Section J DTS Report

Muswellbrook Shire Council
Infrastructure Depot
For CCG Architects

Revision	Date	Description	Author	Reviewer
P1	6/02/2025	Preliminary Issue	SP	SA

The reader's attention is drawn to the following important information:

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Introduction

A preliminary assessment has been completed to determine the building fabric and glazing performance to achieve compliance with NCC 2022 Section J, Part J4 and J5 for the proposed Muswellbrook Shire Council Infrastructure Depot at 252 Coal Road, Muswellbrook NSW.

The NCC 2022 façade calculator, published by the Australian Building Codes board, is used for the assessment of Part J4D6 Walls and glazing Deemed to Satisfy provisions. Part J4D6 assesses the wall-glazing construction, which is the combination of wall and glazing components comprising the building envelope.

Envelope, for the purpose of Section J, means the parts of a building's fabric that separate a conditioned space or habitable room from the exterior of the building; a non-conditioned space including the floor of a rooftop plant room, lift-machine room or the like, the floor above a carpark or warehouse, and common wall with a carpark, warehouse, or the like.

In this assessment, the following items will be addressed:

- J4 Building Fabric (Wall and Glazing); and
- J5 Building Sealing.

Building Description

The proposed development is a Muswellbrook Shire Council Infrastructure Depot located at 252 Coal Road, Muswellbrook NSW consisting of administration, offices, meeting rooms, delivery office, meal room, reception, workshop, storeroom, and toilets.

BCA Classification and Climate Zone

The project is located at 252 Coal Road, Muswellbrook NSW, which is within the Australian Building Codes Board (ABCB) Climate Zone 6 – mild temperate. For the purpose of this assessment all spaces of Muswellbrook Shire Council Infrastructure Depot are classified as Class 5 Office Building as per the NCC Building Classifications. This should be confirmed by the building surveyor.

Reference Documents

Building Code of Australia

The guidelines from NCC BCA 2022 Volume One are used in this report.

Drawings

This report is based on the following architectural drawings received from:

CCG Architects
5 Wilson Street
Newtown, NSW 2042

The relevant documents and drawings used in compiling this report are as follows:

Project Name	Drawing No.	Revision	Title
23-149	DA 101	7	Proposed Depot Building Upper-Level Floor Plan
	DA 101	7	Proposed Depot Building Lower-Level Floor Plan
	DA 103	5	Proposed Depot Building Roof Plan
	DA 201	4	Proposed Building Depot Elevations Sheet 1
	DA 202	7	Proposed Depot Building Elevations Sheet 2
	DA 303	7	Site Cross Sections Sheet 1
	DA 304	7	Site Cross Sections Sheet 2
	AR 600	2	Perspectives

Table 1: Reference documents

NCC Section J Assessment

The performance requirements of Section J1P1 Energy use are as follows;

A building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, including its services, must have features that facilitate the efficient use of energy appropriate to—

(a) the function and use of the building; and
(b) the level of human comfort required for the building use; and
(c) solar radiation being—
    (i) utilised for heating; and
    (ii) controlled to minimise energy for cooling; and
(d) the energy source of the services; and
(e) the sealing of the building envelope against air leakage; and
(f) for a conditioned space, achieving an hourly regulated energy consumption, averaged over the annual hours of operation, of not more than—
    (i) for a Class 6 building, 80 kJ/m2.hr; and
    (ii) for a Class 5, 7b, 8 or 9a building other than a ward area, or a Class 9b school, 43 kJ/m2.hr; and
    (iii) for all other building classifications, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, 15 kJ/m2.hr.

The NCC has a set of criteria under Deemed to Satisfy provisions (DTS). This allows the building to be assessed as deemed to comply with the building code if it can achieve (or exceed) those specific criteria.

For the purpose of this final assessment, the development will be examined against the DTS criteria for J4 (Building Fabric) and J5 (Building Sealing) only.

Part J4 Building Fabric

Building envelope

The thermal performance of each part of the thermal building fabric is required to comply with the total minimum Insulation R-values in Table 2 below. The DTS total system values are inclusive of building materials, airgaps, insulation etc and should be utilised in conjunction with the attached thermal envelope mark-up in Appendix B. The table shows the minimum section J DTS compliance values.

