D5 Windows and doors	All envelope doors and windows must be sealed or comply with AS 2047, except + a fire door or smoke door + a roller shutter door, roller shutter grille or other security door or device installed for only out-of-hours security 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. 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 + where the conditioned spaced has a floor area of not more than 50 m^2; or + an open front shop must have a 3 m deep unconditioned zone between the open front and the conditioned space, and all other entrances have self-closing doors A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door.
J5D6 Exhaust fans	All exhaust fans fitted in a conditioned space must be fitted with a sealing device such as a self-closing damper or the like.
J5D7 Construction of ceilings, walls and floors	Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like when forming part of the envelope must be constructed to minimise air leakage and + 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, expanding foam, rubber compression strip, caulking or the like;

	+ does not apply to openings, grilles or the like required for smoke hazard management.
J5D8 Evaporative coolers	An evaporative cooler must be fitted with a self-closing damper or the like when serving a heated space or in climate zones 4, 5, 6, 7 or 8.

3.3 J6 AIR-CONDITIONING AND VENTILATION SYSTEMS

The mechanical engineer shall be responsible for ensuring the design complies with NCC Section J6.

Refer to mechanical design documentation for detailed air-conditioning and ventilation system sizing compliance requirements.

3.4 J7 ARTIFICIAL LIGHTING AND POWER

The electrical engineer shall be responsible for ensuring the design complies with NCC Section J7.

Refer to electrical design documentation for detailed artificial lighting illumination power density and power/ controls specification compliance requirements.

3.5 J8 HEATED WATER SUPPLY AND SWIMMING POOL FACILITIES AND SPA PLANT POOL

The hydraulic engineer shall be responsible for ensuring the design complies with NCC Section J8.

Part J	Requirements
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.

3.6 J9 ENERGY MONITORING AND ON-SITE DISTRIBUTED ENERGY RESOURCES

The electrical engineer shall be responsible for ensuring the design complies with NCC Section J9.

A summary is provided below for reference:

Part J	Requirements
J9D1 Application	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 + to a Class 8 electricity network substation.
J9D3 Facilities for energy monitoring	1. A building or sole-occupancy unit 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. 2. A building with a floor area of more than 2,500 m^2 must have energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (3), of the energy consumption of + air-conditioning plant (heating plant, cooling plant and air handling fans) + artificial lighting + appliance power

	+ central hot water supply + internal transport devices (lifts, escalators and moving walkways) + 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 stored, analysed and reviewed. 4. The provisions of (2) do not apply to a Class 2 building with a floor area of more than 2,500 m^2 where the total area of the common areas is less than 500 m^2.
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— + in accordance with Table J9D4 in each storey of the carpark; and + labelled to indicate use for electric vehicle charging equipment 2. Electrical distribution boards dedicated to serving electric vehicle charging in a carpark must— + be fitted with a charging control system with the ability to manage and schedule charging of electric vehicles in response to total building demand; and + when associated with a Class 2 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 11:00 pm to 7:00 am daily; and + when associated with a Class 5 to 9 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 9:00 am to 5:00 pm daily; and + when associated with a Class 3 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 48 kWh from 11:00 pm to 7:00 am daily; and + be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in— ▪ 100% of the car parking spaces associated with a Class 2 building; or ▪ 10% of car parking spaces associated with a Class 5 or 6 building; or ▪ 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and + contain space of at least 36 mm width of DIN rail per outgoing circuit for individual sub-circuit electricity metering to record electricity use of electric vehicle charging equipment; and + be labelled to indicate the use of the space required by (f) is for the future installation of metering equipment.
J9D5 Facilities for solar photovoltaic and battery systems	The main electrical switchboard of a building must— + contain at least two empty three-phase circuit breaker slots and four DIN rail spaces labelled to indicate the use of each space for— ▪ a solar photovoltaic system; and * ▪ a battery system; and **

	+ be sized to accommodate the installation of solar photovoltaic panels producing their maximum electrical output on at least 20% of the building roof area. * ** At least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels, except for buildings— + with installed solar photovoltaic panels on at least 20% of the roof area *or* an equivalent generation capacity elsewhere on-site; or + where 100% of the roof area is shaded for more than 70% of daylight hours; or + with a roof area of not more than 55 m2; or + where more than 50% of the roof area is used as a terrace, carpark, roof garden, roof light or the like. Note: * Requirements do not apply to a building with solar photovoltaic panels installed on at least 20% of the roof area. ** Requirements do not apply to a building with battery systems installed.

