

METAL WALL CLADDING COMPLIANCE PERFORMANCE SOLUTION

Marsden Park Public School Development



Marsden Park Public School

ISSUE A

DATE 9TH JULY 2020

PROJECT 19154

WALL CLADDING PERFORMANCE SOLUTION REPORT – MARSDEN PARK PS

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ISSUED	REVIEW	ISSUED BY
Date. 9 th July 2020	Issue A	Elias Khamis (reviewed by Trevor Eveleigh)

WALL CLADDING PERFORMANCE SOLUTION REPORT – MARSDEN PARK PS

1.0 INTRODUCTION

1.1 GENERAL

NBRS Architecture have been engaged by ADCO Constructions Pty Ltd to document the design for the development of Marsden Park Public School, on the proposed site at Northbourne Drive Marsden Park for the NSW Department of Education (School Infrastructure NSW).

Generally, the proposed works have been designed and detailed to meet the Deemed to Satisfy Provisions of the Building Code of Australia (BCA 2019). However, it has been identified that there are a few aspects of the design that could be considered to be non-compliances to the Deemed to Satisfy Provisions of the BCA2019.

The following table sets out the identified potential non-compliant elements of the design.

Non-compliance 1 relating to the external wall cladding water ingress prevention is addressed as a Performance Solution within this report.

Table 1

	Within Design	BCA DTS Clause	Performance Requirement	Comments
1	Metal External Wall Cladding to be used	<p>F1.0 Deemed-to-Satisfy Provisions (a) Performance Requirement FP1.4, for the prevention of the penetration of water through <u>external walls</u>, must be complied with.</p> <p style="background-color: #e0f0ff; padding: 5px; text-align: center;">There are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.</p> <p>(b) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements FP1.1 to FP1.3 and FP1.5 to FP1.7 are satisfied by complying with F1.1 to F1.13. (c) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A0.7.</p>	<p>FP1.4 A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause— (a) unhealthy or dangerous conditions, or loss of amenity for occupants; and (b) undue dampness or deterioration of building elements.</p>	Performance Solution developed Within in this report

The purpose of this report is to review the identified non-compliance for the external cladding to the Deemed to Satisfy Provisions of the Building Code of Australia (BCA 2019) and to develop a Performance Solution that sets out how the material meets the related Performance Requirements.

1.2 PROJECT PARTICIPANTS

The project participants are as follows:

Architect	NBRSearchitecture	Elias Khamis & James Kim
Certifier	Blackett Maguire	
Client	ADCO Constructions	Dean Isreal
Owner	School Infrastructure NSW (NSW Department of Education)	

As part of the design process a review has been undertaken of the proposed design against current building regulations and to ensure that the design meets the appropriate building regulations, including the provision of equitable access for all occupants.

WALL CLADDING PERFORMANCE SOLUTION REPORT – MARSDEN PARK PS

The proposed design for the development is represented in the following plans prepared by NBRS Architecture which have been used as part of this review.

Table 2

Drawing number	Issue	Drawing name	Date
19154-A-1000		LEVEL 1 – FULL PLAN	07/07/2020
19154-A-1001		LEVEL 1 – PARTIAL PLAN A	07/07/2020
19154-A-1002		LEVEL 1 – PARTIAL PLAN B	07/07/2020
19154-A-1003		LEVEL 1 – PARTIAL PLAN C	07/07/2020
19154-A-1004		LEVEL 1 – PARTIAL PLAN D	07/07/2020
19154-A-1005		LEVEL 2 – FULL PLAN	07/07/2020
19154-A-1006		LEVEL 2 – PARTIAL PLAN A	07/07/2020
19154-A-1007		LEVEL 2 – PARTIAL PLAN B	07/07/2020
19154-A-1008		LEVEL 2 – PARTIAL PLAN C	07/07/2020
19154-A-1009		LEVEL 2 – PARTIAL PLAN D	07/07/2020
19154-A-1010		ROOF PLAN	07/07/2020
19154-A-3000		NORTH ELEVATION	07/07/2020
19154-A-3001		EAST & WEST ELEVATION	07/07/2020
19154-A-3002		SOUTH ELEVATION	07/07/2020
19154-A-4000		SECTION 1 – NORTH COURT ELEV.	07/07/2020
19154-A-4001		SECTION 2 & 3 – EAST & WEST COURT ELEV.	07/07/2020
19154-A-4002		SECTION 4 – SOUTH COURT ELEV.	07/07/2020

1.3 SITE DETAILS

The site is a new vacant lot located on Northbourne Drive within the Marsden Park precinct. The real lot description of the site is.