Building Thermal Envelope components for conditioned & habitable spaces	Minimum Compliant Total System R-value (m^2K/W)	Insulation Required
Roof/Ceiling – Over conditioned space (solar absorptance (SA) of upper surface of a roof must be ≤ 0.45)	R3.2T	YES (Refer to Appendix-B for Thermal Markup)
External & Internal Walls – separating conditioned space from external or non-conditioned space (solar absorptance (SA) of walls must be ≤ 0.60 for external walls)	R1.4T	YES (Refer to Appendix-B for Thermal Markup)
Suspended Slab between conditioned & unconditioned space	R2.0T	YES Added Insulation required (Refer to Appendix-B Markup for location)
Floor – Slab on Ground (No additional insulation is required. A slab on Ground without in-slab heating or cooling is considered to achieve Total R value of 2.0 in NCC 2022.)	R2.0[T]	No Added Insulation

Table 2: Building Fabric minimum DTS Total System requirements.

[T] The required Total R-Value and Total System U-Value, must include allowance for thermal bridging, must be—

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

Under **NCC 2022** Specification 39C2 Table S39C2a, the insulative properties of the sub-floor can be considered for conditioned areas. The Minimum Total System R-value estimated sub-floor insulation R-value and added slab Insulation required for spaces classified under Class-5 is denoted in Table-3 below as well as shown in Appendix-B Thermal Markup.

Suspended Slab Location**	Minimum Total System R-value Required R-Value (m^2K/W)	Sub-floor Slab insulation achieved R-Value (m^2K/W)	Added insulation required
Suspended Slab between conditioned & unconditioned space	R2.0	R0.32	R1.68

Table 3: R-value of Sub-floor spaces and minimum DTS Total System requirements.

*** See Appendix-B Markup for Exact location.*

Glazing

The compliance of this assessment for all spaces classified as Class 5 Office Building is achieved via Method 2 (Multiple Aspect) assessment (which allows trading off low thermal performance with better performing aspects). Method 2 compliant solution occurs where the proposed design overall wall-glazing U-value and air-conditioning (AC) Energy value remains less than the DTS reference case, as shown in Appendix A.

The assessment is based on the dimension of each glazing. The total system thermal performance requirements of U-Value and Solar Heat Gain Coefficient (SHGC) are as per Table 4 below. The glazing performance values are system values inclusive of frame elements.

The table shows the minimum section J DTS compliance values.

Maximum Glazing System including framing elements			
Description	**Orientation**	**Total System U-Value (W/m^2K)**	**Total System SHGC**
External & Internal glazing of Conditioned Space	All	≤ 4.00	≤ 0.28

Table 4: System-value glazing performance requirements

In general, glazing performance can be made less stringent by:

- Reducing glazing area;
- Increasing shading;
- Using insulated spandrel panels instead of glazing for certain windows.

An alternative assessment to glazing can be conducted via J1V3 modelling. This allows the walls, floors and ceiling to have additional insulation to compensate for more relaxed glazing performance. It may also enable the use of alternative performance values for the building fabric to that proposed in this report should there be physical constraints. Any changes to the drawings or deviations from the assumptions listed in this report should be communicated to erbas™ as it may impact the outcome of the Section J assessment.

Thermal construction general

Insulation installation shall meet the following:

(1) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it—
  (a) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
  (b) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
  (c) does not affect the safe or effective operation of a service or fitting.

(2) Where required, reflective insulation must be installed with—
  (a) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
  (b) the reflective insulation closely fitted against any penetration, door or window opening; and
  (c) the reflective insulation adequately supported by framing members; and
  (d) each adjoining sheet of roll membrane being—
    a. overlapped not less than 50 mm; or
    b. taped together.

(3) Where required, bulk insulation must be installed so that—
  (a) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and

(b) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

(4) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification 36.

(5) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be—

(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.

Part J4D4 Roof and ceiling construction

A roof or ceiling that is part of the thermal envelope must achieve the Total R-Value specified in Table 2.

Part J4D5 Roof Lights

☒ There are no roof lights present on conditioned space in this design.

