PERFORMANCE BASED BUSHFIRE ASSESSMENT REPORT

Variation S43C14 'Vehicular Access' of National Construction Code Volume One (2022) Building Code of Australia.

Proposed Additions and Alterations to existing Education Facility

Lot 388 DP 750227 & Lot 485 DP728071
64 Culgoa Crescent
Pambula Beach

11 October 2023
Reference: S023103

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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SET Consultants Pty Ltd

NOWRA
51 Graham Street
Nowra 2541
Tel: (02) 4421 4500

KIAMA
2/125 Terralong Street
Kiama 2533
Tel: (02) 4233 2006

Email: *mail@setconsultants.com.au*

Document Control Table:

Prepared By	Reviewed By	Revision Number	Date
Peter Dowse B.S (Env), Grad Dip (Bushfire Protection) **Senior Environmental and Bushfire Planner** **BPAD Accredited Practitioner** BPAD- 46547 (Level 2)	**David Cannon** *M.Env.Eng.Sc, Grad Dip (Bushfire Protection), B.Env.Sc.Adv (Hons 1)* **Environmental Engineer** BPAD-23829 (Level 3) **Member - PIA**	Ver 0.1 – Draft	18 September 2023
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The assessment has been prepared in accordance with Planning for Bushfire Protection - A Guide for Councils, Planners, Fire Authorities and Developers, 2019, NSW Rural Fire Service (RFS) and Planning NSW.

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1 INTRODUCTION

This Performance Based Bushfire Assessment Report has been prepared for *Austin McFarland Architects* on behalf of Lumen Christi Catholic College to accompany a development application for alterations and additions to an existing educational establishment. The site is legally described as Lot 338 DP750277 and Lot 485 DP728071, No. 64 Culgoa Crescent Pambula Beach. For this assessment, the proposal is, by virtue of Section 4.46 of the Environmental Planning and Assessment (EP&A) Act 1979, integrated development and requires a Bush Fire Safety Authority under Section 100B of the Rural Fires Act 1997 in respect of bush fire safety for the development of land for a Special Fire Protection Purpose (Educational Establishment). The Bushfire Assessment Report has been prepared in accordance with Clause 45 of the Rural Fires Regulation 2022, which specifies the information requirements for consideration of a bush fire safety authority under section 100B of the RF Act 1997. Eurobodalla Shire Council's Bushfire Prone Land Map indicates that the subject lot is bushfire prone (Figure 1).

Figure 1: Bega Valley Shire Council Bushfire Prone Land Mapping.

The assessment of the site is based on the results of a field survey conducted by Mr Peter Dowse and David Cannon on 2023. The following current legislation and guidelines were referred to when preparing this report:

- Planning for Bushfire Protection, A Guide for Council, Planner, Fire Authorities and Developers' (NSW Rural Fire Service (RFS) in cooperation with the Department of Planning (2019);
- Addendum to Planning for Bushfire Protection 2022;
- National Construction Code 2022;
- Rural Fires Act 1997;
- Australian Standard 3959-2018 Construction of Buildings in Bushfire Prone Areas; and
- Rural Fires Regulation 2022.

NOTE: *that the 'Planning for Bushfire Protection, A Guide for Council, Planners, Fire Authorities, and Developers (NSW Rural Fire Service (RFS) in cooperation with the Department of Planning (NSW) (2019)' mentioned above, will herein be referred to as the* ***'PBP 2019'.***

1.1 SPECIFICATION 43 BUSHFIRE PROTECTION FOR CERTAIN CLASS 9 BUILDINGS

The National Construction Code (2022) has additional Bushfire Protection Measures for certain Class 9 buildings which are detailed in Specification 43 *'Bushfire Protection Measures for Certain Class 9 Buildings*' Volume 1 NCC (2022). The additional measures relate to Class 9a Primary or Secondary Schools, Class 9b Early Childhood Centre and Primary/Secondary Schools and Class 9c Residential Care Building. The additional provisions are summarized as follows;

- ***S43C10 Building envelope.***
- ***S43C11 Supply of water for fire-fighting purposes.***
- ***S43C14 Vehicular access.***
- *S43C3 Separation between buildings.*
- *S43C4 Separation from allotment boundaries and car parking areas.*
- *S43C5 Separation from hazards (such as liquefied petroleum gas bottles, fuel storage, storage of combustible materials, waste bins, vehicles, machinery, and the like).*
- *S43C6 Non-combustible path around building.*
- *S43C7 Access pathways.*
- *S43C8 Exposed external areas.*
- *S43C9 Internal tenability.*
- *S43C12 Emergency power supply.*
- *S43C13 Signage.'*

Of the twelve additional requirements listed above, this assessment has addressed sections '*S43C10 Building envelope'*; '*S43C11 Supply of water for fire-fighting purposes'*; and '*S43C14 Vehicular access'* as these requirements relate specifically to the area of expertise of a BPAD Practitioner.
NSW S43C2 Separation from classified vegetation

The NSW Amendment to NCC 2022 promptly exempts certain clauses of Specification 43, notably S43C2, which pertains to distancing from classified vegetation. The specified minimum distances for Asset Protection Zones (APZs) in SFPP development, as stipulated by PBP 2019, take precedence. Consequently, S43C2 is not applicable to the planned expansion of the existing school. The remaining specifications **will be the responsibility of the Principal Architect, Building Certifier and/or Fire Engineer**.

1.2 OBJECTIVES

All development on Bushfire Prone Land must satisfy the aim and objectives of PBP 2019. PBP 2019 states:

"The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

More specifically, the objectives are to:

a) *afford buildings and their occupants protection from exposure to a bush fire;*
b) *provide for a defendable space to be located around buildings;*
c) *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
d) *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
e) *provide for ongoing management and maintenance of BPMs; and*
f) *ensure that utility services are adequate to meet the needs of firefighters.*

Due to the vulnerable nature of the occupants of SFPP developments, there is more reliance on the provision of an APZ and emergency management. The development relates to a small redevelopment of two dated buildings within an existing SFPP development and the objectives of Section 6.4 Development of Existing SFPP Facilities applies to the proposed development.

The objectives that apply to existing SFPP development are as follows:

a) *provide an appropriate defendable space;*
b) *site the building in a location which ensures appropriate separation from the hazard to minimise potential for material ignition;*
c) *provide a better bush fire protection outcome for existing buildings;*
d) *new buildings should be located as far from the hazard as possible and should not be extended towards or situated closer to the hazard than the existing buildings (unless they can comply with section 6.8);*
e) *ensure there is no increase in bush fire management and maintenance responsibility on adjoining land owners without their written confirmation;*
f) *ensure building design and construction enhances the chances of occupant and building survival; and*
g) *provide for safe emergency evacuation procedures including capacity of existing infrastructure (such as roads).*

This assessment includes an analysis of the potential hazard persisting and affecting the subject site and the standards and bushfire mitigation measures that should be introduced to address the objectives of the PBP 2019 and AS3959-2018. The mitigation measures have been derived from the provisions (performance criteria and acceptable solutions) as outlined within the PBP 2019 and AS3959-2018.

1.3 PROPOSAL

This proposal is for alterations and additions to the existing Educational Establishment. Figure 2 shows an extract of the Site Plan prepared by *Austin McFarland Architects* which has been submitted as part of this application.

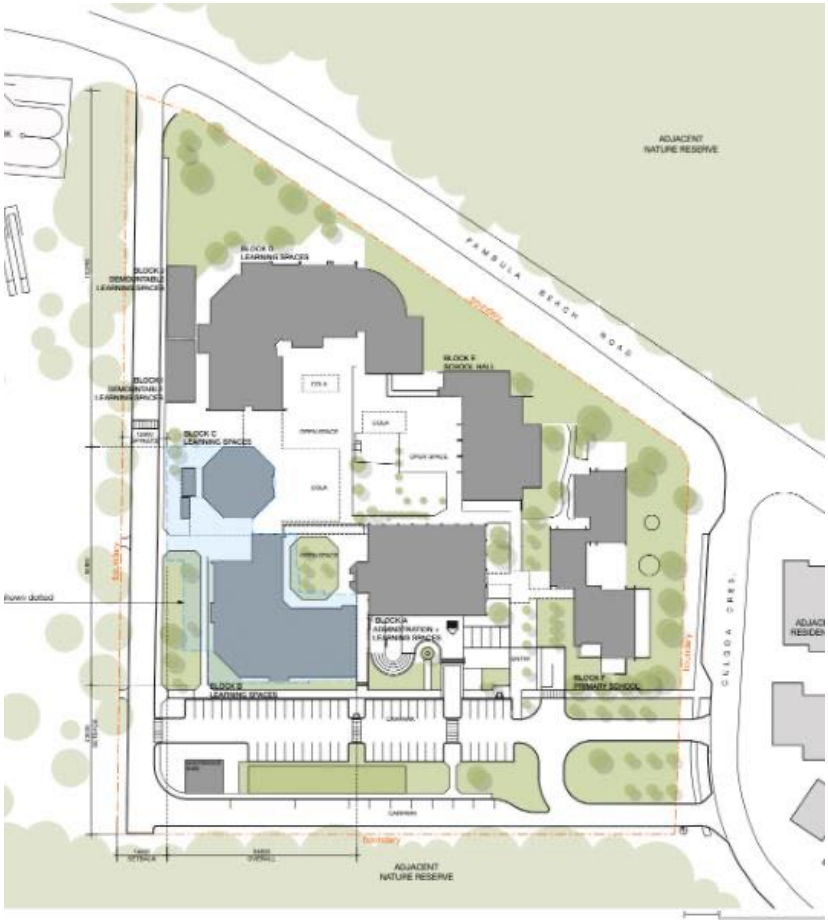


Figure 2 Extract of the proposed Site Plan prepared by *Austin McFarland Architects.*

The proposed alterations and additions to the existing building include joining block B TAS and C Science Building extending to the west only extension to the south is the inclusion of perforated metal screens.

Block B Learning Spaces

Addition of 1st floor to accommodate.

- Classrooms general learning areas
- Break out spaces

Block C Learning space

- Extension to building to the southern elevation with cut metal screening.
- Extension to building to the western elevation to extend the
- First floor extension
- New workshops
- Machine rooms
- Materials handling space

- Classrooms
- Adaptable spaces so can have smaller rooms with lab beside or large classrooms.

The alterations and additions are not to increase the capacity of the school but to create adaptable and flexible learning spaces and staff facilities to better utilise the site and provide modern learning facilities for students, teachers and the school community to meet the expectation of staff, students and carers.

Figure 3 shows an extract of the Elevation Plans prepared by *Austin MacFarland Architects*. A full set of architectural plans have been submitted with this application.

Figure 3 Extract of Elevation Plan prepared by *Austin McFarland Architects.*

Materials have been included in the submitted Architectural Plans including metal roof sheeting, face brick, blockwork, bagged brickwork, fibre cement sheeting and perforated metal screening.

<u>School capacity</u>
Student population capacity (unchanged)

K-6	150
7-12	521
Total	671

Total staff (FTE rounded) 64

Parking requirements:

Y12 Students	1 for every 20 students	75 students	4 car spaces req
Visitors	1 for every 30 students	671 students	23 spaces

Staff	1 for20 students	671 students	34 spaces
Total required 61			

The site accommodates the required car parking spaces.

2 PROPERTY DETAILS

2.1 DESCRIPTION OF PROPERTY

The subject site is legally described as Lot 388 DP750227 and Lot 485 DP728071, and known as 64 Culgoa Crescent, Pambula. The site is located to the south of Pambula Beach Road and west of Culgoa Crescent. The site has an area of approximately 2.68hectares and is irregular in shape. Figure 4 shows a location image of the subject site and immediate surroundings.

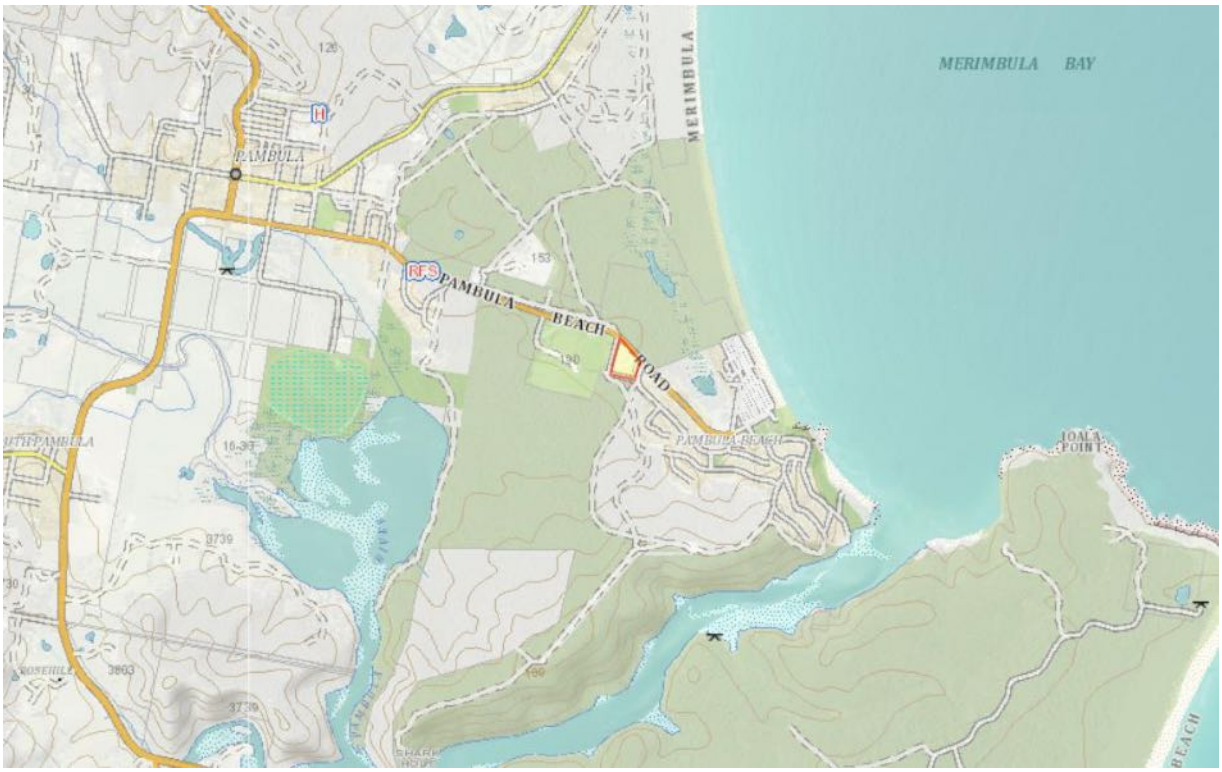


Figure 4: Locality map showing the subject site (red) in relation to the surrounding area.

The site accommodates the existing School - Lumen Christi Catholic College which is a co-educational kindergarten to year 12 College for students with a maximum of 700 students and 64 staff (full time equivalent). The site is developed with the College buildings being classrooms, halls, staff rooms, administration, open space (covered and uncovered) onsite carparking, drop off/pick up zones and access roads and landscaping.

The site has two access points with vehicles entering from Pambula Beach Road and exiting onto Culgoa Crescent. Access and egress to Culgoa Crescent is along the southern boundary which provides access to the car park and administration building, with alternative access to Pambula Beach Road along the western side boundary. Figure 5 shows an image of the site.

Figure 5: Aerial image showing the school and surrounding land, image sourced nearmap.com.

The proposed development is located in the southwestern corner of the site adjacent to Pambula Beach Sporting Complex. Vegetation forming the predominate threat to the proposed development comes from Beowa National Park to the north and south of the school. Figure 6 shows the vegetation impact of the site to the south as viewed from the western side of the proposed development.

Figure 6: Foerst Vegetation located to the south forming the dominant bushfire threat to the proposed development.

