Section J Part J1 Compliance Report

Blakebrook Public School – Northern Rivers Schools Cluster
417 Rosehill Road, Blakebrook, NSW 2480

Project No.	P00700
Revision	2
Issued	11/12/2023
Client	ADCO

E-LAB Consulting

Where science and engineering inspire design.

Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	24/10/2023	REF Issue	BC	CM
2	11/12/2023	For DA	BC	CM
3				
4				

Qualifications:

Information has been based on E-LAB's understanding of the documented development within the information provided. This report outlines the compliance requirements for NCC 2019 Section J Part J1 compliance only.

The project design and construction team are required to review and consider the implications of these recommendations on their design for the project.

The design team shall coordinate with any specific condensation, acoustic, wind, structural, safety, constructability, maintenance or Architectural Design requirements for a particular project.

Insulation values are whole of system values. The impact of framing can significantly derate performance and must be accounted for in the building's design.

Confidentiality:

This document contains commercial information which has been prepared exclusively for the use by The Principal. The document in entirety is confidential. No information contained in this document may be released in part or whole to any third party without the approval of the Author or The Principal.

Authorised by:

Engineering Lab NSW Pty Ltd

Chris Mann | Associate

Sustainability

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Executive Summary

E-LAB have been engaged by ADCO to provide Section J JV3 Consultancy Services for the proposed Blakebrook Public School development, located at 417 Rosehill Road, Blakebrook, NSW 2480. This report covers the building envelope for the development.

The intent of the assessment is to confirm the minimum performance requirements to satisfy Section J, Part J1 (Building Fabric and Glazing).

E-LAB have assessed the development and confirm the design will comply with NCC 2019, using the JV3 Performance Verification method and the performance requirements outlined in this report.

This assessment is made through comparing the energy consumption of a modelled building using actual performance criteria for the design and comparing its annual energy consumption to that of an equivalent, minimum Deemed-to-Satisfy (DtS) compliant building.

The key results are summarised below:

MODEL	HEATING	COOLING	LIGHTS & EQUIPMENT	TOTAL ($KGCO2_E$/ANNUM)
REFERENCE	2,170	47,151	19,837	69,158
PROPOSED	2,351	45,937	19,837	68,125
REDUCTION				**1.5%**
OUTCOME				COMPLIANT

The key façade performance requirements to demonstrate compliance are outlined in the table below. Deviation from these values may impact the compliance of the development for Section J JV3.

Glazed Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE*
Glazing (External Fixed windows)	U Value 4.4 SHGC 0.65
Glazing (External louvres)	U Value 5.4 SHGC 0.4
Glazing (Internal windows)	U Value 5.9 SHGC 0.77

*Glazing performance values are whole system performance values (i.e. glass + frame)

Solid Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE**
New Roof/Ceiling	R-Value = 3.7 m2.K/W
New External and Internal Walls	R-Value = 2.0 m2.K/W
New Floor	R-Value = 2.0 m2.K/W

**R-Value represents whole system, including thermal breaks, air gaps, bulk insulation, and metal-on-metal contact.

Note: This report provides certification for the design of the building fabric only against NCC 2019 Part J1. This does not certify the installation, nor other parts of Section J such as services, air tightness or energy monitoring.

Model Geometry:

The figure below shows the IES 3D model of the building for the purpose of this JV3 assessment. The building geometry is used for both Case 1 - Reference Building and Case 2 - Proposed Building simulations.