Annexures

Annexure A - Design Documentation

The report has been based on the following design documentation:

+ Architectural plans prepared by: Centric Architects, 22/09/2023 Pre-DA Submission

Table 15: Design Documentation

Drawing Number	Revision	Title
2000	A	Site Plan – Existing
2002	G	Site Plan – Proposed
2002a	B	Site Plan – Proposed Mitsubishi + Suzuki
2500	A	Site Elevations
3300	A	Workshop – Existing / Demolition Plan
3400	E	Workshop – General Arrangement Plan
3500	E	Workshop Elevations
3600	B	Workshop Sections
4300	A	Mazda – Existing / Demolition Plan
4400	D	Mazda – General Arrangement Plan
4500	C	Mazda Showroom Elevations
4600	A	Mazda Sections
5300	A	Mitsubishi + Suzuki – Existing / Demolition Plan
5400	D	Mitsubishi + Suzuki – General Arrangement Plan
5500	C	Mitsubishi + Suzuki Showroom Elevations
6300	A	Kia – Existing / Demolition Plan
6400	B	Kia – General Arrangement Plan
6500	B	Kia Showroom Elevations
6600	A	Kia Sections

Annexure B - Building Envelope

Legend:

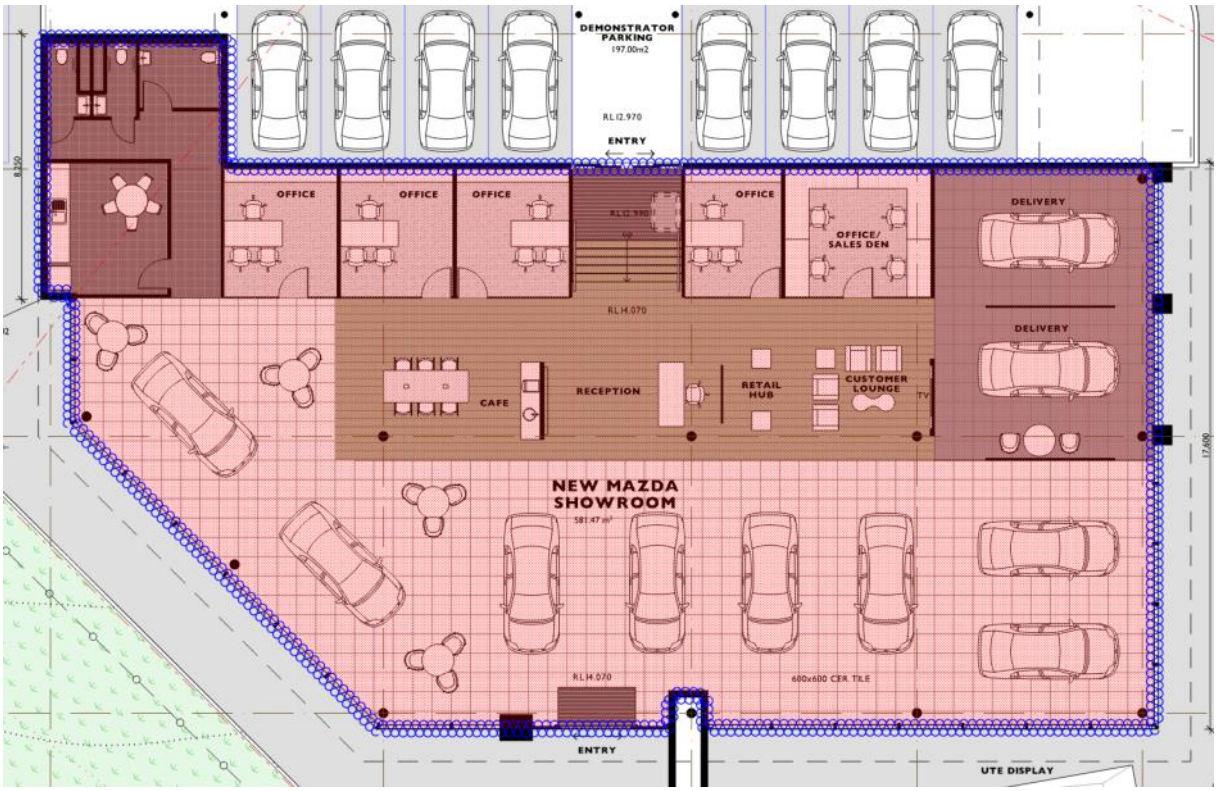
Roof insulation according to J4D4

Wall insulation according to J4D6

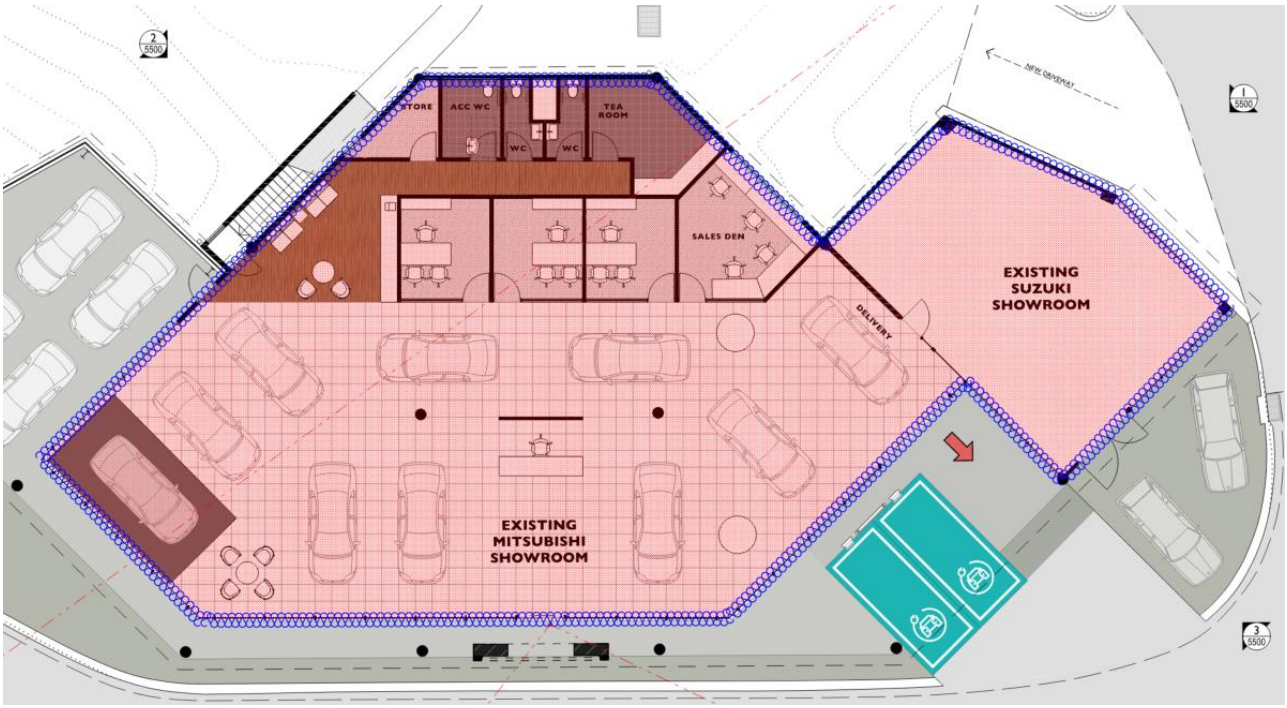
Floor insulation according to J4D7

*Applicable to new works only

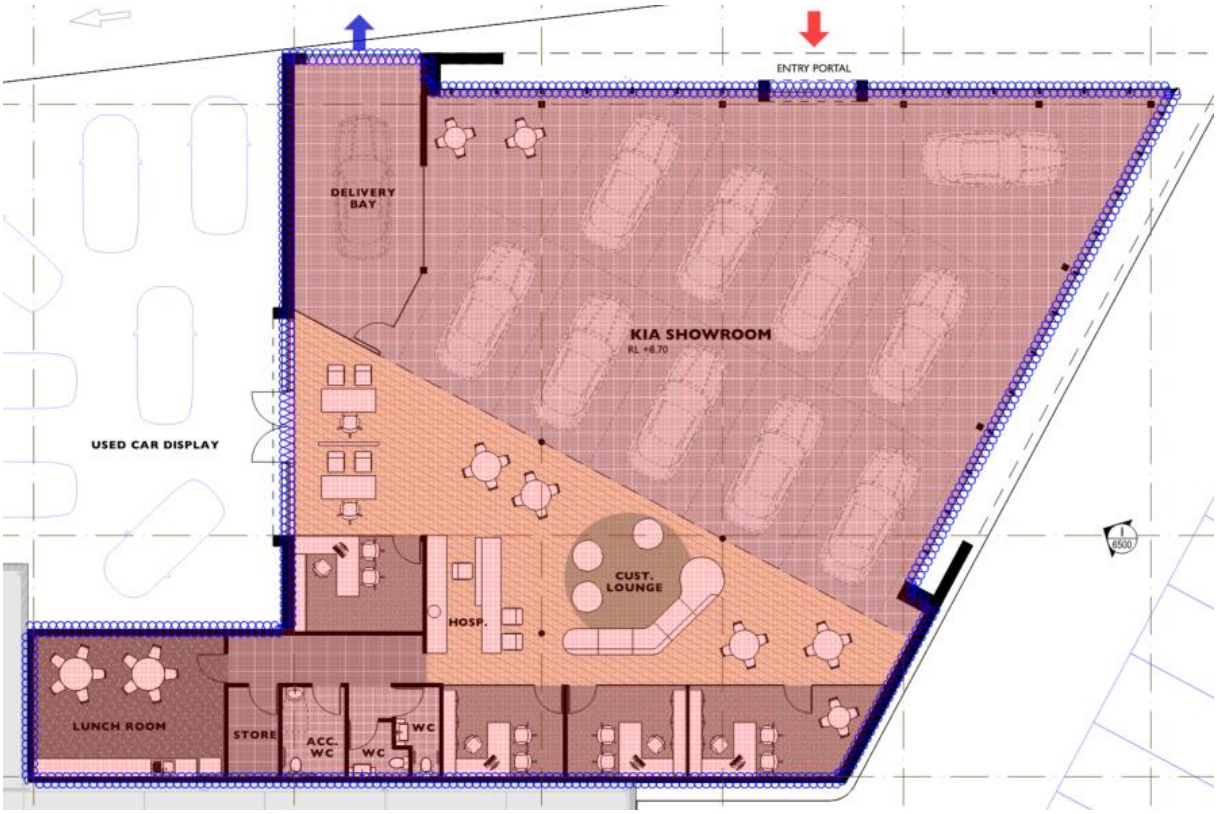
MAZDA SHOWROOM



MITSUBISHI + SUZUKI SHOWROOM



KIA SHOWROOM



WORKSHOP

***Floor thermal insulation removed via J1V3 alternative solution**

Annexure C - Building Fabric Minimum DTS Compliance Requirements

J4D4 Roof & Ceiling

Table 16: Minimum roof & ceiling Total R-value and maximum solar absorptance

Climate Zone	Minimum Total R-Value	Maximum Solar Absorptance (Upper Surface of Roof)
Climate Zone 1, 2, 3, 4 & 5	R3.70 (downwards heat flow)	0.45
Climate Zone 6	R3.20 (downwards heat flow)	0.45
Climate Zone 7	R3.70 (upwards heat flow)	0.45
Climate Zone 8	R4.80 (upwards heat flow)	N/A

J4D5 Roof Lights

+ Roof lights must have:
  - a total area of not more than 5% of the floor area of the room or space served; and
  - transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of:
    - Total system U-Value, not more than U3.90; and
    - Total system SHGC as per NCC Table J4D5 below.