- Lot 2889 DP 1230906

The site is within the Blacktown City Council Local Government area.



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1.4 THE PROPOSAL

The proposal is for the construction of a new two storey primary school, including classrooms, Library, Administration office area, Multipurpose hall and associated facilities constructed around a central courtyard space.

Table 3- Classroom Building Usage

Level	Use	Use Type	Area(m2)
Level 1	Administration Offices, Hall, Canteen, Classrooms, OOSHC & amenities	Class 5 associated with Class 9b	2998
Level 2	Classrooms, & amenities	Class 9b	4791

1.4.1 RISE IN STOREYS & EFFECTIVE HEIGHT

Table 4

Building	Building Use	Building Use Class	Compartment Area	Rise in Storeys	Type of Construction
Primary School	Assembly (School)	Class 9b	7789 m ²	2	Type A

Effective Height is 4.9m

1.5 BCA REQUIREMENTS

The Building Code of Australia (BCA) sets out number of Performance Requirements that a building solution must meet to achieve a reasonable level of access to buildings, through buildings and connection with other buildings.

To enable detailed working design solutions the BCA usually sets out Deemed to Satisfy Provisions that if complied with will mean that the Performance Requirement is complied with, however for the prevention of water ingress, as highlighted in Clause F1.0 (included below), there is no defined Deemed to satisfy provision that meets the Performance Requirement of FP1.4 for external walls. Therefore a Performance Solution is to be developed to show that the proposed design meets the requirements of FP1.4, using a comparison to the Deemed to Satisfy Provision for the roofing material that complies with the performance requirement of FP1.4.

Performance Solutions are permitted under Claus A.03 & A.05 with the relevant Performance Solution set out in Clause A.07.

Any Performance Solutions is subject to the approval of the Principal Certifying Authority.

Below is Performance Requirement FP1.4 relating to Waterproofing of External Walls of a building.

FP1.4

A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—

- (a) unhealthy or dangerous conditions, or loss of amenity for occupants; and
- (b) undue dampness or deterioration of building elements.

The following is the Deemed to Satisfy Provision of the BCA relating to performance Requirement FP1.4

BCA F1.0

Deemed-to-Satisfy Provisions

- (a) Performance Requirement FP1.4, for the prevention of the penetration of water through external walls, must be complied with.

There are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.

As there are no Deemed to Satisfy Provisions to address Waterproofing External Walls a Performance Solution is to be developed to show that the proposed design meets the Performance Requirement FP1.4.

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2.0 BCA NON-COMPLIANCES & METHOD OF ASSESSMENT

The following Performance Solutions have been identified based on reviews of the documents.

Table 5

Within Design	BCA DTS Clause	Performance Requirement	Comments
1 Metal External wall cladding to be used	<p>F1.0 <i>Deemed-to-Satisfy Provisions</i> (a) <i>Performance Requirement FP1.4, for the prevention of the penetration of water through external walls, must be complied with.</i></p> <p style="background-color: #e0f0ff; padding: 5px;">There are no Deemed-to-Satisfy Provisions for this Performance Requirement in respect of external walls.</p> <p>(b) Where a <i>Deemed-to-Satisfy Solution</i> is proposed, <i>Performance Requirements FP1.1 to FP1.3 and FP1.5 to FP1.7</i> are satisfied by complying with <i>F1.1 to F1.13.</i> (c) Where a <i>Performance Solution</i> is proposed, the relevant <i>Performance Requirements</i> must be determined in accordance with <i>A0.7.</i></p>	<p>FP1.4 <i>A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—</i> (a) <i>unhealthy or dangerous conditions, or loss of amenity for occupants; and</i> (b) <i>undue dampness or deterioration of building elements.</i></p>	Performance Solution developed Within in this report

3.0 PERFORMANCE SOLUTION – METAL EXTERNAL CLADDING.

3.1 INTRODUCTION

As identified earlier a Deemed to Satisfy Provision in Part F of the BCA do not include a Deemed to Satisfy Provision for external walling that would meet the Performance Requirement of FP1.4

External wall cladding systems are a combination of the external cladding material, and the appropriate designed flashings and sealants to ensure that the overall system prevents the ingress of the weather including water and moisture to within the building.