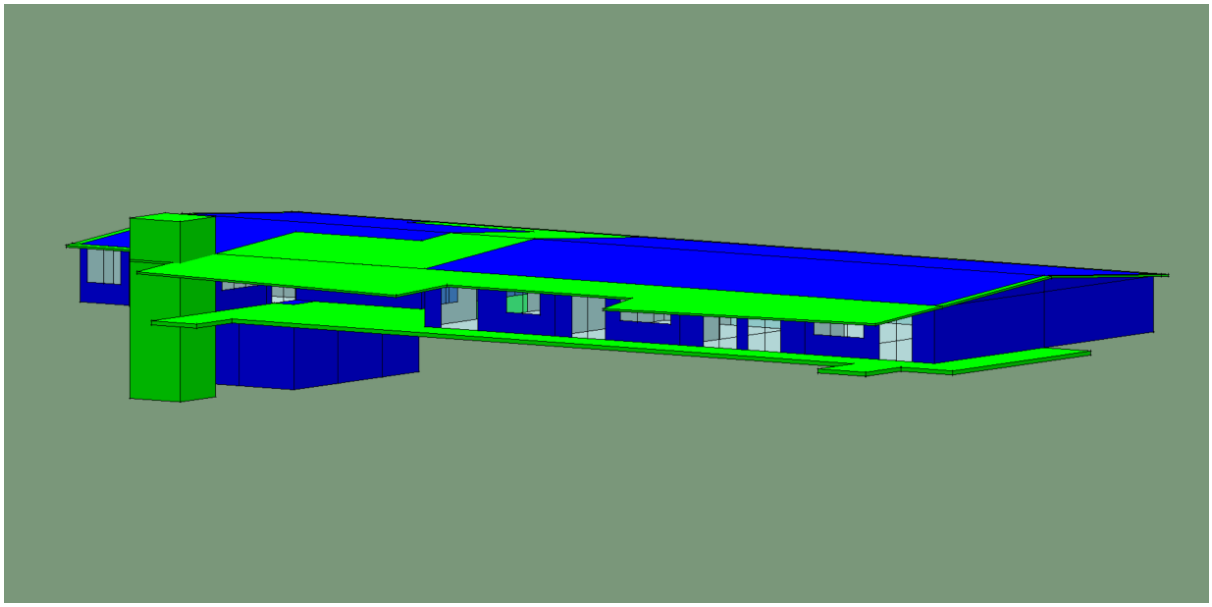


Figure 1 IES model

1 INTRODUCTION

1.1 PURPOSE

The existing buildings at Blakebrook Public School, 417 Rosehill Road, Blakebrook (Lot 2 Deposited Plan (DP) 859866) were significantly inundated during the February / March 2022 floods and most of the structures are no longer habitable due to the damages caused by the flood waters. As a result, the NSW Department of Education is proposing to demolish most of the existing school buildings and construct a new elevated school building to replace it. The floor level of the new building will be located above the design flood level to increase flood resistance and create useable undercroft spaces.

This report has been prepared by E-LAB Consulting (E-LAB) at the request of ADCO to demonstrate compliance with the NCC 2019 Volume 1, Section J requirements for Part J1. The report also highlights the steps undertaken to demonstrate compliance, documents the results, and highlights the required performance for the development.

The development, subject of this report, is for the development of the Public School which has been assessed using the DtS Pathway. The design has been found to comply with the Requirements of Part J1 of the NCC 2019, provided systems are installed in line with the values stated in this report.

1.2 PROJECT OVERVIEW

The works are being undertaken as a Development Application (DA) to Lismore City Council (Council)

The proposed development is to be undertaken in two (2) stages as follows:

- Stage 1: Demolition of the existing buildings and tree removal (separate Early Works DA)
- Stage 2: Construction of a new elevated school building and landscaping and ancillary works and structures (this Main works DA).

The Main Works development comprises:

- Construction of a new elevated school building, with at-grade (undercroft) amenities and storage, including:
  - Ground Level:
    - Open undercroft space for covered outdoor learning and play.
    - Male and female amenities and accessible toilet / change room facility.
    - Cleaners' store.
    - Equipment store.
    - Sport equipment store.
  - Elevated Level:
    - New administration comprising interview room, clerical spaces, Principal's office, staff room, sick bay and male, female and accessible amenities.
    - School library with computer room, store, main communications room and library office.
    - Four (4) General Learning Spaces (GLS) with learning commons and multi-purpose space.
    - Canteen with open servery space.
    - Store.

    - Male, female and accessible amenities.
    - Mechanical plant.
- New and hard soft landscaping including replacement play equipment, vegetable garden, fernery and yarning circle.
- New hydrant pump house with fire tanks.
- Relocation and replacement of existing septic tanks and water tanks.

It is not proposed to increase staff or student numbers as a result of these works.

Figure 1 Proposed Site

1.3 LOCATION

The site is located at 417 Rosehill Road, Blakebrook, NSW within the City of Lismore LGA. Figure 2 highlights the location of the site.

Figure 2 Site and Local Context (Source: Google Maps)

The Blakebrook Public school site resides within Climate Zone 2 (Warm humid summer, mild winter).