Table 17: Roof lights – total system SHGC (NCC Table J4D5)

Roof light shaft index	Total area of roof lights up to 3.5% of the floor area of the room or space	Total area of roof lights more than 3.5% and up to 5% of the floor area of the room or space
< 1.0	≤ 0.45	≤ 0.29
≥ 1.0 to < 2.5	≤ 0.51	≤ 0.33
≥ 2.5	≤ 0.76	≤ 0.49

Notes:

1. The roof light shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2. The area of a roof light is the area of the roof opening that allows light to enter the building. The total area of roof lights is the combined area for all roof lights serving the room or space.

J4D6 Walls and Glazing

+ The Total System U-Value and the Solar Admittance of wall-glazing construction must be calculated in accordance with Specification 37.
+ The Total System U-Value of display glazing must not be greater than U5.8 (glazing used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant).

Table 18: Maximum Total System U-Value of wall-glazing construction

Climate Zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area	Class 3 or 9c building or Class 9a ward area
1	2.0	1.1
2	2.0	2.0
3	2.0	1.1
4	2.0	1.1
5	2.0	2.0
6	2.0	1.1
7	2.0	1.1
8	2.0	0.9

Table 19: Minimum wall Total R-Value – Wall area 80% or more of wall-glazing construction area (NCC22 Table J4D6a)

Climate Zone	Class 2 common area, Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area	Class 3 or 9c building or Class 9a ward area
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

+ Where the wall is less than 80% of the area of the wall-glazing construction, minimum wall Total R-Value is R1.0.

Table 20: Maximum wall-glazing construction solar admittance - Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a ward area (NCC22 Table J41D6b)

Climate Zone	Eastern aspect solar admittance	Northern aspect solar admittance	Southern aspect solar admittance	Western aspect solar admittance
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.20	0.20	0.42	0.36

Table 21: Maximum wall-glazing construction solar admittance - Class 3 or 9c building or Class 9a ward area (NCC22 Table J4D6c)

Climate Zone	Eastern aspect solar admittance	Northern aspect solar admittance	Southern aspect solar admittance	Western aspect solar admittance
1	0.07	0.07	0.10	0.07
2	0.10	0.10	0.10	0.10
3	0.07	0.07	0.07	0.07
4	0.07	0.07	0.07	0.07
5	0.10	0.10	0.10	0.10
6	0.07	0.07	0.07	0.07
7	0.07	0.07	0.08	0.07
8	0.08	0.08	0.08	0.08

J4D7 Floors

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.
3. A floor must be insulated around the vertical edge of its perimeter with insulation having an R-Value greater than or equal to 1.0 when the floor—
    a. is a concrete slab-on-ground in climate zone 8; or
    b. has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.
4. Insulation required by (b) for a concrete slab-on-ground must—
    a. be water resistant; and
    b. be continuous from the adjacent finished ground level—
        i. to a depth not less than 300 mm; or
        ii. for the full depth of the vertical edge of the concrete slab-on-ground.

Table 22: Floors – Minimum Total R-Value (NCC22 Table J4D7)

Location	Climate Zone 1 – Upwards heat flow	Climate Zones 2 & 3 – Upwards and downwards heat flow	Climate Zones 4, 5, 6 & 7 – Downwards heat flow	Climate Zones 8 – Downwards heat flow
A floor without an in-slab heating or cooling system	2.0	2.0	2.0	3.5
A floor with an in-slab heating or cooling system	3.25	3.25	3.25	4.75

Note: For the purpose of calculating the Total R-Value of a floor, the sub-floor and soil R-Value must be calculated in accordance with Specification 39 or Section 3.5 of CIBSE Guide A.