Part J4D6 Walls and Glazing

For the purpose of this Section, wall and glazing components comprising the part of envelope of a building excluding—

a) display glazing; and

b) opaque non-glazed openings e.g. doors, vents, penetrations and shutters.

In assessing the thermal properties for building fabric (walls and glazing), the part of building fabric that separate a conditioned space or habitable room from the following must be considered:

a) the exterior of the building; or

b) a non-conditioned space including—

(i) the floor of a rooftop plant room, lift-machine room or the like; and

(ii) the floor above a carpark or warehouse; and

(iii) the common wall with a carpark, warehouse or the like.

External walls and glazing that is part of the envelope must achieve the thermal performance specified in Table 2 and Table 4, respectively.

Part J4D7 Floors

A floor that is part of the envelope must achieve the Total R-Value specified in Table 2.

For the purpose of calculating the Total R-value of a floor, Table 4 details the R-values considered to be achieved by enclosed sub-floor spaces that are —

(a) mechanically ventilated by not more than 1.5 air changes per hour; or

(b) provided with not more than 150% of the aggregate sub-floor ventilation area required by Part F1 and are not mechanically ventilated.

Ratio of Floor area to floor perimeter (m)	Sub-floor space R-Value
1.0	0.10
1.5	0.15
2.0	0.20
2.5	0.25
3.0	0.30
3.5	0.35
4.0	0.40
4.5	0.45
5.0	0.50

5.5	0.55
6.0	0.60
6.5	0.65
7.0	0.70

Table 6: R-Value of sub-floor spaces (Ref: NCC 2022 Specification 39, Table S39C2a). Where the ratio to floor perimeter is between the values stated, interpolation may be used to determine the sub-floor space R-Values.

Part J5 Building Sealing

The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 to 9 building, other than—

(a) a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or

(b) 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

(c) a building or space where the mechanical ventilation required by Part F6 provides sufficient pressurisation to prevent infiltration.

Part J5D3 Chimneys and flues

There are no chimneys and flues at the conditioned space or habitable section of the building.

Part J5D4 Roof lights

☒ There are no roof lights present on conditioned space in this design.

☐ There are roof lights present on conditioned space in this design.

(a) A roof light must be sealed, or capable of being sealed, when serving—

(i) a conditioned space; or
(ii) a habitable room in climate zones 4, 5, 6, 7 or 8.

(b) A roof light required by (a) to be sealed, or capable of being sealed, must be constructed with—

(i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
(ii) a weatherproof seal; or
(1) a shutter system readily operated either manually, mechanically or electronically by the occupant.

Part J5D5 Windows and doors

(1) A door, openable window or the like must be sealed—
(a) when forming part of the envelope; or
(b) in climate zones 4, 5, 6, 7 or 8.

(2) The requirements of (1) do not apply to—
(a) a window complying with AS 2047; or
(b) a fire door or smoke door; or
(c) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(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 the conditioned space has a floor area of not more than 50 m^2; or
(b) where a café, restaurant, open front shop or the like has—
(i) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and
(ii) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.

(6) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.

Part J5D6 Exhaust fans

An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—

(a) a conditioned space; or

(b) a habitable room in climate zones 4, 5, 6, 7 or 8.

Part J5D7 Construction of roofs, walls and floors

(1) Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (2) when forming part of—

(a) the envelope; or

(b) in climate zones 4, 5, 6, 7 or 8.

(2) Construction required by (1) must be—

(a) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or

(b) sealed at junctions and penetrations with—

(i) close fitting architrave, skirting or cornice; or

(ii) expanding foam, rubber compressible strip, caulking or the like.

(3) The requirements of (1) do not apply to openings, grilles or the like required for smoke hazard management.

Part J5D8 Evaporative coolers

There are no evaporative coolers installed on this building.

Appendix A – Façade Calculator

Calculator that includes both External and Internal Walls for U-value only.