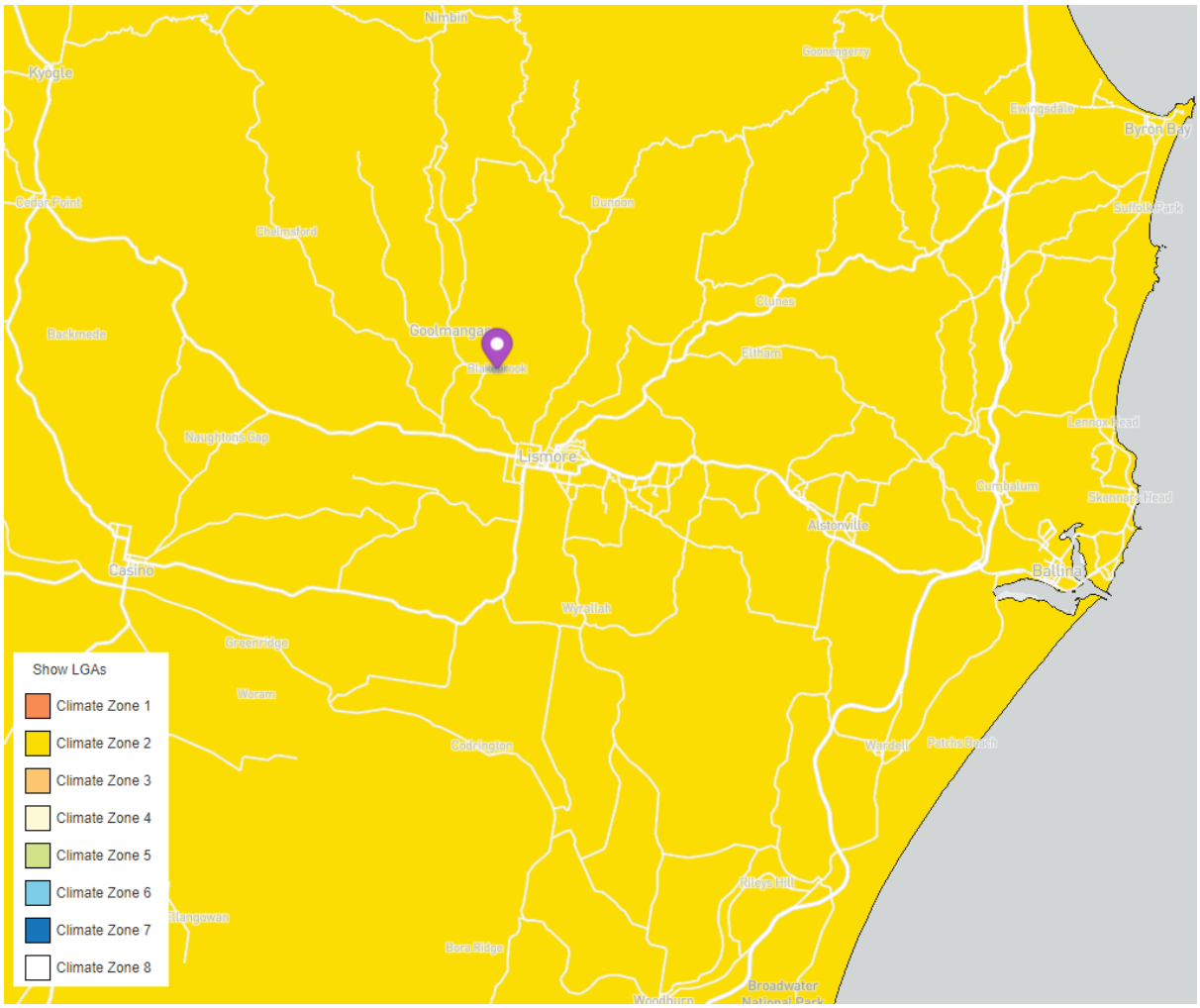


Figure 3 Climate Zone 2

1.4 DESIGN SKETCHES

Figure 4 Undercroft Floor Plan

Figure 5 Raised Level Floor Plan

2 BUILDING ENVELOPE REQUIREMENTS

2.1 GLAZING

The following method mentioned below outline the glazing performance modelled in the J1 compliance solution. This is the minimum performance required to Section J. Any relaxation of these values will need to be confirmed for compliance in writing by the Section J Certifying consultant.

The below values are whole of system values, including the impact of framing.

Glazed Elements:

SECTION J GLAZING ELEMENT	PERFORMANCE*
Glazing (External Fixed windows)	U Value 4.4 SHGC 0.65
Glazing (External louvres)	U Value 5.4 SHGC 0.4
Glazing (Internal windows)	U Value 5.9 SHGC 0.77

*Glazing performance values are whole system performance values (i.e. glass + frame)

2.2 BUIDING FABRIC

The following outlines the building fabric performance requirements as modelled in the J1 Proposed solution. This is the minimum performance required to Section J.

SECTION J GLAZING ELEMENT	PERFORMANCE**
New Roof/Ceiling	R-Value = 3.7 m2.K/W
New External Walls	R-Value = 2.0 m2.K/W
New Floor	R-Value = 2.0 m2.K/W

**R-Value represents whole system, including thermal breaks, air gaps, bulk insulation, and metal-on-metal contact.

3 RESULTS

A JV3 Assessment has been completed in line with the requirements for NCC 2019 Section J. This included:

- Modelling a reference building with reference services, using DtS Provisions for as outlined in Specification JV3 and Part J1, J3, J5 and J6 of the code.
- Modelling a proposed building fabric with reference services, using the actual constructions for the fabric and glazing, and DtS provisions for part J3, J5 and J6.

The annual Greenhouse Gas Emissions of each scenario has been modelled using appropriate software and methods. The study has found the school building complies with NCC 2019 Section J for Part J1, using the JV3 Compliance Pathway Performance Solution.