2.2 CLASS OF VEGETATION

The vegetation types have been classified using the formations and sub-formations provided in Figure A1.2 of the bushfire guideline. Vegetation descriptions are as per Keith D, 2004 in Keith (2004) "Ocean Shores to Desert Dunes" published by DECC (except heathlands which is provided two sub-formations rather than one based largely on vegetation height) the main categories are as follows:

- Forests (wet sclerophyll forests and dry sclerophyll forests);
- Woodlands;
- Forested wetlands;
- Tall heaths;
- Freshwater wetlands;
- Short heaths;
- Alpine complex;
- Semi-arid woodlands;
- Arid shrublands;
- Rainforests; and
- Grasslands.

Fuel loads are based on recent information provided by:

- The University of Wollongong's (UoW) Fuels Modelling Project;
- The University of Melbourne (UoM) which reference the fuel classifications found in Keith (2004); and
- CSIRO Ecosystems Sciences and Bushfire Dynamics and Applications.

Where a mix of vegetation types exist, the type providing the greatest bushfire hazard has been used. Vegetation that is to be cleared as part of the development has not been included in this assessment. It should also be noted that remnant vegetation (a parcel of vegetation < 1 ha or fire run of < 50m) and Riparian vegetation are considered a low hazard and APZ setbacks and building construction standards for these will be the same as required for rainforest vegetation.

The following are not required to be considered a bushfire threat for the purposes of PBP, as detailed below:

- Single areas of vegetation less than 1 hectare in area and greater than 100 metres separation from other areas of Category 1 or 2 vegetation.
- Multiple areas of vegetation less than 0.25 hectares in area and not within 20m of the site, or each other or of other areas of vegetation being classified vegetation.
- Strips of vegetation less than 20 metres in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or 2 each other, or other areas of vegetation being Category 1, 2 or 3 vegetation.
- Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load, including grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses such as playing areas and fairways, maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens and other non-curing crops, cultivated gardens, arboretums, commercial nurseries, nature strips and windbreaks.

Note: 1. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bush fire attack (recognizable as short cropped grass for example, to a nominal height of 100 mm). 2. A windbreak is considered a single row of planted trees located on a boundary and used as a screen or to reduce the effect of wind on the leeward side of the trees.

- Existing areas of managed gardens and lawns within curtilage of buildings. Non-vegetated areas, including waterways, roads, footpaths, buildings, and rocky outcrops.

The details of the predominant vegetation in all directions, to a distance of 140m from the proposed child-care facility are provided in section **3.2**.

The proposed development will join the existing block B and C which are situated within the south western corner of the development site (Figure 7). Vegetation forming the predominate bushfire threat to the proposed development comes from vegetation located to the north and south associated with Beowa National Park. The neighboring Pambula Beach Sports Complex is maintained regularly and has been assessed as managed land.

Vegetation communities have been classified using NSW State Vegetation Type Map (SVTM) compiled by Department of Planning and Environment 2022 and has been classified as PCT 3662 South Coast Lowland Blackbutt Forest to the south and a combination of PCT 3662 South Coast Lowland Blackbutt Forest and 3638 South Coast Sands Bangalay Forest to the north.

When converted to the vegetation formations used by Planning for Bushfire Protection 2019 (Keith 2004).

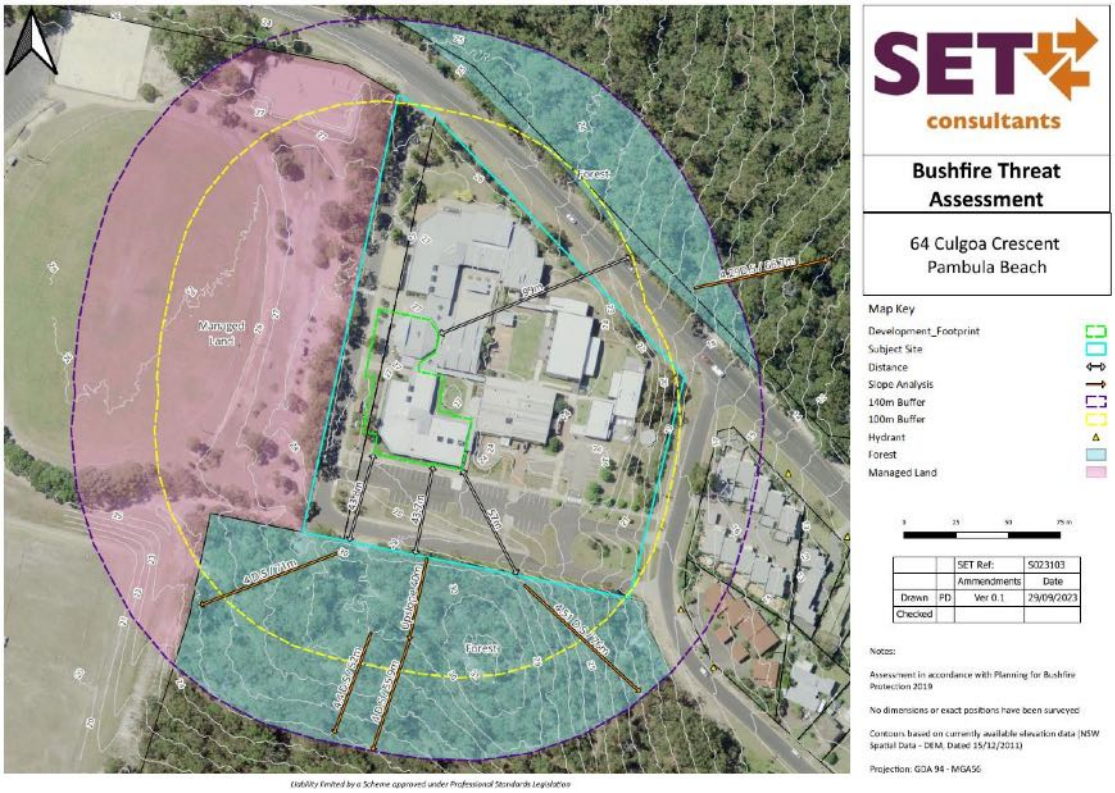


Figure 7: Bushfire Assessment

2.3 ASSESSMENT OF SLOPE

The slope in all directions over a distance of 100m from the existing property boundary or building footprint has been assessed in terms of the following classes:

(i) all upslope vegetation (considered 0°)
(ii) >0 to 5° downslope vegetation
(iii) >5 to 10° downslope vegetation
(iv) >10 to 15° downslope vegetation
(v) >15 to 18° downslope vegetation.

During the assessment of the slope, if it was found that there were a number of different slope classes present over the 100m in any one direction, the slope of the area, which will most significantly influence the fire behavior, has been adopted.

The subject site has a general downslope in a northerly direction towards Illawong Nature Reserve. Planning for Bushfire Protection 2019 acknowledges that there may be varying slope and, in this regard, the "gradient within the hazard (vegetation) which will most significantly influence the fire behaviour of the site having regard to the vegetation found" can be used.

The slope most significantly influencing bushfire behaviour is as follows (Figure 7):

- North and South - 0 to 5^{o} Downslope.

2.4 SIGNIFICANT ENVIRONMENTAL FEATURES

The neighbouring environmentally zoned land relates to a coastal wetland.

2.5 THREATENED SPECIES

There are no known threatened species on the subject land.

2.6 ABORIGINAL RELICS

There are no known aboriginal relics located on the subject land.

2.7 ZONING

The site is subject to the provisions of Bega Valley Council LEP 2013, under which the lot is zoned R3 Medium Density Residential. Figure 8 shows the zoning map of the subject site and surrounding lands.

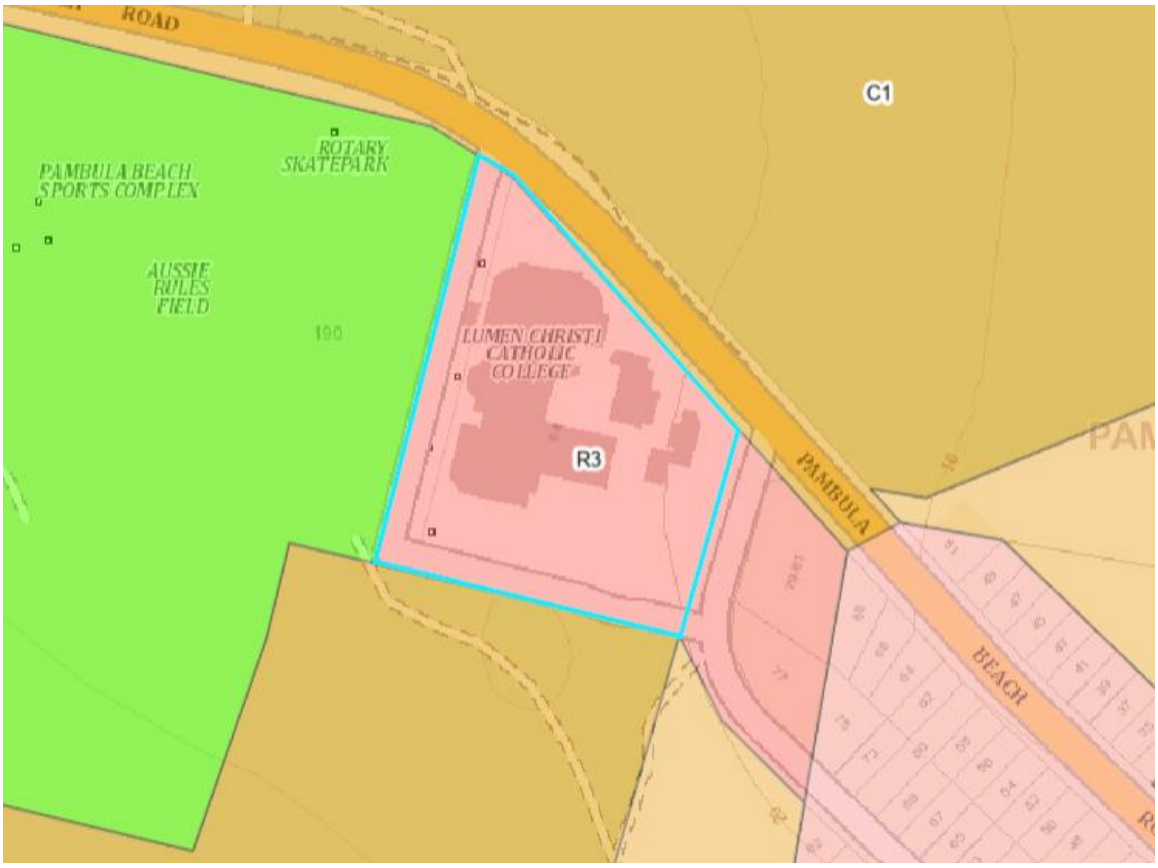


Figure 8: Extract of Bega Valley LEP 2013 Zoning map showing the subject site outlined in blue.

The objectives of the R3 Low Density Residential zone are as follows:

- To provide for the housing needs of the community within a medium density residential environment.
- To provide a variety of housing types within a medium density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.

Permitted with consent

Attached dwellings; Boarding houses; Centre-based child care facilities; Community facilities; Group homes; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Respite day care centres; Roads; Seniors housing; Tank-based aquaculture; Any other development not specified in item 2 or 4

Prohibited

Advertising structures; Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Biosolids treatment facilities; Boat building and repair facilities; Boat sheds; Camping grounds; Car parks; Caravan parks; Cemeteries; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Emergency services facilities; Entertainment facilities; Extractive industries; Forestry; Freight transport facilities; Function centres; Funeral homes; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Local distribution

premises; Marinas; Mooring pens; Moorings; Mortuaries; Open cut mining; Passenger transport facilities; Port facilities; Public administration buildings; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Restricted premises; Rural industries; Rural workers' dwellings; Service stations; Sewage treatment plants; Sex services premises; Storage premises; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Water recycling facilities; Water supply systems; Wharf or boating facilities; Wholesale supplies

The proposal is for alterations and additions to an existing educational establishment, which is defined as:-.

educational establishment *means a building or place used for education (including teaching), being—*

(a) ***a school****, or*

(b) a tertiary institution, including a university or a TAFE establishment, that provides formal education and is constituted by or under an Act.

Educational establishments are not prohibited and therefore are identified as permitted with consent.

3 PROPERTIES ADEQUACY FOR BUSHFIRE PROTECTION

3.1 ASSESSMENT METHODOLOGY

A site inspection was conducted to determine the direction and scale of any potential bush fire event based on an analysis of slope, aspect, vegetation type and density, current fuel loading and evidence of past fire history.

The information contained in the appendices of the PBP 2019 has been used to categorise vegetation type and slope class in the locality, as discussed in Sections 2.2 and 2.3 of this report. Section A1.6 of the PBP 2019 was used to determine the appropriate fire area and corresponding FDI rating. Following on from this, Table A1.12.1 of PBP 2019 was used to determine APZs for each respective vegetation class and the bushfire exposure level (construction requirements) for the proposed development.

The assessment has also assessed the development against the additional Bushfire Protection measures detailed in Addendum to PBP 2022 for certain Class 9 buildings. These specific Performance Criteria and Acceptable Solutions are included in their relevant sections below.

3.2 SPECIFICATIONS FOR ASSET PROTECTION ZONE

The intent measures are to provide suitable building design, construction and sufficient space to ensure that radiant heat level do not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants. The performance criteria and acceptable solutions for asset protection zones for Special Fire Protection Purpose development in accordance with PBP 2019 are provided in Table 1.

Table 1: Provides the performance criteria and acceptable solutions for APZ for SFPP development in accordance with PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance
The intent may be achieved where:		
Radiant heat levels of greater than 10kW/m^2 (calculated at 1200K) experienced on any part of the building.	• **An APZ is provided in accordance with Table A1.12.1 of Appendix 1 of PBP 2019.**	The proposed building maintains the existing offset to the south with a covered walkway extending the development footprint approximately 1m further to the south. As the development cannot meet the provisions for a 10kW/m2 APZ a performance solution has been prepared demonstrating compliance with the aims and objectives of Section 6.4 *'Development of Existing SFPP Facilities'*, Section 3.3 below.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	• APZs are located on lands with a slope less than 18 degrees.	The subject site does not have slopes greater than 18 degrees.
APZs are managed and maintained to prevent the spread of fire to the building. APZ is provided in perpetuity.	• The APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site; • APZ are wholly within the boundaries of the development site; and • other structures located within the APZ need to be located further than 6m from the refuge building.	The APZs on the subject site should have no problem being maintained in accordance with the requirements of Standards for Asset Protection Zones.

Table 2 provides a breakdown of the vegetation type, slope class and the required APZ for the proposed development. The APZs have been calculated for the Far South Coast region using a FFDI of 100. The distance for the asset protection zone/separation distance for the asset protection zone/separation distance has been measured in accordance with Table A1.12.1 of PBP 2019 (Determination of BAL, FFDI 100 – Special Fire Protection Purposes) which is between each of the vegetation stands identified (from the edge of the foliage cover) and the building. The separation distances have been measured onsite using a Nikon Forestry Pro Range Finder and Clinometer.

Table 2: Breakdown of the vegetation type, slope class and the recommended APZ for proposed works (10kW/m^2).

Direction	Dominate Vegetation Type	Effective Bushfire Slope	APZ Required (m)	APZ Provided	BAL	Comments
North	Forest	0 to 5° Downslope	79m	99m	BAL 12.5	The proposed building will be located approximately 99m from the prevailing bushfire threat to the north and would meet the provisions of 10kW/m2 for this elevation.
South	Forest	0 to 5° Downslope	79m	43.7m	**BAL 19**	The proposed building maintains the existing offset to the south with a covered walkway extending the development footprint approximately 1m further to the south.
All other Directions	Managed residential land	-	>100m		BAL Low	Combination of developed residential land to the east and managed sports field to the west.

3.3 Performance Solution - Objective Assessment Section 6.4 'Development of Existing SFPP Development' PBP 2019

The proposed development relates to alterations and additions to an established SFPP development. The development cannot achieve the acceptable solutions for APZs and an assessment of the development against the specific objectives of Section 6.4 *'Development of Existing SFPP Development'* PBP 2019 has been undertaken.

Table 3 Assessment of the proposed development against the objectives of existing SFPP development as specified in Section 6.4 of PBP 2019.