ABCB

Façade

Report

National Construction Code Calculator

Project Summary

Date
4/02/2025

Name
Suyash Parikh

Company
erbas™

Position
ESD Consultant

Building Name / Address
Muswellbrook Shire Council Infrastructure Depot
252 Coal Road, Muswellbrook

Building State
NSW

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification
Class 5 - office building

Storeys Above Ground
2

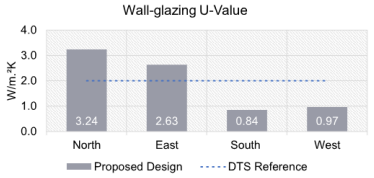
Tool Version
1.5 (May 2024)

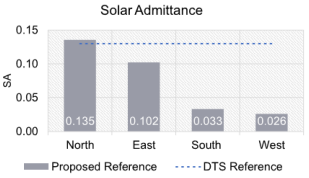
The summary below provides an overview of where compliance has been achieved for Specification S37 - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	3.24	2.63	0.84	0.97	1.99
Solar Admittance	0.14	0.10	0.03	0.03	
AC Energy Value					61

Method 1





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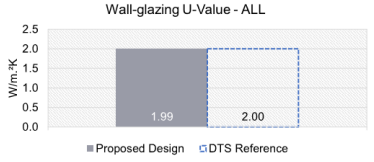
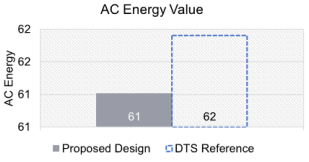




Project Details

	North	East	South	West
Glazing Area (m²)	134.207	37.868	6.936	4.608
Glazing to Façade Ratio	77%	58%	4%	8%
Glazing References	G-01 G-02 G-03	G-01 G-02 G-03	G-01 G-02	G-01
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	4.00	4.00	4.00	4.00
Average Glazing SHGC	0.28	0.28	0.28	0.28
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	40.703	27.182	167.934	54.548
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	R 1.4	R 1.4	R 1.4	R 1.4
Wall Thickness	230 140	230	230 140	230
Average Wall R-value (m².K/W)	1.40	1.40	1.40	1.40
Solar Absorptance	0.6	0.6	0.6	0.6

Façade Calculator without Internal Walls for SHGC only

ABCB

Façade

Report

National Construction Code

Calculator

Project Summary

Date
4/02/2025

Name
Suyash Parikh

Company
erbas™

Position
ESD Consultant

Building Name / Address
Muswellbrook Shire Council Infrastructure Depot
252 Coal Road, Muswellbrook

Building State
NSW

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification
Class 5 - office building

Storeys Above Ground
2

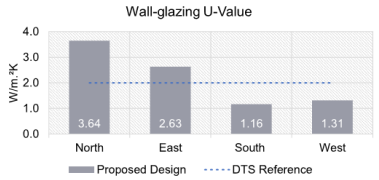
Tool Version
1.5 (May 2024)

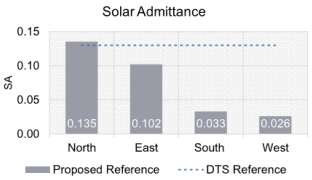
The summary below provides an overview of where compliance has been achieved for Specification S37 - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	3.64	2.63	1.16	1.31	2.78
Solar Admittance	0.14	0.10	0.03	0.03	
AC Energy Value					54

Method 1





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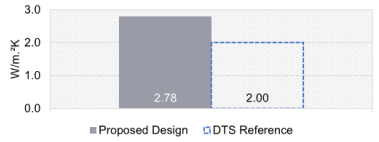

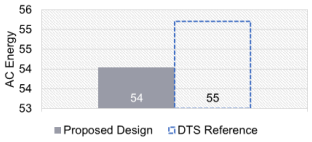

Project Details

	North	East	South	West
Glazing Area (m²)	134.207	37.868	6.936	4.608
Glazing to Façade Ratio	89%	58%	14%	18%
Glazing References	G-01 G-02 G-03	G-01 G-02 G-03	G-01 G-02	G-01
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	4.00	4.00	4.00	4.00
Average Glazing SHGC	0.28	0.28	0.28	0.28
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	16.403	27.182	44.434	20.792
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	R 1.4	R 1.4	R 1.4	R 1.4
Wall Thickness	230	230	230	230
Average Wall R-value (m².K/W)	1.40	1.40	1.40	1.40
Solar Absorptance	0.6	0.6	0.6	0.6