The modelled results are per the below table.

MODEL	HEATING	COOLING	LIGHTS & EQUIPMENT	TOTAL ($KGCO2_E$/ANNUM)
REFERENCE	2,170	47,151	19,837	69,158
PROPOSED	2,351	45,937	19,837	68,125
REDUCTION				**1.5%**
OUTCOME				Compliant

All other elements of the NCC Section J are required to meet DtS provisions, or compliance shall be demonstrated by the relevant consultant through an alternate pathway. This report does not relieve any other party of their duties, and certification is subject to the performance targets in this report being met.

APPENDIX A FAÇADE CALCULATORS

Façade

Report

Calculator

Project Summary

Date
7/12/2023

Name
Blake Crowley

Company
E-LAB

Position
Undergraduate Sustainabilty Engineer

Building Name / Address
NRSC - Blakebrook
0

Building State

NSW

Climate Zone
Climate Zone 2 - Warm humid summer, mild winter

Building Classification

Class 9b - schools

Storeys Above Ground
2

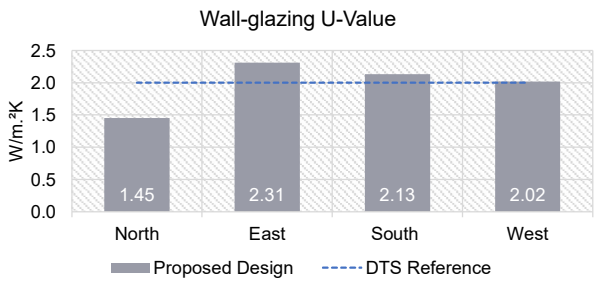
Tool Version
1.2 (June 2020)

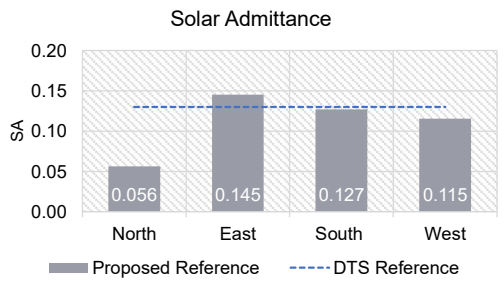
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

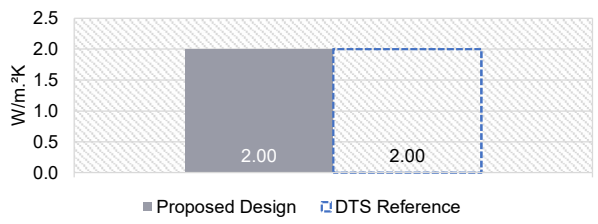
	Method 1 North	Method 1 East	Method 1 South	Method 1 West	Method 2 All
Wall-glazing U-Value (W/m².K)	1.45	2.31	2.13	2.02	2.00
Solar Admittance	0.06	0.15	0.13	0.12	
AC Energy Value					65

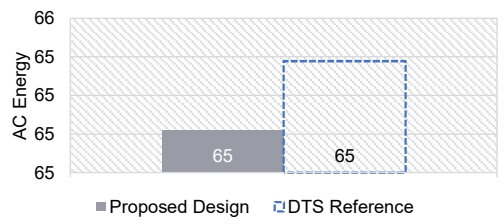
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	16.25	52.55	37.65	42
Glazing to Façade Ratio	17%	43%	37%	34%
Glazing References	Glazing Full Height Glazing 1m Elevated	Glazing Full Height Glazing 1m Elevated	Glazing Full Height 1m Elevated Glazing	Glazing 1m Elevated
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Frame Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Average Glazing U-Value (W/m².K)	4.18	4.18	4.18	4.18
Average Glazing SHGC	0.34	0.34	0.34	0.34
Shading Systems				
Wall Area (m²)	81.65	70.375	63.1375	81.75
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	DTS Wall	DTS Wall	DTS Wall	DTS Wall
Wall Thickness	100	100	100	100
Average Wall R-value (m².K/W)	1.10	1.10	1.10	1.10
Solar Absorptance	0.6	0.6	0.6	0.6