Objective	Justification
1. Provide an appropriate defendable.	The entire property is currently maintained to an APZ standard the development benefits from existing managed land.
2. Site the building in a location which ensures appropriate separation from the hazard to minimise potential for material ignition.	The building maintains the existing setback from the vegetation to the south, with a 1m (approx.) covered walkway extending the development footprint closer. The proposed works are separated from the prevailing threat by 43m and the development has been determined to be BAL 19.
3. Provide a better bush fire protection outcome for existing buildings.	The existing buildings are believed to predate the implementation of formal bushfire planning policy.

	Through the renewal of buildings, the classrooms will benefit from additional bushfire protection by being built to the current version of AS3959.
4. New buildings should be located as far from the hazard as possible and should not be extended towards or situated closer to the hazard than the existing buildings (unless they can comply with section 6.8).	The building will maintain the existing southern boundary setback. An attached awning will extend the building slightly towards the southern elevation (Approx 1m).
5. Ensure there is no increase in bush fire management and maintenance responsibility for adjoining landowners without their written confirmation.	The proposed development will not result in an increase maintenance responsibility for neighbouring land owners.
6. Ensure building design and construction enhances the chances of occupant and building survival; and	The new building will be constructed in accordance with AS3959 (2018) which will provide the building protection against bushfires.
7. Provide safe emergency evacuation procedures including capacity of existing infrastructure (such as roads).	It is the authors understanding there is an existing Bushfire Emergency Evacuation Plan

Conclusion

The proposed development will reconfigure the current classrooms but will not result in an increase in the occupation level of the school. The school will benefit from a new building which will be built to a BAL 19 standard in accordance with Australian Standard AS3959-2018 Construction of buildings in bush fire-prone area or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate and as amended by section 7.5 of Planning for Bush Fire Protection 2019.

3.4 ASSESSING THE BUSHFIRE RISK

The main factors directly affecting the behavior of fire are:

- Wind (strength and direction);
- Fuel Moisture and content (how dry it is, relative humidity);
- Type quantity and arrangement of fuel (vegetation density); and
- Slope (fire spreads quicker upslope due to preheating).

The prevailing weather conditions associated with the bushfire season in the Bega (Pambula) region are strong north-westerly winds, low relative humidity, and high temperatures. With the combination of the vegetation (Post Development), slope and the proposed APZ's, the overall bushfire risk associated with the proposed development based on radiant heat exposure is **Low to Moderate**, with the foremost bushfire risk coming from vegetation located to the north and south associated with Beowa National Park.

At the commencement of building works, and in perpetuity, the area around the proposed works shall be managed as outlined within section 6.8 and Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones as follows:

- North and West Directions: Inner Protection Area (IPA) for a distance of 42 metres.
- Northeast, East and Southwest Directions: IPA for a distance of 79 metres.
- South Direction: IPA for a distance of 67 metres.

At the commencement of building works and in perpetuity the approved Asset Protection Zone under DA29/18 shall be established surrounding the existing building works.

When establishing and maintaining an Inner Protection Area the following principles apply;

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

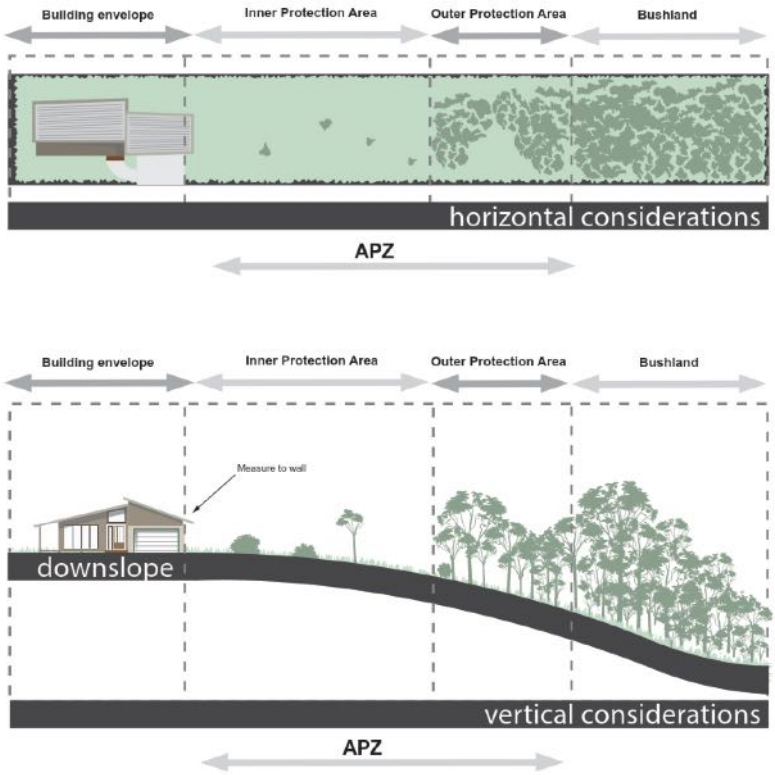


Figure 9: Diagrammatic representation of an Asset Protection Zone.

3.5 CONSTRUCTION STANDARDS

The construction standards and associated performance criteria for infill development require that the proposed building can withstand bushfire attack in the form of wind, smoke, embers, radiant heat, and flame contact. Section 3.3 of PBP 2019 requires that the construction standards be determined in accordance with AS3959 or NASH Standards.

It needs to be recognised that a building with any facade identified as requiring a construction level must build all facades to at least BAL-12.5. Where more than one facade is exposed to a hazard, then the facade with the highest construction requirement is used to determine the appropriate level of construction. All other facades may be reduced by one level of construction unless that facade is also subject to the same bush fire attack level.

Recommendations

Based on the proposed siting of the building works, the development has been determined as having a bush fire behaviour exposure level equivalent to **BAL 19.** Attack by burning debris is significant with radiant heat (not greater than 19kW/m²). Radiant heat is unlikely to threaten building elements (such as unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.

Table 2 of the Addendum to PBP 2022 outlines additional construction measures for hospitals, schools, childcare centres and residential care buildings which are summarized in table 3 below.

Table 4: Addendum to PBP 2022 SFPP Development Construction Standards – Specific requirements for hospitals, schools, childcare centres and residential care buildings.

Performance Criteria	Acceptable Solutions	Comment
The proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	A construction level of BAL-19 or greater under AS 3959 and section 7.5 of PBP is applied.	The proposed development can meet the provisions detailed in Table A1.12.1 of PBP 2019. The proposed development shall be constructed to comply with the provisions of BAL 19.

It is therefore recommended that the proposed development be constructed in accordance with the following recommendations:

- New construction shall comply with section 3 and 6 (BAL 19) Australian Standard AS3959-2018 Construction of buildings in bush fire-prone area or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate and as amended by section 7.5 of Planning for Bush Fire Protection 2019.

The specific construction requirements for **BAL 19** are provided in Australian Standard AS3959-2018 'Construction of buildings in bush fire-prone areas' (Attachment 3). In addition to the construction requirements set out in AS3959-2018, section 7.5 of 'Planning for Bush Fire Protection 2019' sets out additional construction requirements for development within NSW.

3.6 SITING AND ADEQUACY OF WATER ELECTRICITY AND GAS SUPPLIES

The performance criteria and acceptable solutions for water, electricity, and gas for Special Fire Protection Purposes in accordance with PBP 2019 are provided in Table 4. The intent of the measures are to provide adequate water services for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to buildings.

The addendum to PBP 2019 provides additional provisions for water for hospitals, schools, childcare centres and residential care buildings. The additions provisions are incorporated into Table 5 below.

Table 5: Provides the performance criteria and acceptable solutions for water, electricity, and gas for SFPP development in accordance with PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance

Reticulated water supply areas
 	
An adequate water supply is provided for firefighting purposes is installed and maintained.
	• Reticulated water is to be provided to the development where available.
	• Water for firefighting purposes must be made available and consist of;
	  ○ A fire hydrant system installed in accordance with AS2419.1; or
	  ○ Where no reticulated water is available, a static water supply consisting of tanks, swimming pools, dams or the like, or a combination of these, together with suitable pumps, hoses and fittings, determined in consultation with NSW RFS that;
	  ▪ Is capable of providing the required flow rate for a period of not less than 4 hours or
	  ▪ Has a volume of 10,000 litres for each occupied building.
		The subject development site is connected to the local reticulated town water supply. The size and pressure of the town water supply main servicing the subject development site has not been determined as part of this report.
		
		The site has access to Council infrastructure with a Council hydrant located within the road reserve at the front of the site. The school has an existing internal fire suppression system with hydrants and hoses. The existing system shall be upgraded where required so that the proposed development meets the acceptable solutions.

Water supplies are located at regular intervals. The water supply is accessible and reliable for firefighting operations.	• Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2021. • Hydrants are not located within any road carriageway. • Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	The proposed development shall be serviced by a reticulated system complying with the acceptable solutions.
Flows and pressure are appropriate.	• Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2021.	Hydrant flows and pressures shall comply with the acceptable solutions.

Performance Criteria	Acceptable Solutions	Compliance
The integrity of the water supply is maintained.	• All above ground water service pipes external to the building are metal, including and up to any taps.	All above ground water services pipes shall be metal.
<u>Electricity Services</u> Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	• Where practicable, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed: - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.	The area is serviced by existing above ground electrical transmission lines. The augmentation of that service should have no problem satisfying the acceptable solution for electricity.
<u>Gas services</u> Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	• Reticulated or bottled gas is installed and maintained in accordance with AS 1596:2014 and the requirements of relevant authorities. Metal piping is to be used. • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side. • Connections to and from gas cylinders are metal. • Polymer-sheathed flexible gas supply lines are not used. • Above-ground gas service pipes are metal, including and up to any outlets.	Reticulated piped gas is available to the subject site.

3.7 ADEQUACY OF ACCESS AND EGRESS FROM SITE FOR EMERGENCY RESPONSES

The intent of measures is to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupants faced with evacuation. In relation to this development the performance criteria and acceptable solutions for Property Access Roads in sections 6.8.2 (Table 6.8b) of PBP 2019 are the relevant requirements. An assessment of the proposed development against these requirements is provided in Table 5.

The addendum to PBP 2022 provides additional provisions for access for hospitals, schools, child care centres and residential care buildings. The additional provisions are incorporated into Table 5 below.

Table 6: Provides the performance criteria and acceptable solutions for Property Access Roads for SFPP Development in accordance with section 6.8.2 (Table 6.8b) of PBP 2019.

Performance Criteria	Acceptable Solutions	Compliance
Additional bushfire protection measures for access as per NCC 2022 and the Addendum to PBP 2022. Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	• **Vehicular access must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building.** • Must have a minimum unobstructed width of 6m with no part of its furthest boundary more than 18m from the building and in no part of the 6m width be built upon or used for any purpose other than vehicular or pedestrian movement. • Must provide reasonable pedestrian access from the vehicular access to the building. • Must have a load bearing capacity and unobstructed height to permit the operation and passage of fire fighting vehicles. • Must be wholly within the allotment except that a public road complying with above may serve as the vehicular access or part thereof.	In this instance, the current school infrastructure cannot meet the requirements outlined in the Acceptable Solutions. Specifically, it's not feasible to continuous access for emergency vehicles around the entire building, primarily because of the presence of the existing school building on the site. However, it's important to note that the site already includes a perimeter road that facilitates access around the entire development as a whole, offering direct access to potential bushfire threats. Importantly, the proposed development will not alter the current situation, as the proposed new building will be replacing an existing building within the same footprint. Therefore, it is requested the NSW Rural Fire Service allow for a variation to the BCA S43C14(2) *'Vehicular Access'* as a continuous road is not provided surrounding the development. The existing road network (road width greater than 6m) is located within 18m of the proposed building on the western and southern side.

Performance Criteria	Acceptable Solutions	Compliance
		There is reasonable pedestrian access from the vehicular access to all parts of the proposed building.
Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	• SFPP access roads are two-wheel drive, all-weather roads. • access is provided to all structures. • traffic management devices are constructed to not prohibit access by emergency services vehicles. • access roads must provide suitable turning areas in accordance with Appendix 3. • one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	Given the nature of the proposed development the existing road and carpark located between the proposed building and the bushland interface is considered adequate considering the scale of the proposed works.
The capacity of access roads is adequate for firefighting vehicles. All-weather access is provided.	• The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating. • Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).	The access road will not traverse a wetland or other land potentially subject to periodic inundation.
There is appropriate access to water supply.	there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available	There will be suitable access to within 4m of the static water supply.

3.8 VARIATION STATEMENT - S43C14 'VEHICULAR ACCESS' OF NATIONAL CONSTRUCTION CODE VOLUME ONE (2022) BUILDING CODE OF AUSTRALIA.

The proposal relates to a small addition to an established educational facility and triggers the new provisions for certain Class 9 buildings detailed in Specification 43 of National Construction Code Volume One (2022) Building Code of Australia.

As a result of the existing layout of the educational establishment, a variation to S43C14 *'Vehicular Access'* of National Construction Code Volume One (2022) Building Code of Australia is required as a continuous access for emergency vehicles cannot be provided surrounding the building.

"S43C14 ***Vehicular access***

Vehicular access to the building must be provided in accordance C3D5(2), as if the building were a large isolated building for the purposes of C3D4.

C3D5 ***Requirements for open spaces and vehicular access***

> *(2) Vehicular access required by this Part— (a) must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building;"*

This is summarized in the addendum to Planning for Bushfire Protection 2022 which outlines all bushfire protection measures detailed in Specification 43 that the NSW Rural Fire Service find relevant in NSW. BCA provision C3D5 *'Requirements for open spaces and vehicular access'* is reflected in Table 3 of the Addendum to Planning for Bushfire Protection 2022.

Performance Criteria

> *"Firefighting vehicles are provided with safe, all-weather access to structures and hazardous vegetation"*

Acceptable Solution

> *"Vehicular access must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building"*

Response

In this case, the existing school infrastructure falls short of meeting the criteria outlined in the Acceptable Solutions. Specifically, ensuring continuous access for emergency vehicles around the entire building is unattainable due to the presence of the existing school building on the site. However, it's crucial to emphasize that the site already incorporates a perimeter road, which facilitates access around the entire development, granting direct access to potential bushfire risks.
Significantly, the proposed development will maintain the current situation since the proposed new building will replace an existing one within the same footprint. Additionally, the existing road network, with a width exceeding 6 meters, is situated within 18 meters of the proposed building on the western and southern sides. Furthermore, reasonable pedestrian access from the vehicular entry points to all parts of the proposed building is provided.

The proposed development aligns with the performance criteria, ensuring that fire fighting vehicles are provided with all-weather access to the proposed development at the interface with the bushland.

3.9 ADEQUACY OF BUSHFIRE MAINTENANCE PLANS FOR EMERGENCY

The intent of measures is to provide suitable emergency and evacuation arrangements for occupants of Special Fire Protection Purposed Developments. The performance criteria and acceptable solutions for emergency management are detailed in Section 6.8.4 of Planning for Bushfire Protection 2019 which are detailed in Table 6 below.

The site is located within the Far South Coast Rural Fire District (30 Campbell Street, Moruya 2537 and Maher Street, Bega 2550), which currently administers bushfire maintenance plans and fire emergency procedures in this particular area.

Legislation requires occupants of land to immediately extinguish fires or notify fire-fighting authorities, on becoming aware of fire during fire danger period. The most appropriate course of action is to telephone "000" and report the fire.

Table 7: Performance criteria and acceptable solutions for emergency management plans for SFPP development.

Performance Criteria	Acceptable Solutions	Compliance
a Bush Fire Emergency Management and Evacuation Plan is prepared.	- Bush Fire Emergency Management and Evacuation Plan is prepared consistent with the: o The NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*; o *NSW RFS Schools Program Guide;* o Australian Standard AS 3745:2010 *Planning for emergencies in facilities*; and o Australian Standard AS 4083:2010 *Planning for emergencies – Health care facilities* (where applicable). - The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants. Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.	As the subject development site will be centrally managed and maintained, the application and implementation of a fire emergency plan and a bushfire maintenance plan could be reasonably managed and undertaken as part of the subject development sites operations and ongoing activities. Therefore, in the author's opinion a site-specific Bush Fire Emergency Management Plan is required. As advised by the proponent, a formal bushfire maintenance and/or fire emergency plan and procedures has been prepared for the subject development site. The existing bushfire emergency evacuation plan shall be upgraded, where required to include the proposed development. The bushfire emergency evacuation plan shall be consistent with the acceptable solutions of planning for bushfire protection and take into consideration the relevant planning policies.