A number of systems have been tested and reviewed to ensure that they meet the requirements of FP1.4, however prefinished metal Spandek & Trimdek cladding has not been tested as a system.

Specified Cladding Materials

CODE	MATERIAL	DETAILS	THICKNESS	COLOUR	SUPPLIER	LOCATION	NOTE
Metal Cladding MC1 & MC2	Profiled sheet metal	Bluescope Colorbond, Lysaght Trimdek profile	0.48 BMT	Surfmist & Windspray	Bluescope Lysaght	External Parapet & courtyard walls	Install Vertically
Metal Cladding MC4	Profiled sheet metal	Bluescope Colorbond, Lysaght Spandek profile	0.48 BMT	Ironstone	Bluescope Lysaght	Spandrel panels	Install horizontally

3.2 ASSESSMENT

3.2.1 ASSESSMENT METHOD

The assessment is carried out in accordance with the approach set out in Clause A0.3 (ii) and A0.5 (c) & (d) to qualitatively compare the design to the Deemed to Satisfy provision and therefore demonstrate compliance with Performance Requirement FP1.4 of the BCA.

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A0.5 Assessment Methods

The following Assessment Methods, or any combination of them, can be used to determine that a Performance Solution or a Deemed-to-Satisfy Solution complies with the Performance Requirements, as appropriate:

- (a) Evidence to support that the use of a material or product, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy Provision as described in A2.2.
- (b) Verification Methods such as–
 - (i) the Verification Methods in the NCC; or
 - (ii) such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements.
- (c) Expert Judgement.
- (d) Comparison with the Deemed-to-Satisfy Provisions.

3.2.2 ASSESSMENT CONSIDERATIONS

As an external wall cladding material the criteria under FP1.4 is for a cladding to prevent the penetration of water through the external wall to inside where the presence of excessive moisture could create an unhealthy environment for the occupants, or loss of amenity.

An external wall is constructed to predominately to protect the internal space from the outside conditions, including:

- protection from the outside weather, such as rain, hail and the like.
- Protection from harsh winds,
- Protection from the outside temperature, either extreme heat or extreme cold.

The External wall is usually a build-up and combination of a few elements and materials to provide protection to the varying elements.

For the proposed building the external wall generally includes the following elements and materials.

- External façade
 - o Prefinished profiled metal cladding (Lysaght Colorbond Spandek or Trimdek profile)
 - o Fixed to 50mm top hat furring channels
 - o Breathable sarking membrane
 - o Thermal Break insulation
 - o Fire rated plasterboard to outside face of spandrel wall framing (where spandrel required)
 - o Steel stud wall framing,
 - o Thermal insulation between framing members
 - o Plasterboard Internal wall lining (fire rated where required).

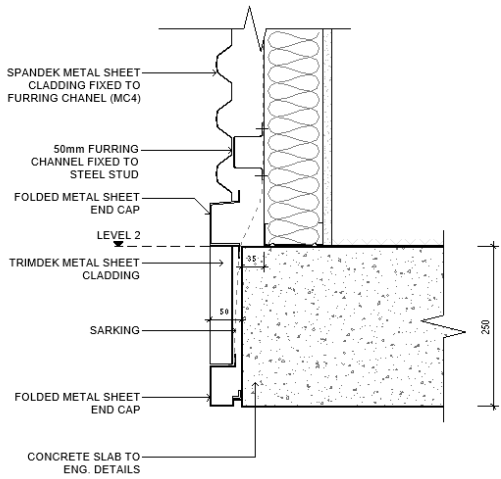
The following table sets out the various materials within the external wall, the function and purpose of the materials.