Annexure D - Breakdown of Energy and Thermal Comfort PMV Results

Reference (DTS) Model Detailed Energy Results

	Total lights energy (MWh)	Total equip energy (MWh)	Ap Sys boilers energy (MWh)	Ap Sys chillers energy (MWh)	Ap Sys aux + DHW/solar pumps energy (MWh)	Ap Sys heat rej fans/pumps energy (MWh)	Total energy (MWh)
Date	117280-DTS	117280-DTS	117280-DTS	117280-DTS	117280-DTS	117280-DTS	117280-DTS
Jan 01-31	3.1562	0.5548	0.0001	1.0091	0.9498	0.4238	6.0938
Feb 01-28	2.8507	0.5011	0.0000	1.0434	0.8579	0.4382	5.6913
Mar 01-31	3.1562	0.5548	0.0005	0.8107	0.9498	0.3405	5.8124
Apr 01-30	3.0544	0.5369	0.0233	0.3781	0.9192	0.1588	5.0706
May 01-31	3.1562	0.5548	0.1141	0.1261	0.9498	0.0530	4.9539
Jun 01-30	3.0544	0.5369	0.3190	0.0234	0.9192	0.0098	4.8628
Jul 01-31	3.1562	0.5548	0.4074	0.0126	0.9498	0.0053	5.0860
Aug 01-31	3.1562	0.5548	0.3127	0.0178	0.9498	0.0075	4.9987
Sep 01-30	3.0544	0.5369	0.1023	0.1269	0.9192	0.0533	4.7929
Oct 01-31	3.1562	0.5548	0.0439	0.3888	0.9498	0.1633	5.2567
Nov 01-30	3.0544	0.5369	0.0104	0.6398	0.9192	0.2687	5.4294
Dec 01-31	3.1562	0.5548	0.0016	0.8209	0.9498	0.3448	5.8280
Summed total	37.1613	6.5321	1.3353	5.3976	11.1832	2.2670	63.8765

Proposed J1V3 Model Detailed Energy Results

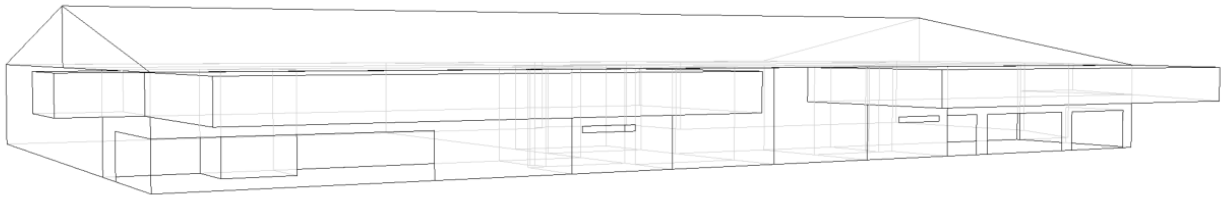
	Total lights energy (MWh)	Total equip energy (MWh)	Ap Sys boilers energy (MWh)	Ap Sys chillers energy (MWh)	Ap Sys aux + DHW/solar pumps energy (MWh)	Ap Sys heat rej fans/pumps energy (MWh)	Total energy (MWh)
Date	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3	117280-JV3
Jan 01-31	3.1562	0.5548	0.0022	0.8537	0.9498	0.3585	5.8752
Feb 01-28	2.8507	0.5011	0.0012	0.9283	0.8579	0.3899	5.5291
Mar 01-31	3.1562	0.5548	0.0044	0.6465	0.9498	0.2715	5.5832
Apr 01-30	3.0544	0.5369	0.0706	0.2225	0.9192	0.0935	4.8970
May 01-31	3.1562	0.5548	0.2711	0.0517	0.9498	0.0217	5.0053
Jun 01-30	3.0544	0.5369	0.6551	0.0016	0.9192	0.0007	5.1678
Jul 01-31	3.1562	0.5548	0.7977	0.0027	0.9498	0.0011	5.4622
Aug 01-31	3.1562	0.5548	0.6443	0.0021	0.9498	0.0009	5.3081
Sep 01-30	3.0544	0.5369	0.2532	0.0590	0.9192	0.0248	4.8474
Oct 01-31	3.1562	0.5548	0.1292	0.2563	0.9498	0.1076	5.1539
Nov 01-30	3.0544	0.5369	0.0520	0.4754	0.9192	0.1997	5.2374
Dec 01-31	3.1562	0.5548	0.0091	0.6536	0.9498	0.2745	5.5979
Summed total	37.1613	6.5321	2.8901	4.1533	11.1832	1.7444	63.6644