APPENDIX B INSULATION MARKUP

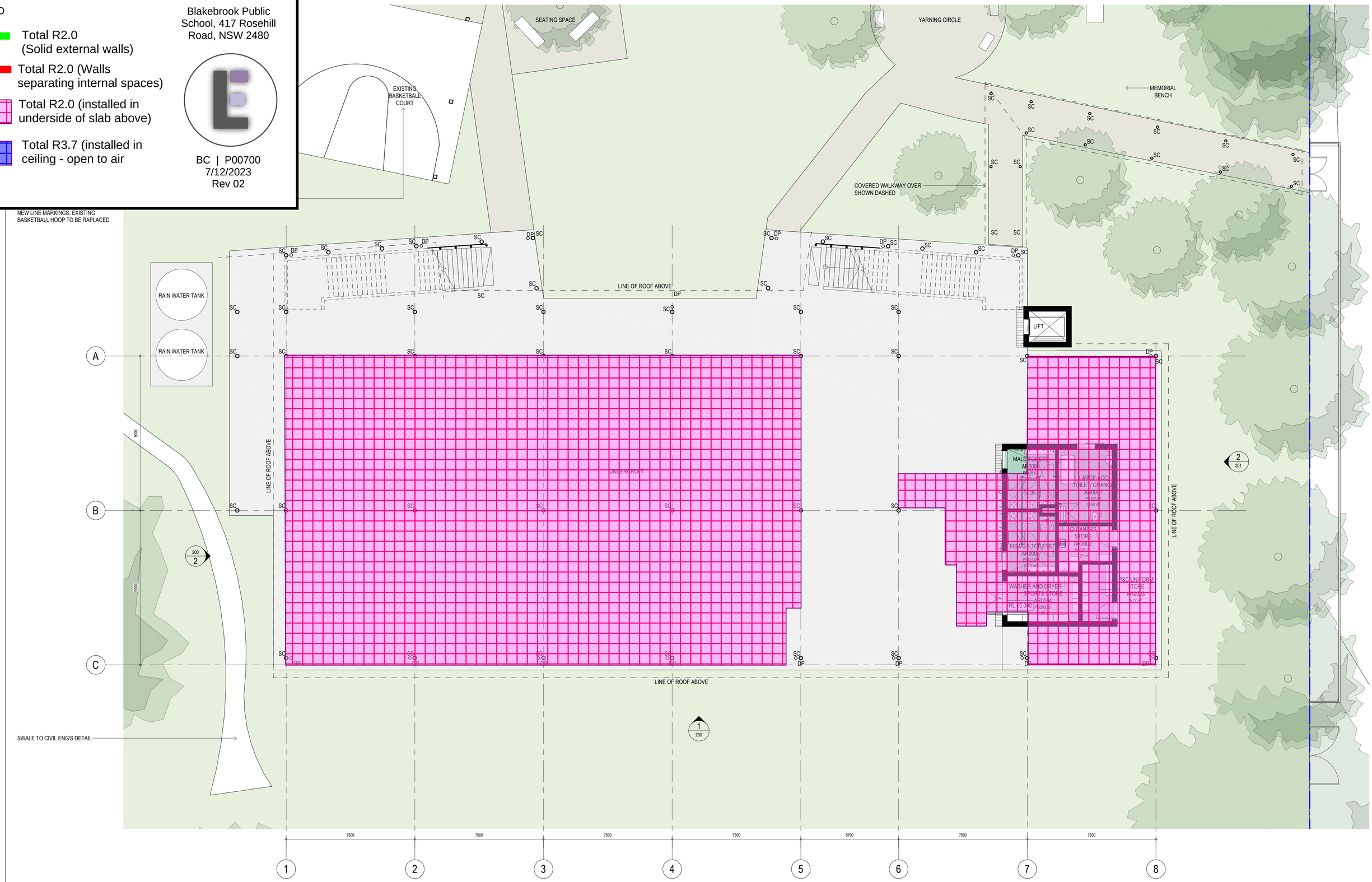
Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
- Total R2.0 (Walls separating internal spaces)
- Total R2.0 (installed in underside of slab above)
- Total R3.7 (installed in ceiling - open to air)

Blakebrook Public School, 417 Rosehill Road, NSW 2480

BC | P00700
7/12/2023
Rev 02



AMENDMENTS			
REV	BY	DATE	DESCRIPTION
A	SG	04/08/2023	PRELIMINARY ISSUE FOR COORDINATION
B	SG	06/09/2023	DRAFT DA ISSUE
C	SG	27/10/2023	ISSUE FOR DA2
D	SG	24/11/2023	ISSUE FOR DA2

ADCO

MODULAR DESIGN & CONSTRUCTION Modscape 0393 166 020	PLANNING EPM 0294 528 300
STRUCTURAL & CIVIL H&H Engineers 0423 222 338	ACCESSIBILITY AND BCA MBC Group 0450 704 954
SERVICES JHA Consulting 0404 552 673	LANDSCAPE ARCHITECT Taylor Brammer 0418 264 111
FIRE ENGINEERING AND ESD E-Lab 0447 343 458	BUSHFIRE Blackash Bushfire Consulting 0419 203 853

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NOMINATED ARCHITECT:
VINCE PEDAVOLI
NSW ARB No. 5045