Element	Material	Purpose	Potential Deterioration
Metal Cladding	Profiled Lysaght Colorbond Spandek or Trimdek profile	Protecting external surface Prevent Water ingress	Colorbond finish to improve durability
Sub framing	50mm top hat furring channels	Support cladding & Provide ventilated cavity	Galvanised to improve durability
Sarking	Breathable sarking membrane	Membrane to prevent water ingress,	Not affected by moisture
Thermal Break		Prevent heat conduction through frame	Protected by Sarking & Cladding
Fire rated spandrel	Fire rated plasterboard to outside of spandrel	Provides fire separation (from external opening below)	Protected by Sarking & Cladding
Framing	Steel framing	Support wall	Galvanised to improve durability
Thermal Insulation	Insulation between framing members	Reduce temperature transfer	Protected by Sarking & Cladding
Fire rated spandrel	Fire rated plasterboard Internal wall lining	Provides fire separation Provides serviceable surface	Protected by other elements

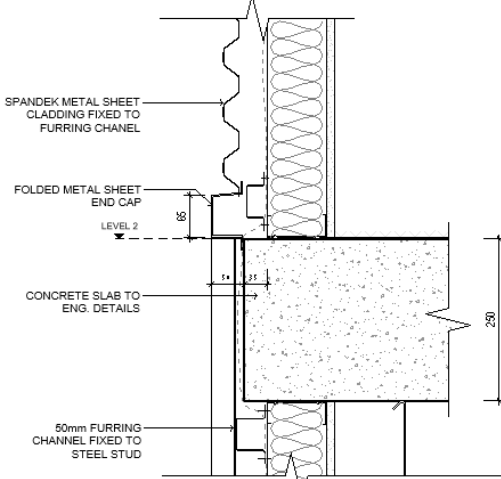
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From the table above it can be seen that the intention of the proposed design of the external wall including the various elements is to protect the internal spaces of the building from weather ingress into the building through the walls.

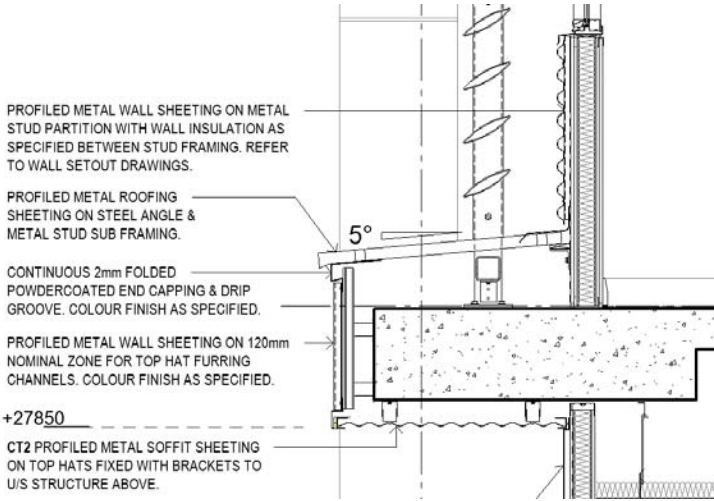
The following figures show the detail construction sections and indicates the wall build up as well as the inclusion of flashings and sealants at junctions of the external wall cladding to prevent water ingress into the building.



4 SLAB EDGE DETAILS 04
1 : 5



3 SLAB EDGE DETAILS 03
1 : 5



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Part J of the BCA sets out the requirements of the building envelope in order to restrict heat transfer through the building envelope, which includes;

- Part J3.4 – Windows and Doors, which requires sealing of doors to the building envelope to prevent air infiltration and windows complying with AS2047, to reduce air infiltration or leakage.
- Part J3.6 – Construction of Roof Walls and Floors, which requires sealing of junctions of building elements to reduce air infiltration or leakage.

Where heat transfer is reduced by sealing junctions and gaps of building elements this sealing will also significantly reduce the potential for moisture to transfer through the total building envelope, including walls.

Within the proposed design, the specification for the wall cladding requires the installation to be undertaken inline with the manufacturers recommendations and also includes the requirement for a interlocking warranty (Section 4.2) to be provided on the completed wall system. This infers that the builder / contractor is to ensure the weatherproof nature of the completed building.

Copies of the Specification sections are included as attachments to this report.