Proposed J1V3 Model Thermal Comfort PMV Results

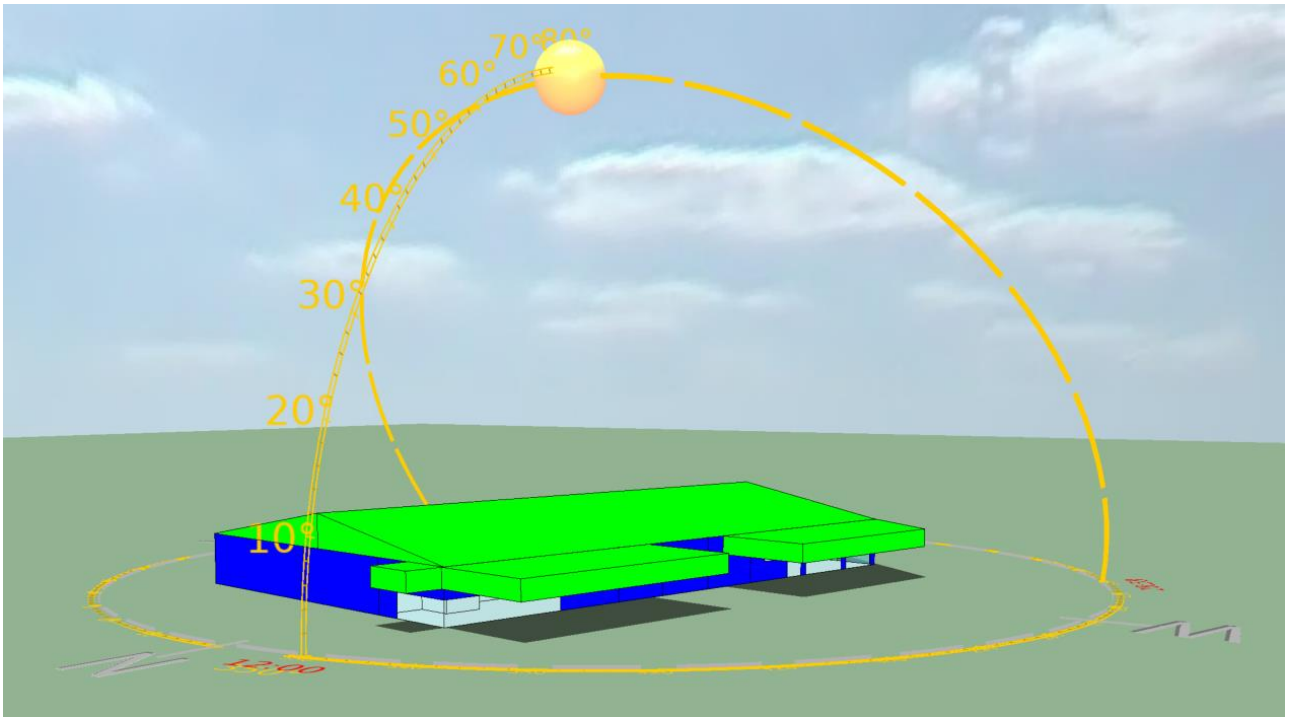
		PMV (ASHRAE 55 Analytical) - hours in range		
File	Location	<= -1.00	>-1.00 to <=1.00	> 1.00
117280-DTS Model-r1.aps	GF_MAZDA RECEPTION	0.0	4015.0	0.0
117280-DTS Model-r1.aps	GF_S.M.	0.0	4015.0	0.0
117280-DTS Model-r1.aps	GF_CONTROL	0.0	4015.0	0.0
117280-DTS Model-r1.aps	GF_CONTROL 2	0.0	4015.0	0.0
117280-DTS Model-r1.aps	GF_RECEPTION 2	0.0	4015.0	0.0
117280-DTS Model-r1.aps	Total hours	0.0	20075.0	0.0

Annexure E - Building Model

Building Fabric Outline (Workshop)



Summer Solstice View – 22nd December, 12:00 pm



Winter Solstice View – 22nd June, 12:00 pm