PEDAVOLI ARCHITECTS

BLAKEBROOK PUBLIC SCHOOL

417 ROSEHILL ROAD BLAKEBROOK NSW 2480

DRAWING NAME

UNDERCROFT FLOOR PLAN

TRUE NORTH

SCALE As indicated @ A1

24/11/2023

DRAWING NUMBER

PROJECT DISCIPLINE PHASE TYPE SERIES NUMBER

BLA - ARC - PP - DWG - 100

REVISION D

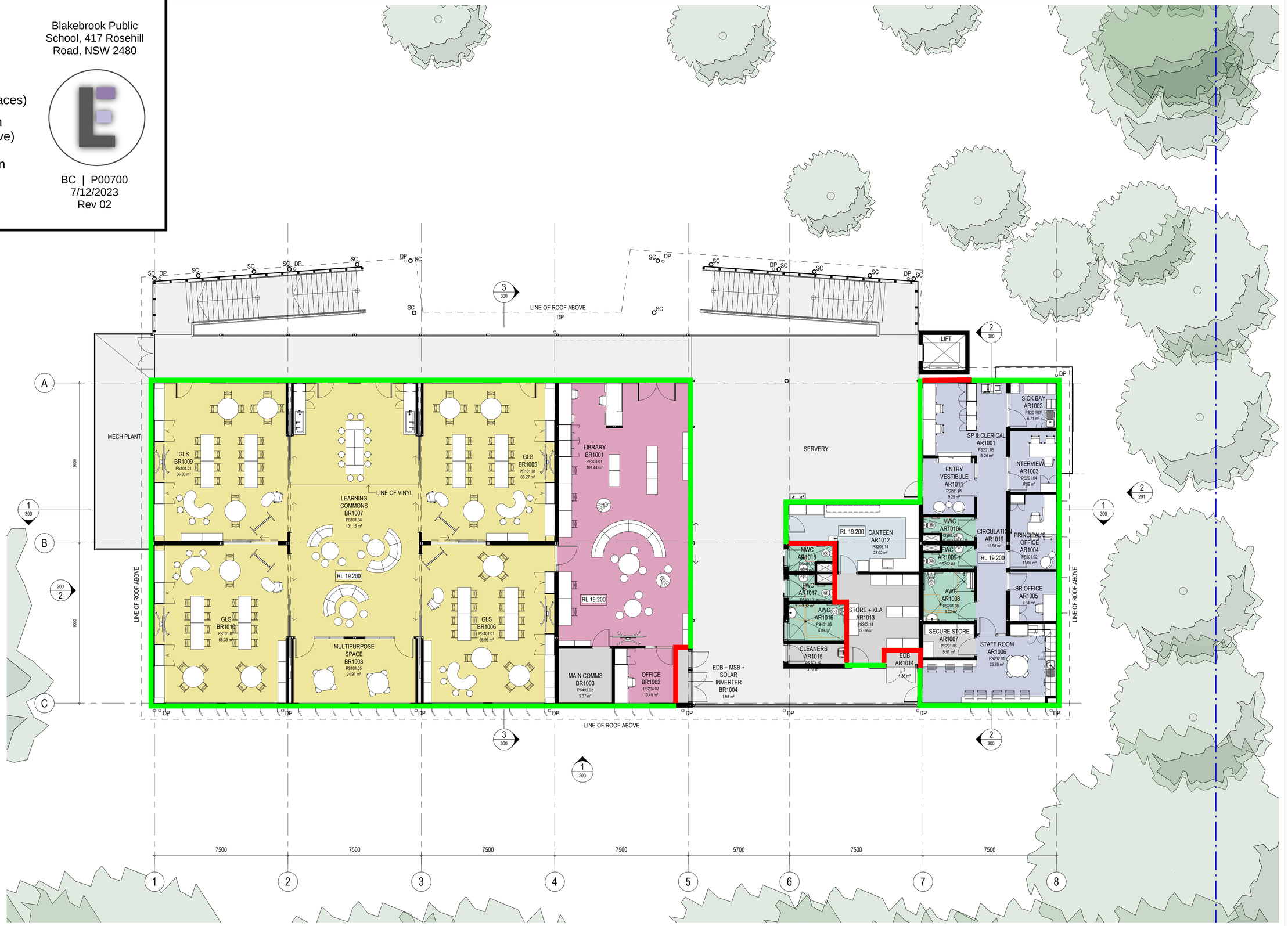
Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
- Total R2.0 (Walls separating internal spaces)
- Total R2.0 (installed in underside of slab above)
- Total R3.7 (installed in ceiling - open to air)

Blakebrook Public School, 417 Rosehill Road, NSW 2480

BC | P00700
7/12/2023
Rev 02



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STRUCTURAL & CIVIL H&H Engineers 0423 222 338	ACCESSIBILITY AND BCA MBC Group 0450 704 954
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BLAKEBROOK PUBLIC SCHOOL