Performance Criteria	Acceptable Solutions	Compliance
appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	- An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and - Detailed plans of all emergency assembly areas including on site and off-site arrangements as stated in AS 3745:2010 are clearly displayed, and an annually emergency evacuation is conducted.	This can be implemented if not already in place.

3.10 LANDSCAPING

The performance criteria is for landscaping to be designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignitions. The general principles of landscaping for bushfire protection are to:

- Prevent flame impingement on the building;
- Provide a defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed".

It is recommended that any future landscaping be designed and maintained in accordance with the following practices:

- maintaining a clear area of low cut lawn or pavement adjacent to the building;
- keeping areas under fences, fence posts and gates and trees raked and cleared of fuel;
- utilising non-combustible fencing and retaining walls;
- breaking up the canopy of trees and shrubs with defined garden beds;
- organic mulch should not be used in bushfire prone areas and non-flammable material should be used as ground cover, e.g., Scoria, pebbles, recycled crushed bricks.
- planting trees and shrubs such that:
    - the branches will not overhang the roof; and
    - the tree canopy is not continuous.

3.11 PBP 2019 SPECIFIC OBJECTIVE ASSESSMENT

All development on Bushfire Prone Land must satisfy the aims and objectives of PBP 2019. Table 5 demonstrates how the proposal complies with the specific objectives of PBP 2019.

Table 5: Compliance with the specific objectives of PBP 2019.

PBP 2019 Specific Objective	Assessment / Comment
Afford buildings and their occupants protection from exposure to a bushfire.	Where the recommendations stated by this report are reasonably and adequately incorporated (where practicable), occupants remaining within the subject development site during a significant bushfire event would be afforded the benefit of bushfire protection 'measures in combination'. In this respect, fire fighters or occupants remaining within the subject development site or else defending an asset or building during a passing bushfire event should reasonably be better afforded an acceptable level of protection.
Provide for a defendable space to be located around buildings.	Where the recommendations relating to APZ management as stated by this report are reasonably and adequately incorporated, all future building structures would be afforded a reasonable area of defendable space (complying APZ) within the subject development site.
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely spread to buildings.	Where the recommendations relating to construction standards & APZ areas stated by this report are reasonably and adequately incorporated a development would reasonably be able to avoid direct flame contact and material ignition.
Ensure that safe operational access and egress for emergency service personnel and residents is available.	Where the recommendation relating to internal roadway installation and maintenance as stated by this report is reasonably and adequately incorporated, both emergency services personnel and occupants should be afforded safe access / egress within the subject development site for firefighting or evacuation purposes.
Provide for ongoing management and maintenance of bushfire protection measures (BPM).	Where the recommendations relating to construction standards and APZ areas stated by this report are reasonably and adequately incorporated, it would be reasonable to assume that regular maintenance works within the subject site would ensure ongoing management and maintenance of bush fire protection measures. Should the standard or upkeep of APZ areas, vegetation maintenance or vehicle access (required for bushfire safety compliance) become compromised during the life of the subject development site, it would also be reasonable to assume such matters would be addressed by the Council or local Fire Authorities through their hazard mitigation policies and notifications.

PBP 2019 Specific Objective	Assessment / Comment
Ensure that utility services are adequate to meet the needs of firefighters.	The recommended water supply facilities within the subject development site are considered adequate for the purposes of bushfire fighting. Similarly, where the installation or connection to electrical and gas services incorporates the recommendations as stated by this report, both emergency services personnel and occupants assisting in bush firefighting should safely be able to manage potential electrical and gas hazards during a bushfire event.
Provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats.	An emergency and evacuation plan consistent with the RFS Guidelines for Emergency/Evacuation Plan should be prepared for the development prior to occupation.

4 CONCLUSION AND RECOMMENDATIONS

This Performance Based Bushfire Assessment Report has been prepared for *Austin McFarland Architects* on behalf of Lumen Christi Catholic College to accompany a development application for alterations and additions to an existing educational establishment. The site is legally described as Lot 338 DP750277 and Lot 485 DP728071, No. 64 Culgoa Crescent Pambula Beach. For this assessment, the proposal is, by virtue of Section 4.46 of the Environmental Planning and Assessment (EP&A) Act 1979, integrated development and requires a Bush Fire Safety Authority under Section 100B of the Rural Fires Act 1997 in respect of bush fire safety for the development of land for a Special Fire Protection Purpose (Educational Establishment).

The National Construction Code (2022) has additional Bushfire Protection Measures for certain Class 9 buildings which are detailed in Specification 43 *'Bushfire Protection Measures for Certain Class 9 Buildings*' Volume 1 NCC (2022). The additional measures relate to Class 9a Primary or Secondary Schools, Class 9b Early Childhood Centre and Primary/Secondary Schools and Class 9c Residential Care Building. Of the twelve additional requirements listed above, this assessment has addressed sections '*S43C10 Building envelope'*; '*S43C11 Supply of water for fire-fighting purposes'*; and '*S43C14 Vehicular access'* as these requirements relate specifically to the area of expertise of a BPAD Practitioner. The remaining specifications **will be the responsibility of the Principal Architect, Building Certifier and/or Fire Engineer**.

The subject site is legally described as Lot 388 DP750227 and Lot 485 DP728071, and known as 64 Culgoa Crescent, Pambula. The site is located to the south of Pambula Beach Road and west of Culgoa Crescent. The site has an area of approximately 2.68hectares and is irregular in shape. The site accommodates the existing School - Lumen Christi Catholic College which is a co-educational kindergarten to year 12 College for students with a maximum of 700 students and 64 staff (full time equivalent).

This proposal is for alterations and additions to the existing building include joining block B TAS and C Science Building extending to the west only extension to the south is the inclusion of perforated metal screens as outlined in the submitted Architectural plans prepared by *Austin McFarland*

Architects. The alterations and additions are not to increase the capacity of the school but to create adaptable and flexible learning spaces and staff facilities to better utilise the site and provide modern learning facilities for students, teachers and the school community to meet the expectation of staff, students and carers. The proposed work involves:

- Block B Learning Spaces - Addition of 1st floor to accommodate.
  - Classrooms general learning areas
  - Break out spaces

- Block C Learning space
  - Extension to building to the southern elevation with cut metal screening.
  - Extension to building to the western elevation to extend the
  - First floor extension
  - New workshops
  - Machie rooms
  - Materials handling space
  - Classrooms
  - Adaptable spaces so can have smaller rooms with lab beside or large classrooms.

The current site comprise Lumen Christi Catholic College, which includes various facilities such as classrooms, halls, staff rooms, administration buildings, both covered and uncovered open spaces, on-site parking, drop-off and pick-up zones, access roads, and landscaping. Adjacent to the site is the well-maintained Pambula Beach Sports Complex, which has been assessed as managed land. The primary bushfire threat to the proposed development emanates from vegetation located to the north and south, associated with Beowa National Park. The slope most significantly influencing bushfire behaviour - 0 to 5^{o} Downslope in a North and South direction.

Given that the development cannot satisfy the requirements for a 10kW/m2 Asset Protection Zone (APZ), a performance-based solution has been prepared to demonstrate alignment with the objectives of Section 6.4, titled 'Development of Existing SFPP Facilities.' The proposed project will involve reconfiguring existing classrooms without increasing the school's occupancy level. The school will gain the advantage of a new building constructed to a BAL 19 standard, in accordance with Australian Standard AS3959.

The site features two entry points, with vehicles entering from Pambula Beach Road and exiting onto Culgoa Crescent. Access to and from Culgoa Crescent primarily occurs along the southern boundary, providing access to the car park and administration building. An alternative access point to Pambula Beach Road is available along the western boundary. In this particular case, the existing school infrastructure does not meet the requirements outlined in the Acceptable Solutions, specifically regarding the provision of continuous access for emergency vehicles around the entire building. This limitation is primarily due to the presence of the existing school building on the site. However, it's crucial to emphasise that the site already includes a perimeter road, facilitating access around the entire development and providing direct access to potential bushfire threats. Importantly, it should be noted that the proposed development will not alter the current situation, as the new building will replace an existing one within the same footprint. Therefore, we kindly request the NSW Rural Fire

Service to consider allowing a variation to BCA S43C14(2) 'Vehicular Access,' as a continuous road surrounding the development is not feasible.

The following combination of mitigation measures are recommended to provide an appropriate level of safety for occupants of the building and a level consistent with that required by PBP 2019:

Asset Protection Zone

1. At the commencement of building works, and in perpetuity, the area around the proposed works shall be managed as outlined within section 6.8 and Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones as follows:
    a) North and West Directions: Inner Protection Area (IPA) for a distance of 42 metres.
    b) Northeast, East and Southwest Directions: IPA for a distance of 79 metres.
    c) South Direction: IPA for a distance of 67 metres.

2. At the commencement of building works and in perpetuity the approved Asset Protection Zone under DA29/18 shall be established surrounding the existing building works.

Construction Requirements

3. New construction shall comply with section 3 and 6 (BAL 19) Australian Standard AS3959-2018 Construction of buildings in bush fire-prone area or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate and as amended by section 7.5 of Planning for Bush Fire Protection 2019.

Landscaping

4. Any future landscaping shall be designed and maintained in accordance with:
    a) maintaining a clear area of low cut lawn or pavement adjacent to the building;
    b) keeping areas under fences, fence posts and gates and trees raked and cleared of fuel;
    c) utilising non-combustible fencing and retaining walls;
    d) breaking up the canopy of trees and shrubs with defined garden beds;
    e) organic mulch should not be used in bushfire prone areas and non-flammable material should be used as ground cover, e.g., Scoria, pebbles, recycled crushed bricks.
    f) planting trees and shrubs such that:
        - the branches will not overhang the roof; and
        - the tree canopy is not continuous.

Access in accordance with Specification 43 of Volume 1 BCA 2022

5. With the exclusion of providing a continuous access for emergency vehicles (C3D5 (2a) Volume One BCA 2022), access to the development shall be provided to comply with the provisions of S43C14 'Vehicular Access' and C3D5 of National Construction Code Volume One (2022) Building Code of Australia;
    a) must have a minimum unobstructed width of 6 m with no part of its furthest boundary more than 18 m from the building and in no part of the 6 m width be built upon or used for any purpose other than vehicular or pedestrian movement; and
    b) must provide reasonable pedestrian access from the vehicular access to the building; and

c) must have a load bearing capacity and unobstructed height to permit the operation and passage of fire brigade vehicles; and
d) must be wholly within the allotment except that a public road complying with (a), (b) and (c) may serve as the vehicular access or part thereof.

Internal Access Planning for Bushfire Protection 2019

6. Any new Access to the development shall be designed to comply with the provisions for non-perimeter roads for Special Fire Protection Purpose (SFPP) developments as detailed below:
   a) minimum 5.5m carriageway width kerb to kerb;
   b) parking is provided outside of the carriageway width;
   c) hydrants are located clear of parking areas;
   d) curves of roads have a minimum inner radius of 6m;
   e) the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
   f) the road crossfall does not exceed 3 degrees; and
   g) a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Services

7. The provision of all new and the modification of any existing water, electricity, and gas services to comply with Section 6.8c of Planning for Bush Fire Protection 2019 and Table 4 of the addendum to Planning for Bushfire Protection 2022.

Emergency Planning

8. The existing bush fire emergency management and evacuation plan shall be upgraded, where required, to incorporate the proposed development and shall be consistent with the following:
   a) The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;
   b) NSW RFS Schools Program Guide;
   c) Australian Standard AS 3745:2010 Planning for emergencies in facilities; and Australian Standard AS 4083:2010 Planning for emergencies – Health care facilities (where applicable). the Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants.
   d) Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.

If the proposed development is constructed and maintained in accordance with the recommendations outlined in this report it will comply with performance requirements provided in *Planning for Bushfire Protection* (2019) and will provide adequate provision for firefighting strategies. Compliance with the overall performance provided in and will provide adequate provision for firefighting strategies. Compliance with the overall performance requirements of Clause 45 of the Rural Fires Regulation 2022 is provided in Table 7.

Table 8: Compliance with the performance requirements of Clause 45 of the Rural Fires Regulation 2022.

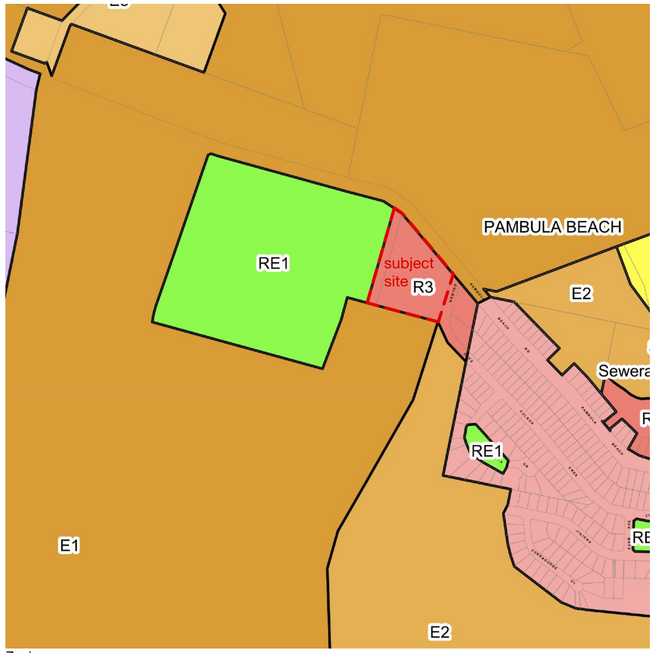
Bushfire Protection Measure	Compliance
Asset Protection Zones	YES - Refer to Sections 3.2 and 3.3
The siting and adequacy of water supplies for fire fighting	YES - Refer to Sections 3.6.
Capacity of public roads to handle increased volumes of traffic in the event of a bushfire emergency.	Not applicable.
Whether or not public roads in the vicinity that link with the fire trail network have two-way access	Not applicable.
Adequacy of emergency response access and egress	YES - Refer to Sections 3.6.
Adequacy of bushfire maintenance plans and fire emergency procedures	YES - Refer to Sections 3.8.
Building construction standards	YES - Refer to Sections 3.4.
Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	Not applicable.

This Bushfire Assessment Report should remain current for a period of twelve months (September 2024), at which time it should be subject to review to take account changing land use and vegetation patterns. Any major bushfire event that affects the subject site should also trigger a review in order to determine the effectiveness of protection measures and annual hazard reduction activities.

The findings contained within this report are the result of discrete/specific methodologies used in accordance with recognised practices. To the best of our knowledge, they represent a reasonable interpretation of the general conditions of the site. However, having stated this, it is important to note that although designing developments to have an improved level of fire resistance will increase the likelihood of their survival in a bushfire, their survival and that of the occupants cannot be guaranteed and therefore the decision as to whether to *stay* or *go* should be based on an understanding that the adoption of solutions outlined in this report will not guarantee safety.