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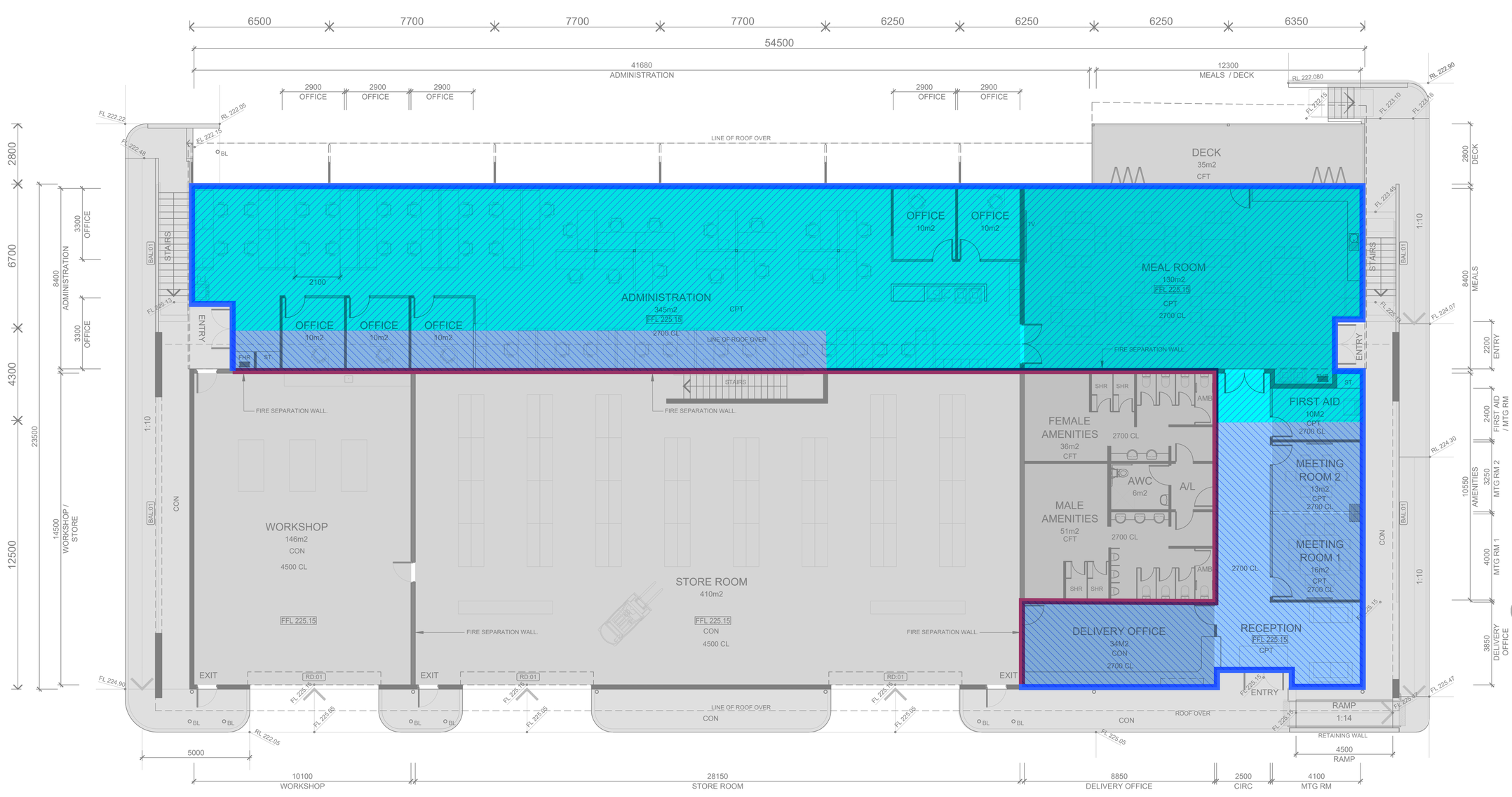
Appendix B – Thermal mark ups



UPPER LEVEL FLOOR PLAN

SCALE 1:100

1 0 1 2 3 4 5 m

1 : 100 FULL SIZE A1

FINISHES & FITTINGS LEGEND

AMB	AMBULANT
CON	CONCRETE
CPT	CARPET
CTF	CERAMIC FLOOR TILES
CL	CEILING LEVEL
FE	FIRE EXTINGUISHER
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
SHR	SHOWER
ST.	STORE

FIRE SEPARATION WALL

Proposed Insulation

R-values indicated represent minimum overall system R-values that requires to be achieved by the overall construction of the wall, floor and roof.