417 ROSEHILL ROAD BLAKEBROOK NSW 2480

DRAWING NAME

RAISED LEVEL FLOOR PLAN

TRUE NORTH

SCALE As indicated @ A1

24/11/2023

DRAWING NUMBER					REVISION
PROJECT	DISCIPLINE	PHASE	TYPE	SERIES NUMBER	
BLA - ARC - PP - DWG - 110					D

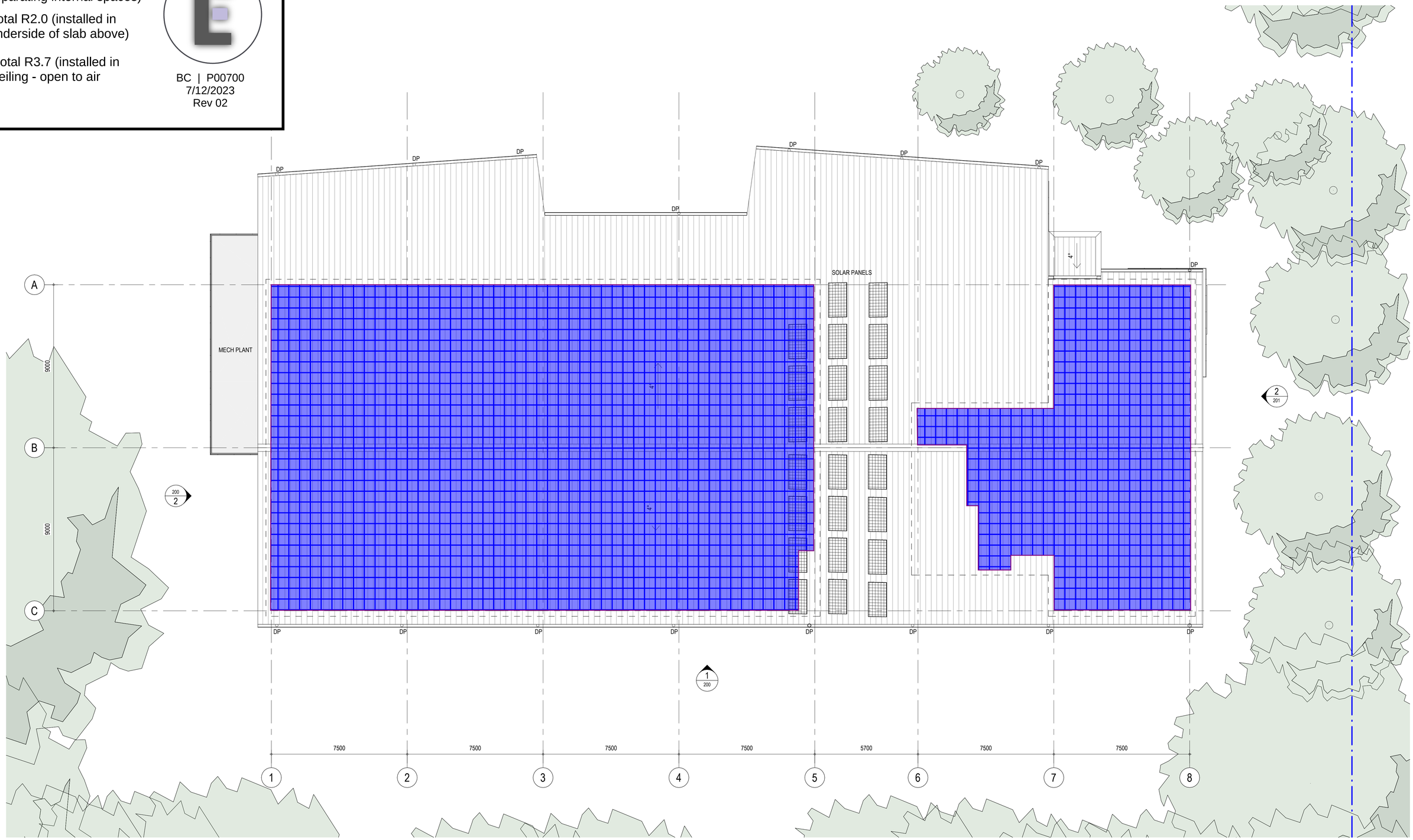
Insulation Mark-ups

LEGEND

- Total R2.0 (Solid external walls)
- Total R2.0 (Walls separating internal spaces)
- Total R2.0 (installed in underside of slab above)
- Total R3.7 (installed in ceiling - open to air)

Blakebrook Public School, 417 Rosehill Road, NSW 2480

BC | P00700
7/12/2023
Rev 02



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ADCO

MODULAR DESIGN & CONSTRUCTION Modscape 0393 166 020	PLANNING EPM 0294 528 300
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SERVICES JHA Consulting 0404 552 673	LANDSCAPE ARCHITECT Taylor Brammer 0418 264 111
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BLAKEBROOK PUBLIC SCHOOL