ATTACHMENT 1

DESIGN PLANS



Zoning
E1 - National Park and Nature Reserves
R3 - Medium Density Residential
RE - Public Recreation

1 ZONING DIAGRAM

0 20 100 M

2 AERIAL PHOTO PLAN

Scale: 1:2500

0 10 50 M

3 SITE PLAN

Scale: 1:500

Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

REV.	DESC.	DATE
A	For Development Application	11/10/2023

AMENDMENT NOTES

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
SITE PLAN

DWG NUMBER DA01
REV A
SCALE @ A1 1:500
S40

Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

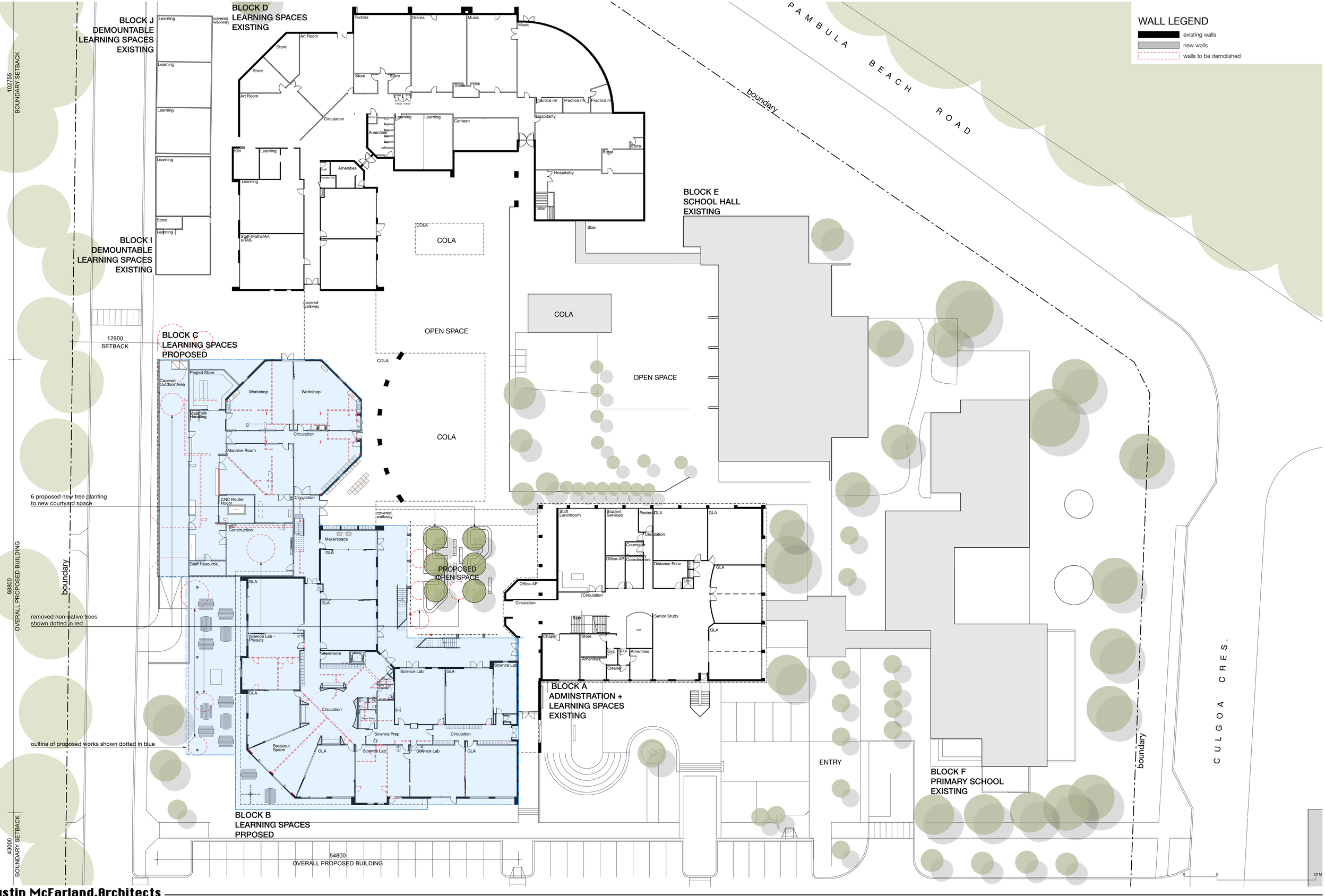
all dimensions are to be verified on site. all door and window dimensions are clear opening dimensions. steelwork, windows and joinery are to be check measured on site prior to manufacture. window schedules are drawn from the external view.

REV.	DESC.	DATE	AMENDMENT NOTES
A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
EXISTING SITE FLOOR PLAN
GROUND FLOOR (SITE LEVEL 2)

DWG NUMBER DA02
REV A
SCALE @ A1 1:250
S40



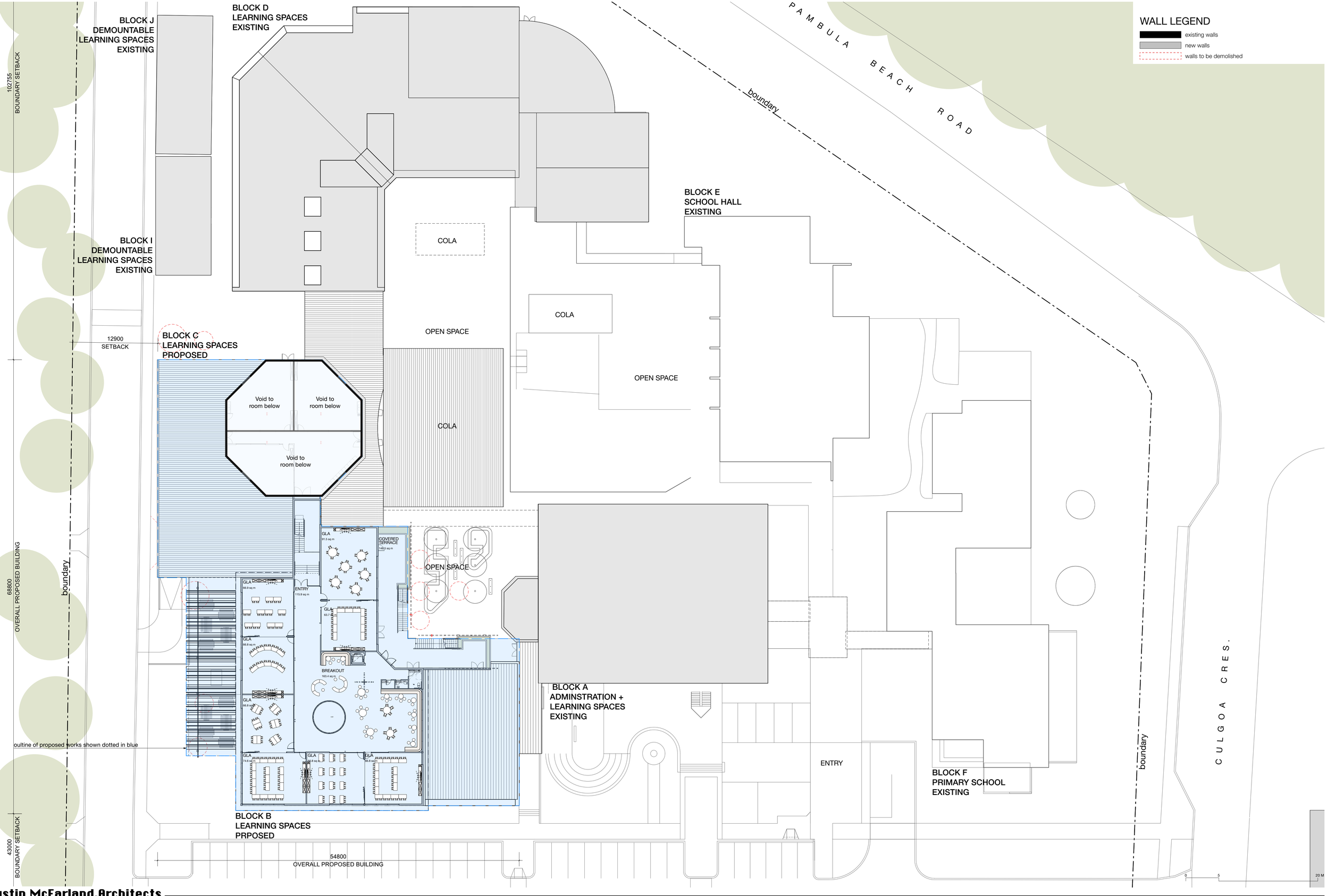
Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

REV.	DESC.	DATE	AMENDMENT NOTES
A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
PROPOSED SITE FLOOR PLAN GROUND FLOOR (SITE LEVEL 2)

DWG NUMBER: DA03
REV: A
SCALE @ A1: 1:250
#: S40



Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

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REV.	DESC.	DATE	AMENDMENT NOTES
A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
PROPOSED SITE FLOOR PLAN
FIRST FLOOR (SITE LEVEL 3)

DWG NUMBER DA04
REV A
SCALE @ A1 1:250
S40

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PO BOX 395 Wingham NSW 2429
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m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

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PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
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DRAWING TITLE
DETAIL FLOOR PLAN - GROUND FLOOR
(SITE LEVEL 2) - NORTH

DWG NUMBER
DA05

REV
A

SCALE @ A1
AS SHOWN

#
S40

boundary

CNC Router Room
20.8 sq m
CNC Router

Circulation
41.1 sq m

VET Construction
80 sq m

Staff Resource
12.1 sq m

covered walkway
92.7 sq m

Staff Lunchroom
88.6 sq m

Makerspace
22.8 sq m
Laser cutter
3D printer

GLA
62.7 sq m

GLA
68.8 sq m

GLA
63.6 sq m

Office-AP
19.6 sq m

Circulation
92.6 sq m

Circul
114.4 sq

Stair
14.1 sq m

DRIVEWAY

Science Lab - Physics
72.4 sq m

Storeroom
8.6 sq m
trolleys

Lift
3.2 sq m

Chapel
38.7 sq m

Store
13.3 sq m

Ameni
13.2 sq m

Science Lab
63.8 sq m

GLA
60.4 sq m

Science Lab
27.3 sq m

Clnrs
2.2 sq m

Amenities
6.1 sq m

GLA
56.2 sq m

WC
2.3 sq m

Unisex WC
2.3 sq m

Circulation
155.4 sq m

Chem Store
7.7 sq m

Store
Building Service

Science Prep
68.3 sq m

Circulation
30 sq m

Breakout Space
52.5 sq m

GLA
56.4 sq m

Science Lab
68.7 sq m

Science Lab
65.9 sq m

GLA
61.4 sq m

WALL LEGEND
- existing walls
- new walls
- walls to be demolished

0 2 10 M

Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

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A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
DETAIL FLOOR PLAN - GROUND FLOOR (SITE LEVEL 2) - SOUTH

N

DWG NUMBER DA06

REV A

SCALE @ A1 AS SHOWN

S40

WALL LEGEND

- existing walls
- new walls
- walls to be demolished

EXISTING COVEREDWAY ROOF
PITCH

Void to room below

Void to room below

Void to room below

EXISTING COLA ROOF
PITCH

NEW ROOF
2° PITCH

GLA
66.9 sq m

ENTRY
115.9 sq m

GLA
91.5 sq m

COVERED TERRACE
146.5 sq m

GLA
63.7 sq m

boundary

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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

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A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
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DRAWING TITLE
DETAIL FLOOR PLAN - FIRST FLOOR
(SITE LEVEL 3) - NORTH

DWG NUMBER DA07
REV A
SCALE @ A1 AS SHOWN
S40

boundary

NEW ROOF
3° PITCH

NEW EAVES GUTTER

GLA
91.5 sq m

COVERED TERRACE
146.5 sq m

GLA
66.9 sq m

ENTRY
115.9 sq m

GLA
63.7 sq m

GLA
66.8 sq m

LIFT
Staff Facilities

BREAKOUT
163.4 sq m

ACCESS WC
Pupil Facilities

CLNRS
Building Service

UNISEX WC
Pupil Facilities

GLA
66.8 sq m

void

EXISTING ROOF

PITCH

PITCH

EXISTING ROOF

GLA
74.6 sq m

GLA
66.8 sq m

GLA
66.8 sq m

EXISTING GUTTER

new covered pergola structure

new perforated metal screen shown dashed

WALL LEGEND

existing walls

new walls

walls to be demolished

0 2 10 M

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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
architects@austinmcfarland.com.au
abn 58 087 414 864

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REV.	DESC.	DATE	AMENDMENT NOTES
A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

DRAWING TITLE
DETAIL FLOOR PLAN - FIRST FLOOR (SITE LEVEL 3) - SOUTH

N

DWG NUMBER DA08

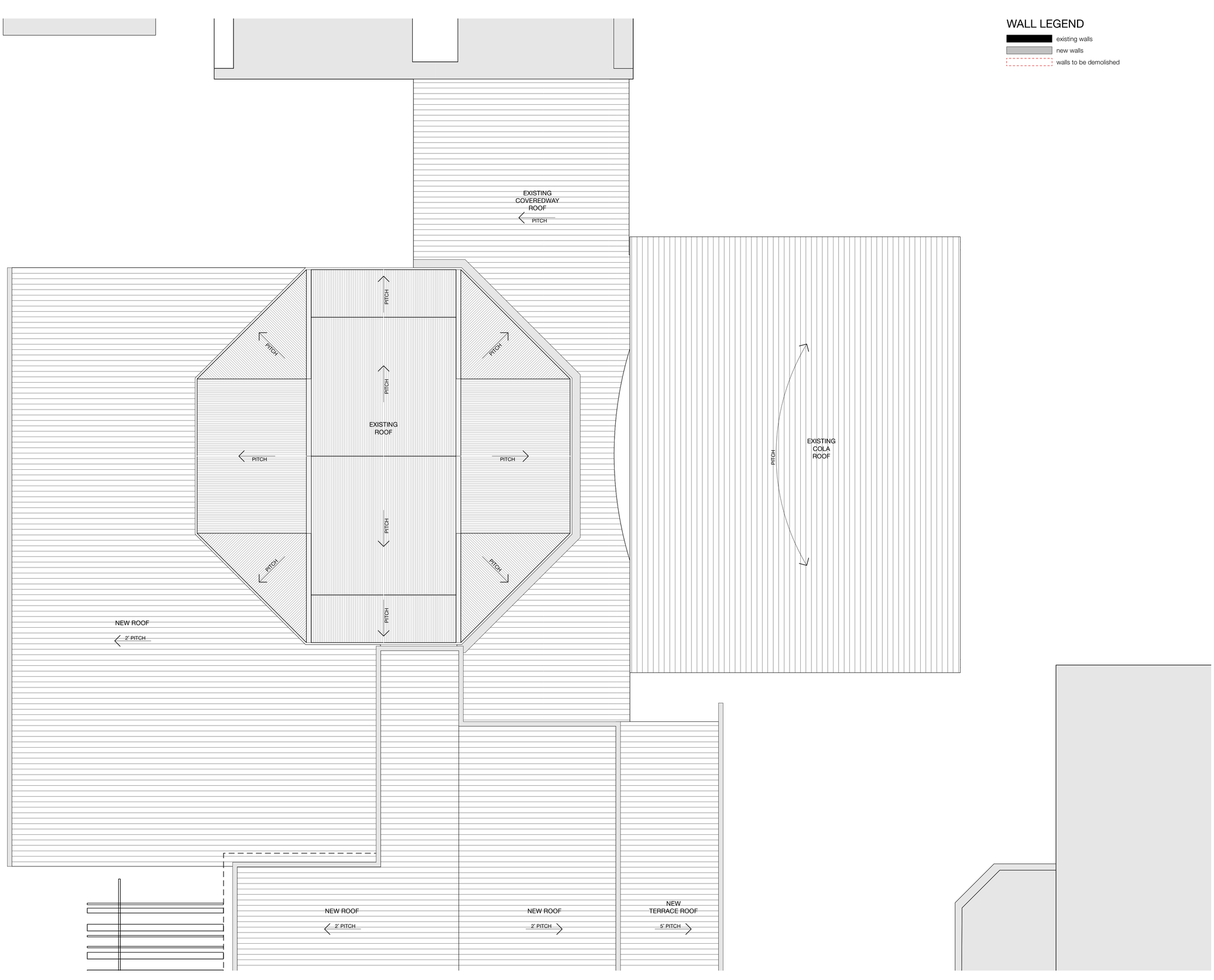
REV A

SCALE @ A1 AS SHOWN

S40

WALL LEGEND

- existing walls
- new walls
- walls to be demolished



boundary

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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
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abn 58 087 414 864