- R1.4 - External wall separating conditioned space and exterior (Solar absorptance of outer surface of a roof must be ≤ 0.60)
- R1.4 - Internal wall between conditioned and unconditioned spaces.
- R2.0 - Concrete slab on ground (No Additional insulation required)
- R2.0 - Suspended Slab between between conditioned & unconditioned area (R1.68 Additional insulation required)

QUALITY CHECK

Drawings Approval for:

Item	Drawn	Project Architect	Director	Date

AMENDMENTS

No.	Description	Drawn	Appd.	Date
1	CONCEPT DESIGN	GC		8.4.24
2	CONCEPT DESIGN	GC		15.4.24
3	CONCEPT DESIGN	GC		16.4.24
4	DEVELOPED DESIGN	GC		22.4.24
5	DEVELOPED DESIGN	GC		21.5.24
6	DEVELOPED DESIGN	AB		9.12.24
7	DA	AB		XX.1.25

DRAFT

Director Approval:

LEGEND

N

NOTES

Verify all dimensions and levels on site and report any discrepancies prior to the commencement of work.

Drawings are to be read in conjunction with all contract documents.

Use figured dimensions only. Do not scale from drawings.

CCG Architects Pty. Ltd. cannot guarantee the accuracy of content and format for copies of drawings issued electronically.

The completion of the issue details checked and authorised section is confirmation of the status of the drawing. The drawing shall not be used for construction unless endorsed 'For Construction' and authorised for issue.

Nominated Architect: David Cook Registration No: 5086

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NEWTOWN
NSW 2042
TEL.(02) 9319 3077
NOMINATED ARCHITECTS: DAVID COOK (5086) HISHAM NOORI (6678)
Website: www.ccgarchitects.com.au
Email: projects@ccgarchitects.com.au
ACN 157 777 065