417 ROSEHILL ROAD BLAKEBROOK NSW 2480

DRAWING NAME

ROOF PLAN

TRUE NORTH

SCALE 1 : 100 @ A1

24/11/2023

DRAWING NUMBER					REVISION
PROJECT	DISCIPLINE	PHASE	TYPE	SERIES NUMBER	
BLA	ARC	PP	DWG	120	D

APPENDIX C Profiles and Performance Inputs

INPUT	REFERENCE	PROPOSED
Climate Zone (Weather File)	Climate Zone 2 (Ballina.Byron.Gateway TMY)	
Geometry	To match the proposed	As per the design
Profiles	As outlined in Specification JVc and detailed in this appendix	
Lighting Levels	Per Part J6 Maximum	
Occupant Density	Per Design Limits for Class 5 and Class 9	
Internal Heat Gains	As outlined in Specification JVc and detailed in this appendix	
Construction Thermal Performance	Per Part J1 Façade Calculator	As outlined in Section 3.2
Glazing Suite Performance	Per Part J1 DtS Standards, documented in Appendix A	Per the proposed glazing suite, outlined in Section 3.1
Building Services Design	Cooling - (Air-cooled chiller with capacity < 528 kWr) Heating – (Gas Boiler consuming less than 500MJ/hour)	
Cooling COP	Air cooled chiller per NCC 2019 2.866	Air cooled chiller per NCC 2019 2.866
Heating COP	Gas boiler per NCC 2019 0.86	Gas boiler per NCC 2019 0.86
Cooling Fuel	Grid Electricity	Grid Electricity
Heating Fuel	Grid Electricity	Grid Electricity
Space Temperature Range	21 – 24 °C	21 – 24 °C
Outdoor Air Rate	In line with code minimum for Part F4.5(b) Modelled at 7.5L/s/person	
Infiltration Air Change Rate	Per Specification JVb, Part 2(d): 0.7 ACH when plant is not operating 0.35 ACH when plant is operating	

APPENDIX D Applicable Clauses

Part J0 Energy efficiency

J0.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—

(i) J0.1 to J0.5; and

(ii) J1.1 to J1.6; and

(iii) J3.1 to J3.7; and

(iv) J5.1 to J5.12; and

(v) J6.1 to J6.8; and

(vi) J7.1 to J7.4; and

(vii) J8.1 to J8.3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J0.1 Application of Section J

Performance Requirement JP1 is satisfied by complying with—

(a) for reducing the heating or cooling loads—

(i) of *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, J0.2 to J0.5; and

(ii) of a Class 2 to 9 building, other than the *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, Parts J1 and J3; and

(b) for *air-conditioning* and ventilation, Part J5; and

(c) for artificial lighting and power, Part J6; and

(d) for heated water supply and *swimming pool* and spa pool plant, Part J7; and

(e) for facilities for monitoring, Part J8.

J0.4 Roof thermal breaks

For compliance with J0.2(c), a roof that—

(a) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and

(b) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens,

must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

J0.5 Wall thermal breaks

For compliance with J0.2(c), a wall that—

(a) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame; and

(b) has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame,

must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.

Part J3 Building sealing

Deemed-to-Satisfy Provisions

J3.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* JP1 is satisfied by complying with—

(i) J0.1 to J0.5; and

(ii) J1.1 to J1.6; and

(iii) J3.1 to J3.7; and

(iv) J5.1 to J5.12; and

(v) J6.1 to J6.8; and

(vi) J7.1 to J7.4; and

(vii) J8.1 to J8.3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

J3.1 Application of Part

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 F4 provides sufficient pressurisation to prevent infiltration.

NSW J3.1(d)

J3.2 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.

J3.3 Roof lights

(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

(iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

J3.4 Windows and doors

(a) A door, openable *window* or the like must be sealed—

(i) when forming part of the *envelope*; or

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

(b) The requirements of (a) do not apply to—

(i) a *window* complying with AS 2047; or

(ii) a fire door or smoke door; or

(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal to restrict air infiltration—

(i) for the bottom edge of a door, must be a draft protection device; and

(ii) for the other edges of a door or the edges of an openable *window* or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.

(d) 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—

(i) where the *conditioned space* has a *floor area* of not more than 50 m^2; or

(ii) where a café, restaurant, open front shop or the like has—

(A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and

(B) at all other entrances to the café, restaurant, open front shop or the like, *self-closing* doors.

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

J3.5 Exhaust fans

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

(i) a *conditioned space*; or

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

J3.6 Construction of ceilings, walls and floors

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

(i) the *envelope*; or

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

(b) Construction *required* by (a) must be—

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

(ii) sealed at junctions and penetrations with—

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

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

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

J3.7 Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like—

(a) when serving a heated space; or

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

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