3.2.1 COMPARISON TO DEEMED TO SATISFY PROVISIONS

Part F of Volume 1 of the BCA generally provides the Deemed to Satisfy provision that are considered to meet the associated performance requirements of Part J, except that for external walling and cladding to a class 2 to 9 use building, there are no defined Deemed to Satisfy Provisions. With respect to other parts of buildings there are deemed to satisfy provisions, two of these other elements that would be similar to the external walling and cladding, which are:

- External walling or cladding to a Class 1a residential building that meet the Deemed to Satisfy Provisions of Part 3.5 of Volume 2 of the BCA will be considered to meet the required weatherproofing Performance Requirement P2.2.2.
- Roofing material that meets the Deemed to Satisfy Provisions of F1.5 of Volume 1 will be considered to meet the required weatherproofing Performance Requirement of FP1.4.
-

3.2.1.1 COMPARISON TO VOLUME 2 WEATHERPROOFING OF EXTERNAL WALL.

Volume 2 of the BCA sets out the requirement for Buildings of Class 1 residential usage and nominates within part 3.5.3 that Metal wall cladding to Australian Standard AS 1562.1 is considered to meet the associated Performance Requirement of P2.2.2 for weatherproofing of the building envelope.

The following table sets out the comparison of the proposed design as a Class 9b-Assembly Building of three storeys to a Class 1 residential building and the use of metal cladding in both situations.

Table 6- Comparison to Volume 2 - Class 1

BCA Volume 1	BCA Volume 2	
Building Use 9b- Assembly	Building Use 1a- Residential	
Occupants are staff and students	A variety of occupants	Similar occupants
Proposed building 2 stories in height	Usually 1 to 2 storeys	Similar building height
<i>FP1.4</i> <i>A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—</i> <i>(a) unhealthy or dangerous conditions, or loss of amenity for occupants; and</i> <i>(b) undue dampness or deterioration of building elements.</i>	<i>P2.2.2 Weatherproofing</i> <i>A roof and external wall (including openings around windows and doors) must prevent the penetration of water that could cause—</i> <i>(a) unhealthy or dangerous conditions, or loss of amenity for occupants; and</i> <i>(b) undue dampness or deterioration of building elements.</i>	Performance requirements are equal
<i>F1.0</i> <i>Deemed-to-Satisfy Provisions</i> <i>(a) Performance Requirement FP1.4, for the prevention of the penetration of water</i>	<i>PART 3.5.3 WALL CLADDING</i> <i>Appropriate Performance Requirements :</i> <i>Where an alternative wall cladding is proposed as a Performance Solution to that</i>	Both link the Deemed to Satisfy Provisions with

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BCA Volume 1	BCA Volume 2	
<p>Building Use 9b- Assembly</p> <p>through <i>external walls</i>, must be complied with.</p> <p>There are no <i>Deemed-to-Satisfy Provisions</i> for this <i>Performance Requirement</i> in respect of <i>external walls</i>.</p> <p>(b) Where a <i>Deemed-to-Satisfy Solution</i> is proposed, <i>Performance Requirements FP1.1 to FP1.3 and FP1.5 to FP1.7</i> are satisfied by complying with <i>F1.1 to F1.13</i>.</p>	<p>Building Use 1a- Residential</p> <p>described in <i>Part 3.5.3</i>, that proposal must comply with—</p> <p>(a) <i>Performance Requirement P2.1.1</i>; and</p> <p>(b) <i>Performance Requirement P2.2.2</i>; and</p> <p>(c) the relevant <i>Performance Requirements</i> determined in accordance with <i>1.0.7</i>.</p>	<p>the appropriate Performance Requirement</p>
<p>No Deemed to Satisfy Provisions listed to satisfy Performance Requirement for external walls</p>	<p>3.5.3.0- ACCEPTABLE CONSTRUCTION MANUALS</p> <p><i>Performance Requirements P2.1.1 and P2.2.2</i> are satisfied for wall cladding if it is designed and constructed in accordance with one of the following, as appropriate:</p> <p>(a) Metal wall cladding: AS 1562.1.</p> <p>(b) Autoclaved aerated concrete: AS 5146.1.</p>	<p>No Deemed to Satisfy Provisions listed to satisfy Performance Requirement in Volume 1</p>

The comparison above shows that the two types of buildings, their use and scale are similar. Therefore with respect to weatherproofing of the external wall, metal cladding complying with AS1562.1 does prevent the penetration of water into the building and as the two performance requirements are the same the proposed design with the use of metal external cladding to AS1562.1 will meet the associated performance Requirement of PF1.4.