CONSULTANTS

CLIENT

muswellbrook shire council

PROJECT

PROPOSED COMMUNITY INFRASTRUCTURE DEPOT

252 COAL ROAD, MUSWELLBROOK NSW 2333

DRAWING

PROPOSED DEPOT BUILDING UPPER LEVEL FLOOR PLAN

PROJECT No.	DWG.No.
23-149	DA 101
	SCALE: 1:100

CCG Info: Plotted by Contractor Two on Thursday, 9 January 2025
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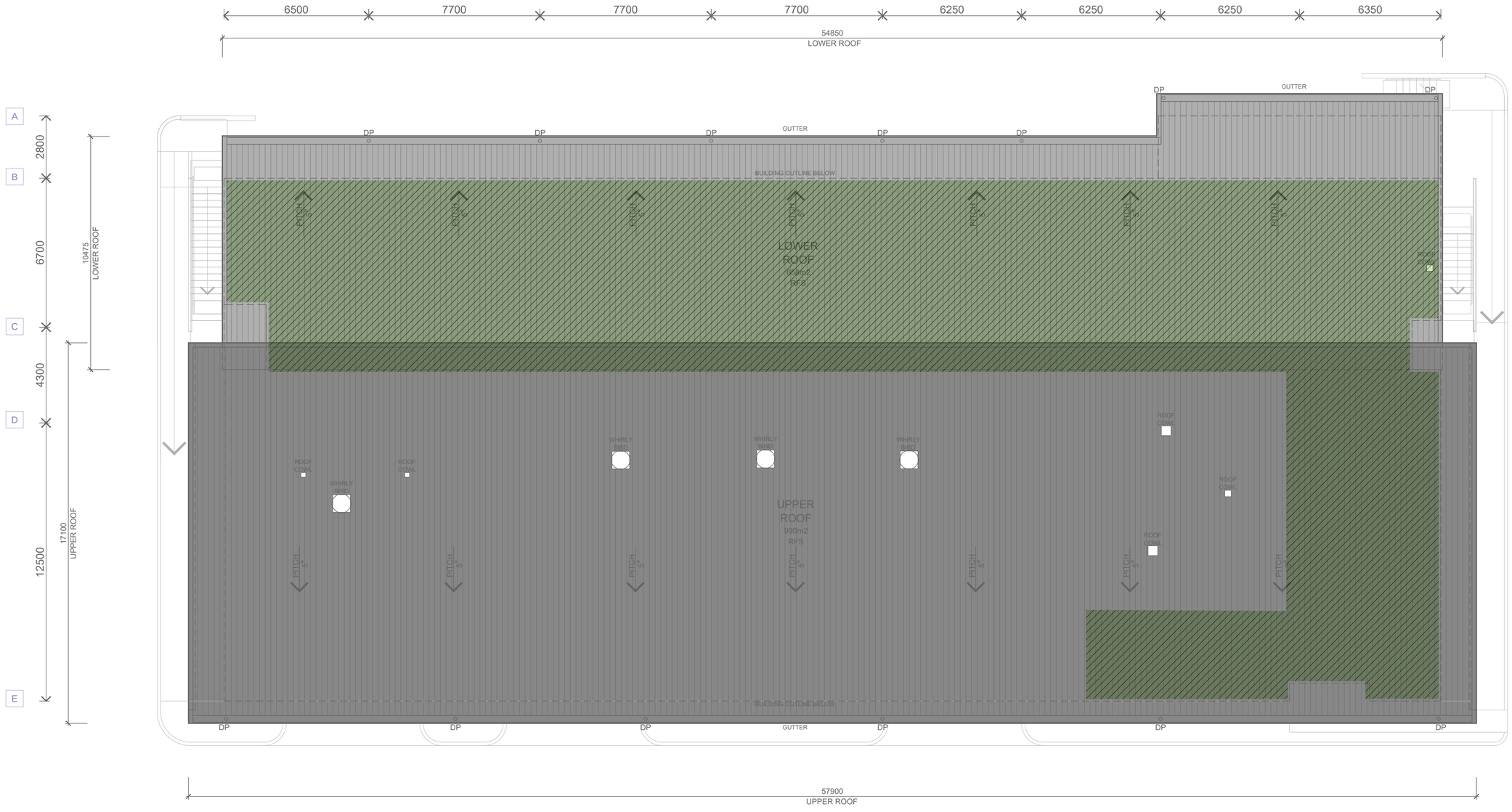

ROOF PLAN
SCALE 1:100

1 : 100 FULL SIZE A1

Proposed Insulation

R-values indicated represent minimum overall system R-values that requires to be achieved by the overall construction of the wall, floor and roof.

R3.2 - Roof and ceiling construction over conditioned area. Solar absorptance of upper surface ≤ 0.45

QUALITY CHECK

Drawings Approval for:

Item	Drawn	Project Architect	Director	Date

AMENDMENTS

No.	Description	Drawn	Appd.	Date
1	DEVELOPED DESIGN	JC		27.5.24
2	DEVELOPED DESIGN	AB		3.12.24
5	DA	AB		XX.1.25

DRAFT

Director Approval:

LEGEND

NOTES

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Drawings are to be read in conjunction with all contract documents.

Use figured dimensions only. Do not scale from drawings.

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PROJECT

PROPOSED COMMUNITY INFRASTRUCTURE DEPOT

252 COAL ROAD, MUSWELLBROOK NSW 2333

DRAWING

PROPOSED DEPOT BUILDING ROOF PLAN

PROJECT No.	DWG.No. DA 103
23-149	SCALE: 1:100

CCG Info: Plotted by Contractor Two on Thursday, 9 January 2025.
P:\23-149 MUSWELLBROOK SC. COMMUNITY INFRASTRUCTURE DEPOT\AUTOCAD\DA102 MSC DEPOT ROOF PLAN.DWG

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