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PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

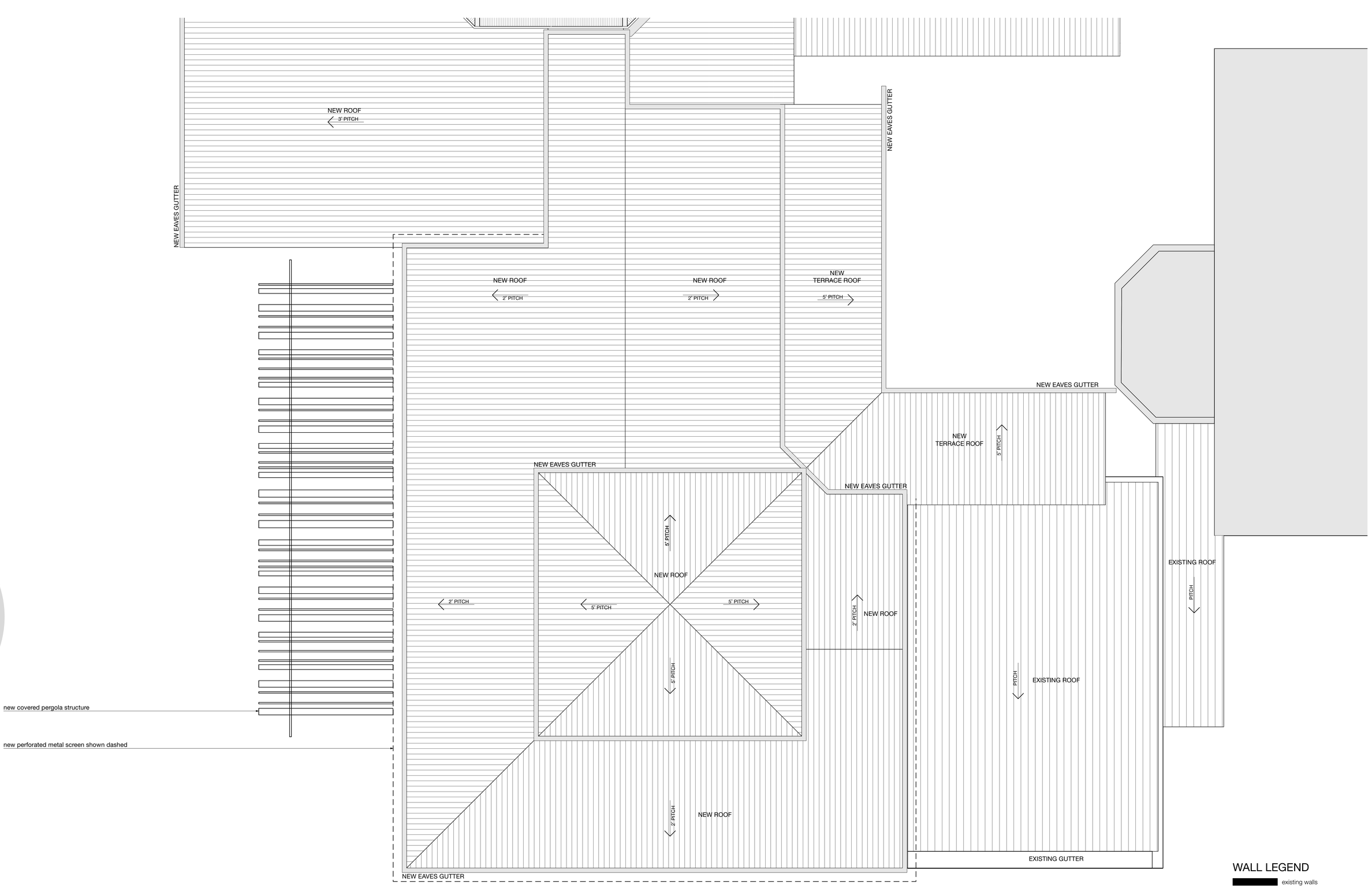
DRAWING TITLE
DETAIL ROOF PLAN - NORTH

DWG NUMBER
DA09

REV
A

SCALE @ A1
AS SHOWN

#
S40



WALL LEGEND

- existing walls
- new walls
- walls to be demolished

0 2 10 M

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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
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PROJECT
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388 Pambula Beach Rd
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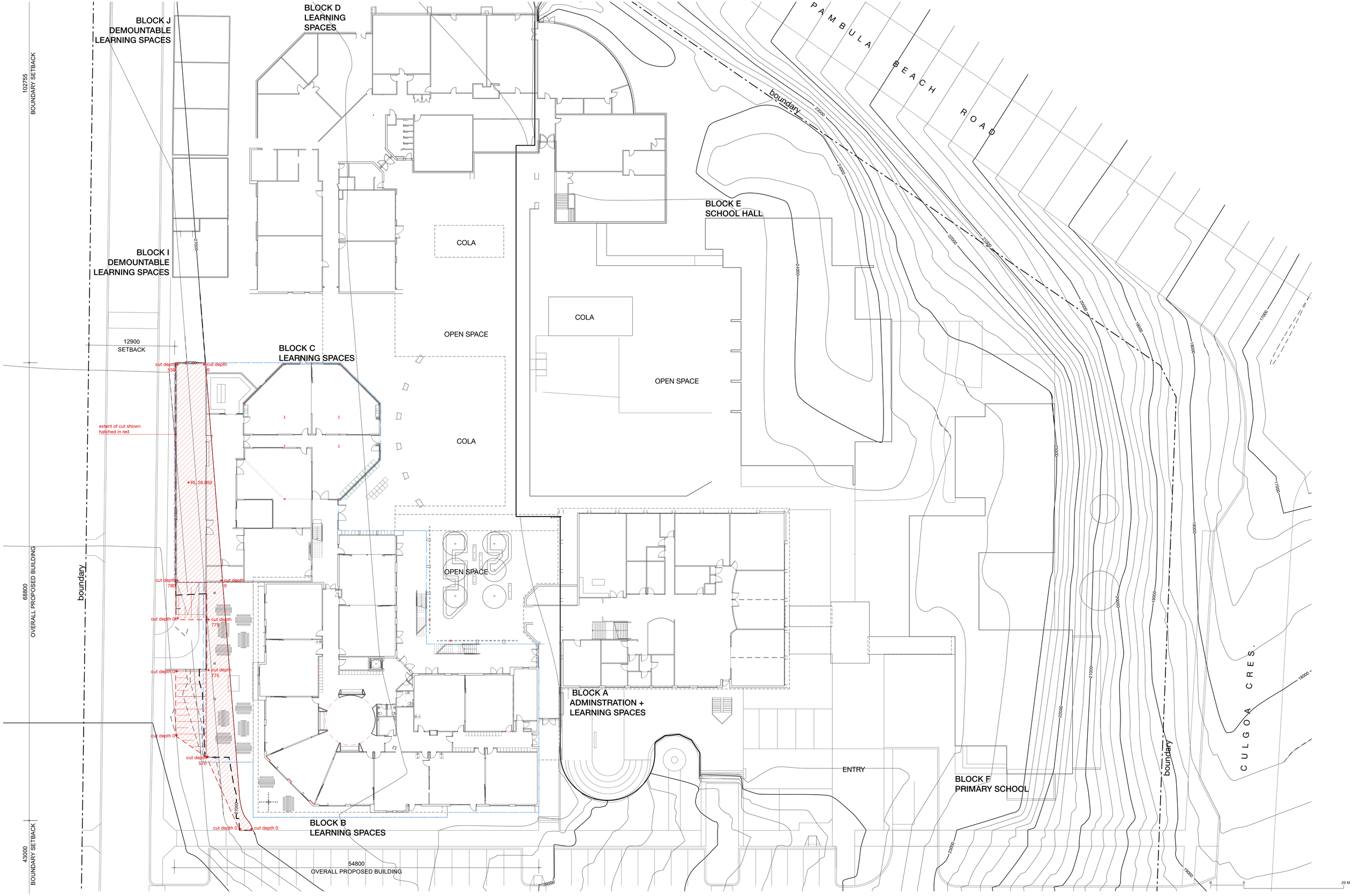
DRAWING TITLE
DETAIL ROOF PLAN - SOUTH

DWG NUMBER DA10
REV A
SCALE @ A1 AS SHOWN
S40



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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
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PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
Pambula Beach NSW 2549

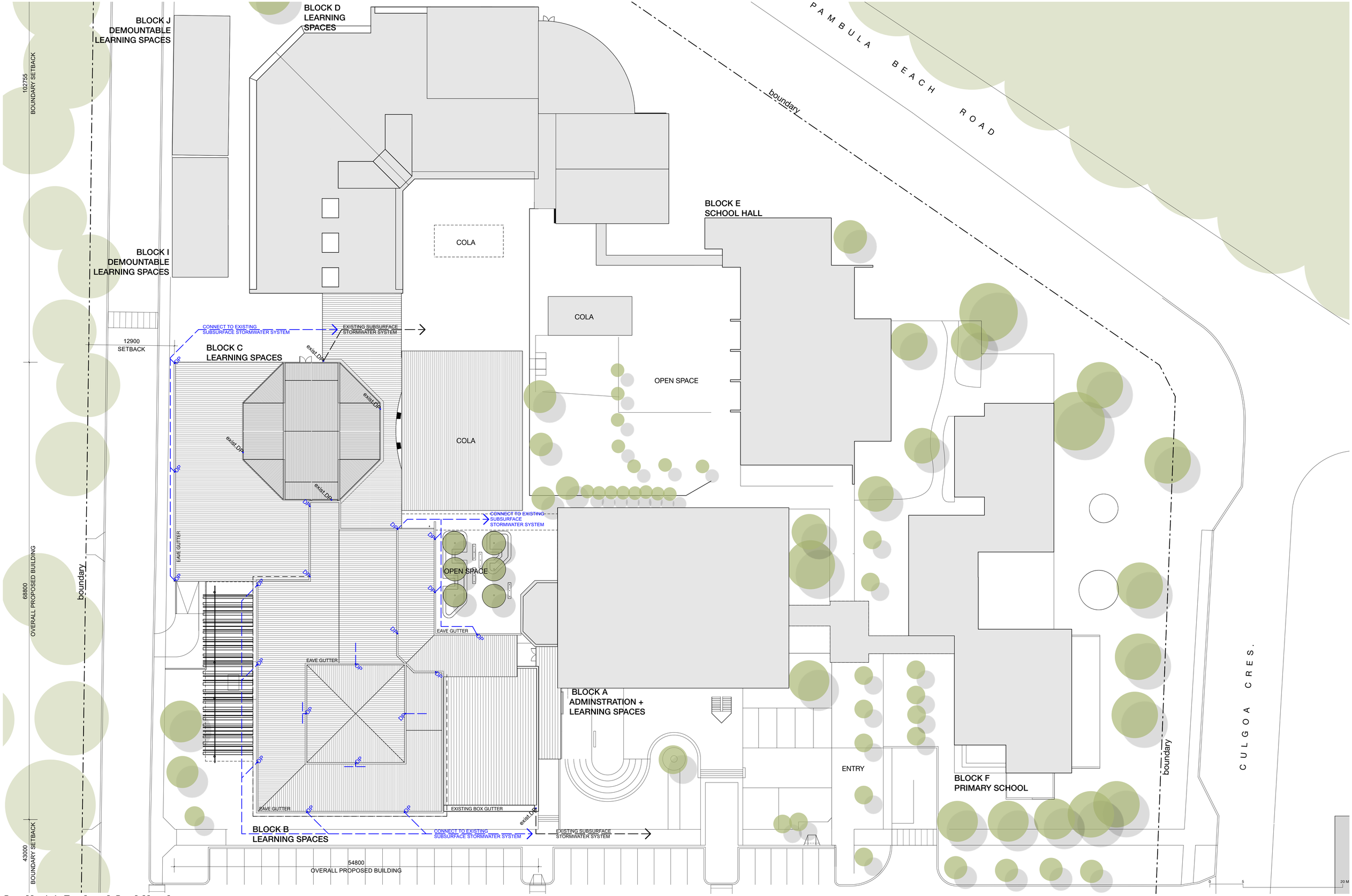
DRAWING TITLE
PROPOSED CUT AND FILL PLAN

DWG NUMBER
DA11

REV
A

SCALE @ A1
1:250

#
S40



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Wingham NSW
PO BOX 395 Wingham NSW 2429
Reg.Arch: Russell McFarland 6636
m. 0400 802284
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A	For Development Application	11/10/2023	

PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
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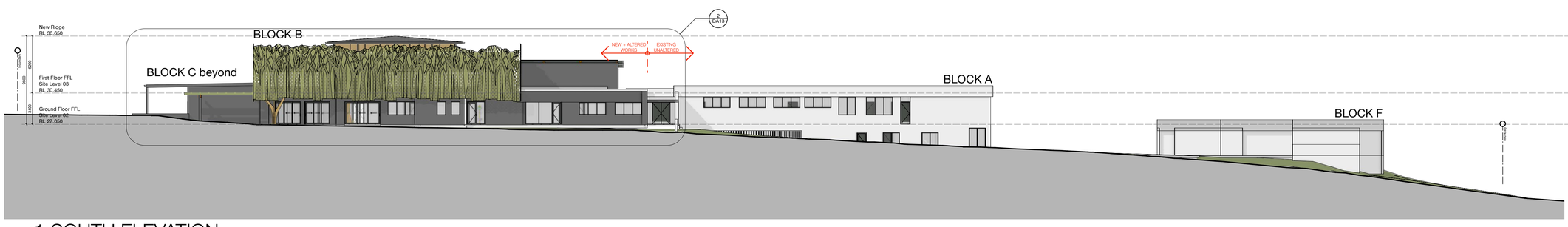
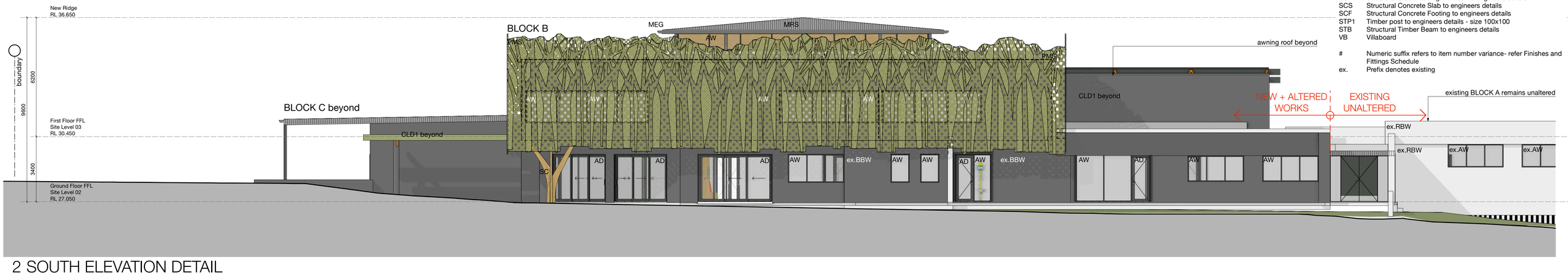
DRAWING TITLE
PROPOSED STORMWATER PLAN

DWG NUMBER DA12
REV A
SCALE @ A1 1:250
S40



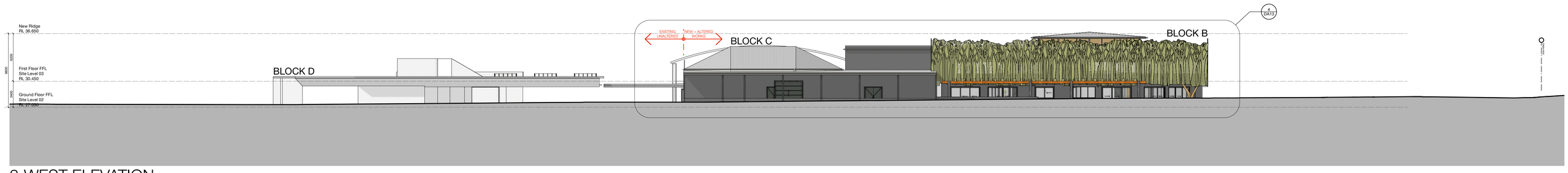
1 SOUTH ELEVATION

Scale: 1:250



2 SOUTH ELEVATION DETAIL

Scale: 1:100



3 WEST ELEVATION

Scale: 1:250

4 WEST ELEVATION DETAIL

Scale: 1:100

LEGEND

AD	Aluminium framed door
AW	Aluminium framed window
AL	Aluminium framed louvre window
BW	Brickwork - face
BBW	Bagged Brickwork
BLW	Blockwork
CLD1	Cladding - Fibre cement, smooth w. V joint
CONC	Concrete
CPT	Carpet
DP	Downpipe - 90Ø Colorbond w. 50mm stand-off brackets
HH	Heka Hood - 900mm wide - proprietary awning fixed to fascia
LAM	Laminate
MFL	Metal Flashing - 50mm high with crushfold
MEG	Metal Eaves Gutter - 200Ø half round - Zincalume
MHR	Metal Handrail - 50 dia steel
MRS	Metal Roof Sheeting
PAV	Paver
PLBD	Plasterboard
PLY	Plywood ceiling panels-polyurethane clear finish - gloss
RESIL	Resilient flooring
RBW	Rendered brickwork
SSC	Structural Steel Column to engineers details
SSB	Structural Steel Beam to engineers details
SSF	Structural Steel Framing member to engineers details
SCS	Structural Concrete Slab to engineers details
SCF	Structural Concrete Footing to engineers details
STP1	Timber post to engineers details - size 100x100
STB	Structural Timber Beam to engineers details
VB	Villaboard
#	Numeric suffix refers to item number variance- refer Finishes and Fittings Schedule
ex.	Prefix denotes existing

Austin McFarland.Architects
Wingham NSW
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m. 0400 802284
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PROJECT
Lumen Christi Catholic College
388 Pambula Beach Rd
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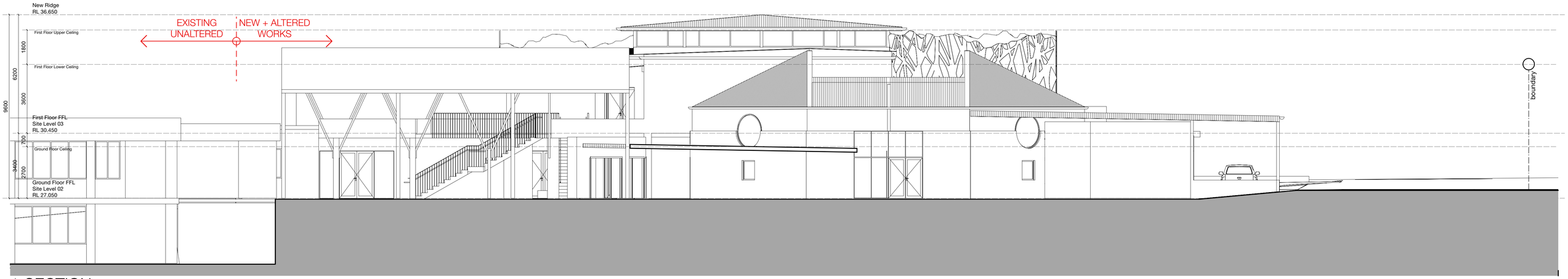
DRAWING TITLE
ELEVATIONS

DWG NUMBER
DA13

REV
A

SCALE @ A1
AS SHOWN

#
S40



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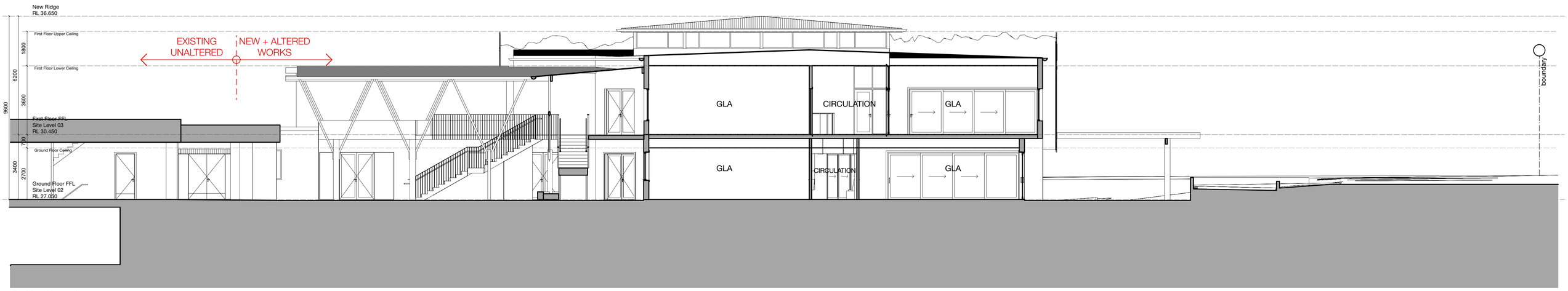

2 SECTION

Scale: 1:100

3 SECTION

Scale: 1:100

Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
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m. 0400 802284
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PROJECT
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388 Pambula Beach Rd
Pambula Beach NSW 2549

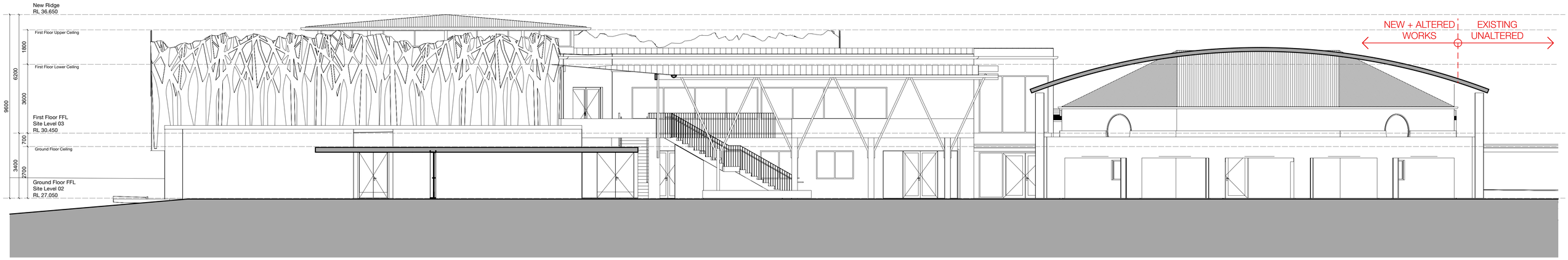
DRAWING TITLE
SECTIONS-SHEET 1

DWG NUMBER
DA14

REV
A

SCALE @ A1
1:100

#
S40



1 SECTION

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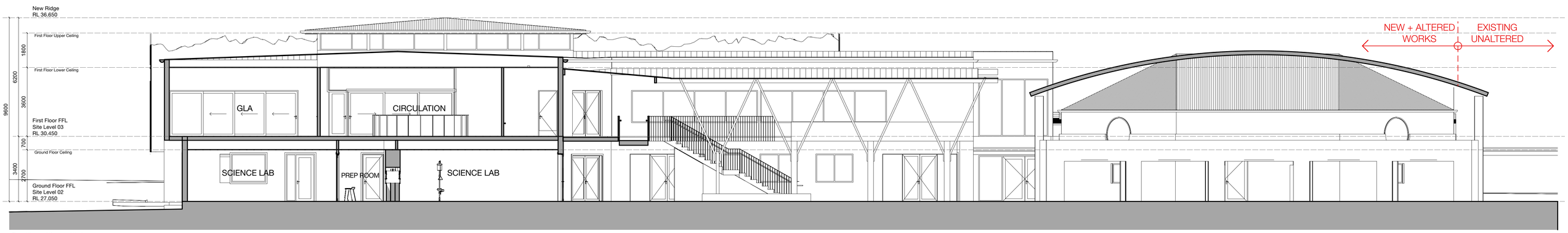

2 SECTION

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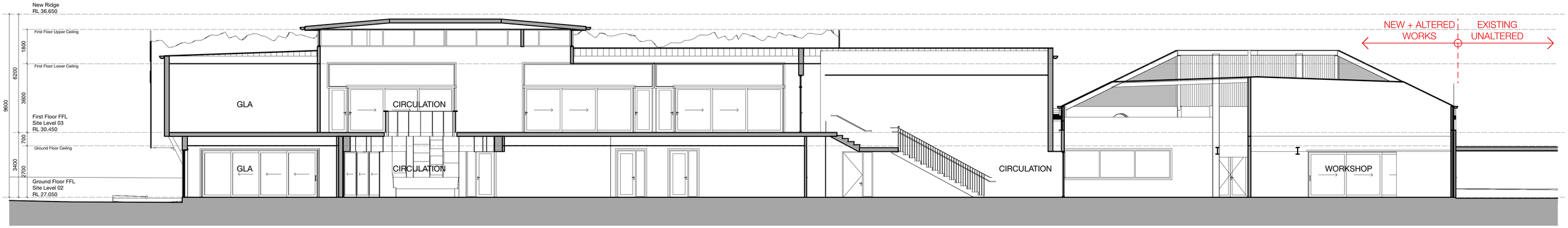

3 SECTION

Scale: 1:100

Austin McFarland.Architects
Wingham NSW
PO BOX 395 Wingham NSW 2429
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m. 0400 802284
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PROJECT
Lumen Christi Catholic College
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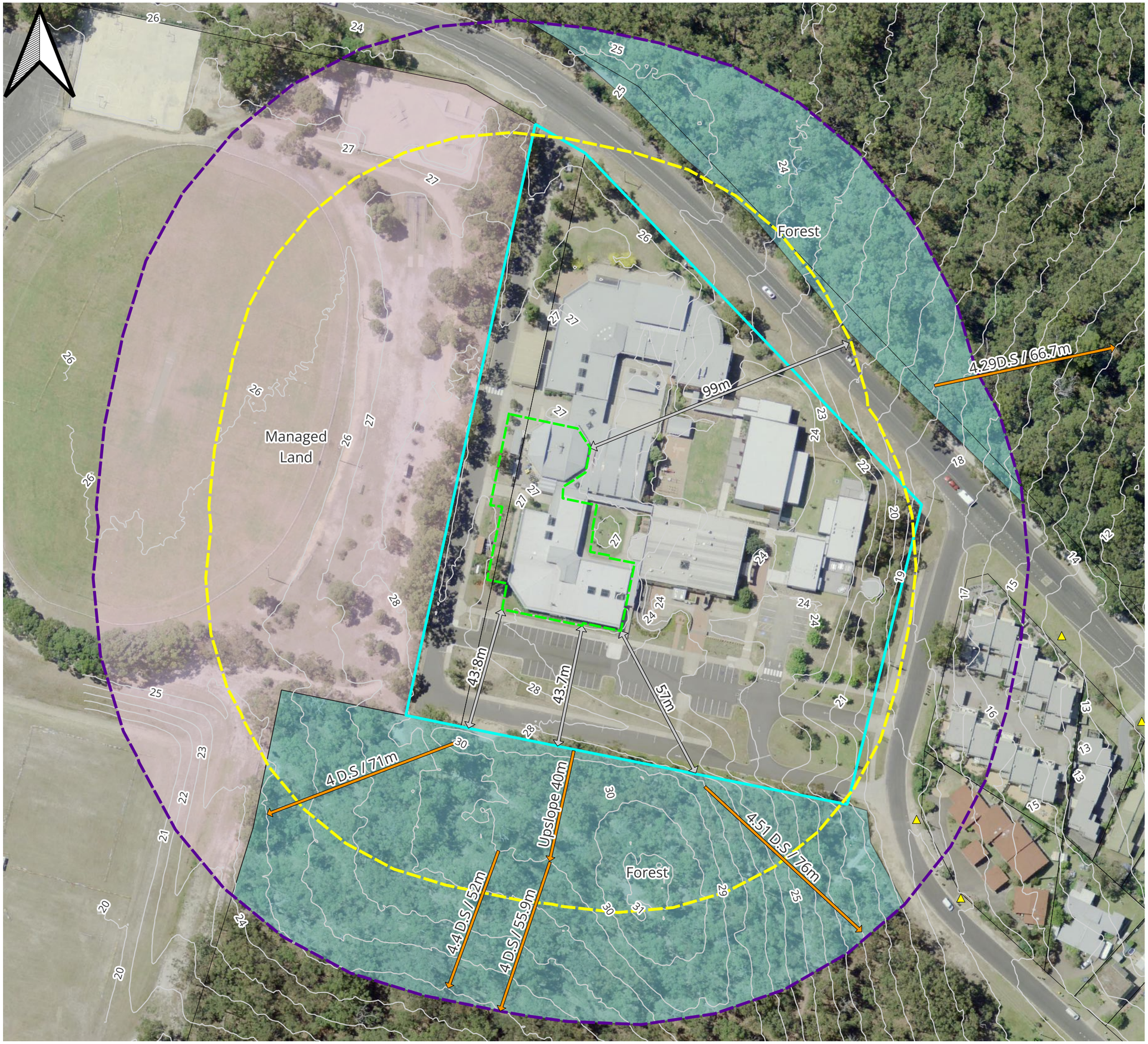
DRAWING TITLE
SECTIONS-SHEET 2

DWG NUMBER DA15
REV A
SCALE @ A1 1:100
S40

ATTACHMENT 2

BUSHFIRE THREAT ASSESSMENT



Bushfire Threat Assessment

64 Culgoa Crescent
Pambula Beach

Map Key

- Development_Footprint
- Subject Site
- Distance
- Slope Analysis
- 140m Buffer
- 100m Buffer
- Hydrant
- Forest
- Managed Land

0 25 50 75 m

		SET Ref:	S023103
		Ammendments	Date
Drawn	PD	Ver 0.1	29/09/2023
Checked			

Notes:

Assessment in accordance with Planning for Bushfire Protection 2019

No dimensions or exact positions have been surveyed

Contours based on currently available elevation data (NSW Spatial Data - DEM, Dated 15/12/2011)

Projection: GDA 94 - MGA56

ATTACHMENT 3

CONSTRUCTION REQUIREMENTS

SECTION 6 CONSTRUCTION REQUIREMENTS FOR BAL—19

6.1 GENERAL

A2 A building assessed in Section 2 as being BAL—19 shall conform with Section 3 and Clauses 6.2 to 6.8.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 6.2 to 6.8 (see Clause 3.8).

NOTE: BAL—19 is primarily concerned with protection from ember attack and radiant heat greater than 12.5 kW/m^2 up to and including 19 kW/m^2.

6.2 SUB-FLOOR SUPPORTS

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 6.4; or

A2 (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

A2 Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be constructed of—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) a timber species as specified in Appendix E Paragraph E1; or

(iv) a combination of Items (i), (ii) and (iii).

NOTE: This requirement applies to the subject building only and not to verandas, decks, steps, ramps and landings (see Clause 6.7).

A2 Combustible material should not be stored in the subfloor space as these may be ignited by embers and cause an additional impact to the building.

‘**Text deleted**’

6.3 FLOORS

6.3.1 General

This Standard does not provide construction requirements for concrete slabs on the ground.

6.3.2 Elevated floors

6.3.2.1 *Enclosed subfloor space*

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

(a) a wall that conforms with Clause 6.4; or

(b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or

(c) a combination of Items (a) and (b).

BAL—19

6.3.2.2 *Unenclosed subfloor space*

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

A2 (a) Material that conform with the following:

(i) Bearers and joists shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) a combination of Items (A) and (B).

(ii) Flooring shall be—

(A) non-combustible; or

(B) bushfire-resisting timber (see Appendix F); or

(C) timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; or

(D) a combination of any of Items (A), (B) or (C).

or

A2 (b) A system that conforms with AS 1530.8.1.

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

6.4 WALLS

6.4.1 General

The exposed components of an external wall that are less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be as follows:

(a) Non-combustible material including the following provided the minimum thickness is 90 mm:

(i) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.

(ii) Precast or in situ walls of concrete or aerated concrete.

(iii) Earth wall including mud brick.

or

(b) Timber logs of a species with a density of 680 kg/m^3 or greater at a 12% moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 mm (see Clause 3.11); and gauge planed.

or

(c) Cladding that is fixed externally to a timber-framed or a steel-framed wall and is—

(i) non-combustible material; or

(ii) fibre-cement a minimum of 6 mm in thickness; or

BAL—19

(iii) bushfire-resisting timber (see Appendix F); or

(iv) a timber species as specified in Paragraph E1, Appendix E; or

A2 (v) steel sheeting; or

(vi) a combination of any of Items (i), (ii), (iii) (iv) or (v).

or

(d) A combination of any of Items (a), (b) or (c) above.

This Standard does not provide construction requirements for the exposed components of an external wall that are 400 mm or more from the ground or 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).

6.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed

6.4.3 Vents and weepholes

Except for exclusions provided in Clause 3.6, vents and weepholes in external walls shall be screened with a mesh made of corrosion-resistant steel, bronze or aluminium.

6.5 EXTERNAL GLAZED ELEMENTS, ASSEMBLIES AND DOORS

6.5.1 Bushfire shutters

Where fitted, bushfire shutters shall conform with Clause 3.7 and be made from—

(a) non-combustible material; or

(b) a timber species as specified in Paragraph E1, Appendix E; or

(c) bushfire-resisting timber (see Appendix F); or

(d) a combination of any of Items (a), (b), or (c).

6.5.2 Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet made of corrosion-resistant steel, bronze or aluminium.

The frame supporting the mesh or perforated sheet shall be made from—

(a) metal; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a timber species as specified in Paragraph E2, Appendix E.

6.5.3 Windows and sidelights

Window assemblies shall—

A2 (a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 6.5.1; or

(b) be completely protected externally by screens that conforms with Clause 3.6 and Clause 6.5.2; or

C6.5.3(b) *For Item (b), the screening needs to be applied to cover the entire assembly, that is including framing, glazing, sash, sill and hardware.*

BAL—19

(c) conform with the following:

(i) *Frame material* For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery, shall be made from any of the following:

A2

(A) Bushfire-resisting timber (see Appendix F).

or

(B) A timber species as specified in Paragraph E2, Appendix E.

or

(C) Metal.

or

(D) Metal-reinforced uPVC. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

A2

There are no specific restrictions on frame material for all other windows.

(ii) *Hardware* There are no specific restrictions on hardware for windows.

(iii) *Glazing* Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), this glazing shall be toughened glass a minimum of 5 mm in thickness, or glass blocks with no restriction on glazing methods.

NOTE: Where double-glazed assemblies are used above, the requirements apply to the external pane of the glazed assembly only.

For all other glazing, annealed glass may be used in accordance with AS 1288.

(iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL.

A2

(v) *Screens* The openable portions of windows shall be screened internally or externally with screens that conform with Clause 3.6 and Clause 6.5.2.

Where annealed glass is used, both the fixed and openable portions of the window shall be screened externally with screens that conform with Clause 6.5.2.

C6.5.3(c) *For Item (c), screening to openable portions of all windows is required in all BALs to prevent the entry of embers to the building when the window is open.*

For Item (c)(v), screening of the openable and fixed portions of some windows is required to reduce the effects of radiant heat on annealed glass and has to be externally fixed.

For Item (c)(v), if the screening is required only to prevent the entry of embers, the screening may be fitted externally or internally.

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6.5.4 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall—

(a) be completely protected by bushfire shutters that conform with Clause 3.7 and Clause 6.5.1;

or

(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 6.5.2;

or

(c) conform with the following:

A2 (i) *Door panel material* Material shall be—

(A) non-combustible; or

(B) solid timber, laminated timber or reconstituted timber, having a minimum thickness of 35 mm for the first 400 mm above the threshold; or

(C) hollow core, solid timber, laminated timber or reconstituted timber with a non-combustible kickplate on the outside for the first 400 mm above the threshold; or

(D) for fully framed glazed door panels, the framing shall be made from metal or bushfire resisting timber (see Appendix F) or a timber species as specified in Paragraph E2, Appendix E or uPVC.

(ii) *Door frame material* Door frame material shall be—

(A) bushfire resisting timber (See Appendix F); or

(B) a timber species as specified in Paragraph E2, Appendix E; or

(C) metal; or

(D) metal reinforced uPVC.

The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

A2 (iii) *Hardware* There are no specific requirements for hardware at this BAL.

(iv) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 5 mm in thickness.

(v) *Seals and weather strips* Weather strips, draught excluders or draught seals shall be installed.

A2 (vi) *Screens* There is no requirement to screen the openable part of the door at this BAL.

(vii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.

6.5.5 Doors—Sliding doors

Sliding doors shall—

A2 (a) be completely protected by a bushfire shutter that conforms with Clause 3.7 and Clause 6.5.1;

or

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(b) be completely protected externally by screens that conform with Clause 3.6 and Clause 6.5.2;

or

(c) conform with the following:

(i) *Frame material* The material for door frames, including fully framed glazed doors, shall be—

(A) bushfire-resisting timber (see Appendix F); or

(B) a timber species as specified in Paragraph E2, Appendix E; or

(C) metal; or

(D) metal-reinforced uPVC and the reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel.

A2 (ii) *Hardware* There are no specific requirements for hardware at this BAL.

(iii) *Glazing* Where doors incorporate glazing, the glazing shall be toughened glass a minimum of 5 mm in thickness.

A2 (iv) *Seals and weather strips* There are no specific requirements for seals and weather strips at this BAL.

(v) *Screens* There is no requirement to screen the openable part of the sliding door at this BAL.

(vi) *Sliding panels* Sliding panels shall be tight-fitting in the frames.

6.5.6 Doors—Vehicle access doors (garage doors)

The following applies to vehicle access doors:

(a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) fibre-cement sheet a minimum of 6 mm in thickness; or

(iv) a timber species as specified in Paragraph E1, Appendix E; or

(v) a combination of any of Items (i), (ii), (iii) or (iv).

(b) All vehicle access doors shall be protected with suitable weather strips, draught excluders, draught seals or brushes. Door assemblies fitted with guide tracks do not need edge gap protection.

NOTES:

1 Refer to AS/NZS 4505 for door types.

2 Gaps of door edges or building elements should be protected as per Section 3.

C6.5.6(b) *These guide tracks do not provide a direct passage for embers into the building.*

(c) Weather strips, draught excluders, draught seals or brushes to protect edge gaps or
A2 thresholds shall be manufactured from material having a flammability index not greater than 5.

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(d) Vehicle access doors with ventilation slots shall be protected in accordance with Clause 3.6.

6.6 ROOFS (INCLUDING PENETRATIONS, EAVES, FASCIAS AND GABLES, AND GUTTERS AND DOWNPIPES)

6.6.1 General

The following applies to all types of roofs and roofing systems:

(a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.

(b) The roof/wall and roof/roof junction shall be sealed or otherwise protected in accordance with Clause 3.6.

(c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet that conforms with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium. A2

(d) Only evaporative coolers manufactured in accordance with AS/NZS 60335.2.98 shall be used. Evaporative coolers with an internal damper to prevent the entry of embers into the roof space need not be screened externally.

6.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

(a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;

(b) cover the entire roof area including ridges and hips; and

(c) extend into gutters and valleys.

6.6.3 Sheet roofs

Sheet roofs shall—

(a) be fully sarked in accordance with Clause 6.6.2 , except that foil-backed insulation blankets may be installed over the battens; or

(b) have any gaps sealed at the fascia or wall line, hips and ridges by—

(i) a mesh or perforated sheet that conforms with Clause 3.6 and that is made of corrosion-resistant steel, bronze or aluminium; or

(ii) mineral wool; or

(iii) other non-combustible material; or

(iv) a combination of any of Items (i), (ii), or (iii).

C6.6.3 *Sarking is used as a secondary form of ember protection for the roof space to account for minor gaps that may develop in sheet roofing.*

6.6.4 Veranda, carport and awning roof

The following applies to veranda, carport and awning roofs:

(a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 6.6.1 to 6.6.6.

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(b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] that conforms with Clause 6.4 shall have a non-combustible roof covering, except where the roof covering is a translucent or transparent material. A2

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.

6.6.5 Roof penetrations

The following applies to roof penetrations:

(a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors or the like, shall be sealed. The material used to seal the penetration shall be non-combustible.

(b) Openings in vented roof lights, roof ventilators or vent pipes shall conform with Clause 3.6 and be made of corrosion-resistant steel, bronze or aluminium.

This requirement does not apply to a room sealed gas appliance.

NOTE: A gas appliance designed such that air for combustion does not enter from, or combustion products enter into, the room in which the appliance is located.

In the case of gas appliance flues, ember guards shall not be fitted.

NOTE: AS/NZS 5601 contains requirements for gas appliance flue systems and cowls. Advice can be obtained from manufacturers and State and Territory gas technical regulators.

(c) All overhead glazing shall be Grade A safety glass that conforms with AS 1288. A2

(d) Glazed elements in roof lights and skylights may be of polymer, provided a Grade A safety glass diffuser, that conforms with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4 mm thickness shall be used in the outer pane of the IGU.

(e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by under-flashing of a material having a flammability index not exceeding five.

(f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

(g) Eaves lighting shall be adequately sealed and not compromise the performance of the element.

6.6.6 Eaves linings, fascias and gables

The following applies to eaves linings, fascias and gables:

(a) Gables shall conform with Clause 6.4.

(b) Eaves penetrations shall be protected as for roof penetrations as specified in Clause 6.6.5. A2

(c) Eaves ventilation openings shall be fitted with ember guards in accordance with Clause 3.6 and made of corrosion-resistant steel, bronze or aluminium.

(d) Joints in eaves linings, fascias and gables shall be sealed, with material such as plastic joining strips or timber storm moulds.

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A2 ‘**Text deleted**

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

6.6.7 Gutters and downpipes

This Standard does not provide material requirements for—

(a) gutters, with the exception of box gutters; and

(b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.

6.7 VERANDAS, DECKS, STEPS AND LANDINGS

6.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

A2 ***C6.7.1*** *Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0 – 5 mm during service. It should be noted that research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacing of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.*

6.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

A2 **6.7.2.1** *Material to enclose a subfloor space*

This Standard does not provide construction requirements for the material used to enclose a subfloor space except where those material are less than 400 mm from the ground.

Where the material used to enclose a subfloor space are less than 400 mm from the ground, they shall conform with Clause 6.4.

6.7.2.2 *Supports*

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

6.7.2.3 *Framing*

This Standard does not provide construction requirements for the framing of verandas, pergolas, decks, ramps or landings (i.e. bearers and joists).

6.7.2.4 *Decking, stair treads and the trafficable surfaces of ramps and landings*

This Standard does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300 mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

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(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a timber species as specified in Paragraph E1, Appendix E; or

(d) a combination of any of Items (a), (b), or (c).

6.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

6.7.3.1 *Supports*

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

6.7.3.2 *Framing*

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e. bearers and joists).

6.7.3.3 *Decking, stair treads and the trafficable surfaces of ramps and landings*

This Standard does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300 mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300 mm (measured horizontally at deck level) from glazed elements that are less than 400 mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from—

(a) non-combustible material; or

(b) bushfire-resisting timber (see Appendix F); or

(c) a timber species as specified in Paragraph E1, Appendix E; or

(d) a combination of any of Items (a), (b), or (c).

6.7.4 Balustrades, handrails or other barriers

This Standard does not provide construction requirements for balustrades, handrails and other barriers.

6.7.5 Veranda posts

Veranda posts—

(a) shall be timber mounted on galvanized mounted shoes or stirrups with a clearance of not less than 75 mm above the adjacent finished ground level; or

A2 (b) less than 400 mm (measured vertically) from the surface of the deck or ground (see Figure D2, Appendix D) shall be made from—

(i) non-combustible material; or

(ii) bushfire-resisting timber (see Appendix F); or

(iii) a timber species as specified in Paragraph E1, Appendix E; or

(iv) a combination of any of Items (a) or (b).

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6.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water supply pipes shall be metal.

External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9 mm whichever is the greater. The metal pipe shall extend a minimum of 400 mm within the building and 100 mm below ground.

NOTE: Refer to State and Territory gas regulations, AS/NZS 5601.1 and AS/NZS 4645.1.

C6.8 *Concern is raised for the protection of bottled gas installations. Location, shielding and venting of the gas bottles needs to be considered.*

7.5 Additional construction requirements

To ensure the performance criteria for construction standards given in section 7.4 can be met, PBP adopts additional measures over and above AS 3959 and NASH Standard as follows:

- construction measures for ember protection at BAL‑12.5 and BAL‑19 provided by AS 3959;
- construction measures for development in BAL‑FZ; and
- requirements over and above the performance criteria contained within AS 1530.8.1 and AS 1530.8.2 apply in regards to flaming.

7.5.1 Ember protection

Based on the findings from the 2009 Victorian Bush Fires Royal Commission, PBP aims to maintain the safety levels previously provided by AS 3959:1999 in relation to ember protection at lower Bush Fire Attack Levels.In particular, the areas addressed are in relation to:

- sarking;
- subfloor screening;
- floors;
- verandas, decks, steps, ramps and landings;
- timber support posts and beams; and
- fascias and bargeboards.

7.5.2 NSW State Variations under G5.2(a) (i) and 3.10.5.0(c)(i) of the NCC

Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC;

- clause 3.10 of AS 3959 is deleted and any sarking used for BAL‑12.5, BAL‑19, BAL‑29 or BAL ‑40 shall:
    - be non‑combustible; or
    - comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and
- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- fascias and bargeboards, in BAL-40, shall comply with:
    - clause 8.4.1(b) of AS 3959; or
    - clause 8.6.6 of AS 3959.

7.5.3 Construction in the flame zone

The flame zone is the area that has significant potential for sustained flame contact during a bush fire. The flame zone is determined by the calculated distance at which the radiant heat of the design fire exceeds 40kW/m².

The NCC references AS 3959 and the NASH Standard. The NSW variation to the NCC excludes both AS 3959 and the NASH Standard as a Deemed to Satisfy solution for buildings that are required to be constructed to BAL‑FZ as defined in AS 3959.

Although Chapter 9 of AS 3959 and the NASH Standard has not been adopted, they should still be used as a basis for a performance based solution demonstrating compliance with the performance requirements of the NCC and PBP for construction in the flame zone.

All flame zone developments should be sited and designed to minimise the risk of bush fire attack. Buildings should be designed and sited in accordance with appropriate siting and design principles to ensure the safest protection from bush fire impacts.

7.5.4 Flaming

Materials that allow flaming can be problematic and are not supported by the NSW RFS for the following reasons:

- flaming materials increase the exposure of other elements of construction and the adjoining structure to flame contact after a bush fire front has passed; and
- flaming materials will potentially increase the exposure of occupants of the building to radiant heat, direct flame contact, smoke after a bush fire front has passed.

This increase in exposure can contribute to the risk of loss of life and compromise the ability of residents to defend their property and egress from the building once the bush fire front has passed.

In addition, it can reduce the ability of occupants to make safe and effective decisions about their safety. Where there is potential for materials of construction to ignite as a result of bush fire attack, the proposed building solution generally fails the construction performance criteria for residential infill development.

For development which may be subject to flame contact (BAL-40 and BAL-FZ), systems tested in accordance with AS 1530.8.1 and AS 1530.8.2 respectively will be considered, except that there is to be no flaming of the specimen except for:

- window frames that have passed the criteria of AS 1530.8.1 and AS 1530.8.2, may be approved provided their flaming is not considered to compromise the safety of other elements of the building; and
- use of other minor elements which allow flaming may be considered provided they do not compromise the integrity of the fire safety of the building (examples include address numbers, house names, decorative artwork, etc).

Flaming of other more significant elements of the building (such as aesthetic wall cladding) is considered to pose an unacceptable risk and will not be supported.

7.6 Fences and gates

Fences and gates in bush fire prone areas may play a significant role in the vulnerability of structures during bush fires. In this regard, all fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only.