3.2.1.2 COMPARISON TO VOLUME 1 WEATHERPROOFING OF ROOF.

The external cladding of a Building is considered by the BCA to be part of the general Building Envelope and is required to provide protection of the internal parts of the building from the external weather conditions as indicated by the performance requirement for external walls and room being the same, that is FP1.4.

FP1.4

A roof and *external wall* (including openings around *windows* and *doors*) must prevent the penetration of water that could cause—

(a) *unhealthy or dangerous conditions, or loss of amenity for occupants; and*

(b) *undue dampness or deterioration of building elements.*

There are only a few minor differences between roofing and walling of a building, being that roofing is generally not vertical, while walling is near vertical. Comparing the two applications with respect to water and moisture ingress through the building envelope it can be seen that the two are equal or similar, as set out in the following table.

Application	Wall Material	Roofing Material	Comment
Material	Prefinished metal sheeting	Prefinished metal sheeting	The same, equal
Manufactured to AS	AS 1562.1	AS 1562.1	Equal
Installed to AS	AS 1562.1	AS 1562.1	Standard includes installation requirements for both roofing and walls
Orientation	Vertical or near vertical	Close to horizontal (min fall dependent on material)	Wall less likely to have sitting water on surface
Performance Requirement	FP1.4	FP1.4	Equal

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Application	Wall Material	Roofing Material	Comment
	A roof and <u>external wall</u> (including openings around <u>windows</u> and doors) must prevent the penetration of water that could cause—	A roof and <u>external wall</u> (including openings around <u>windows</u> and doors) must prevent the penetration of water that could cause—	
Deemed to Satisfy Provision	No Deemed to Satisfy Provisions listed to satisfy Performance Requirement for external walls	F1.5 Roof coverings A roof must be covered with— (a) concrete roofing tiles (b) terracotta roofing tiles complying with (c) cellulose cement corrugated sheeting (d) metal sheet roofing complying with AS 1562.1; or	No Deemed to Satisfy Provisions listed to satisfy Performance Requirement for wall cladding.

The comparison above shows that the two application of the metal sheeting both have the same requirements to prevent water and moisture ingress into the building. In the near horizontal application (roofing) a material meeting the requirements of AS1562.1 for the material characteristics and the installation methods is considered to meet the Performance Requirement of FP1.4, therefore in a near vertical application the same material meeting the same requirements of AS1562.1 would be expected to meet the requirements of FP1.4. Therefore with respect to weatherproofing of the external wall, metal cladding complying with AS1562.1 would prevent the penetration of water into the building and as the two performance requirements are the same the proposed design with the use of metal external cladding to AS1562.1 will meet the associated performance Requirement of PF1.4.

3.3 MEETING PERFORMANCE REQUIREMENTS

The following table shows how the proposed design meets the relevant performance requirement of FP1.4.

Table 7

<i>FP1.4</i>	Included in the Design
A roof and <u>external wall</u> (including openings around <u>windows</u> and doors) must prevent the penetration of water that could cause—	Metal cladding with flashing and sealants will prevent water/moisture ingress into the building. Breathable sarking material will assist in reducing moisture building up within the building. Windows comply with AS2047 for water ingress prevention are included along with sealing of junctions between various elements of the external wall to prevent moisture/water ingress as well as air ingress or leakage.
(a) unhealthy or dangerous conditions, or loss of amenity for occupants; and	
(b) undue dampness or deterioration of building elements.	

4.0 CONCLUSION & RECOMENDATIONS

Based on the assessment above, The Performance Requirements FP1.4 of the Building Code of Australia 2019 is considered to have been met for the provision of appropriate moisture and water ingress into the building of the external metal cladding proposed.



Elias Khamis
Registered Architect #10994
NBRSARCHITECTURE

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5.0 ATTACHMENTS - SPECIFICATION SECTIONS

0431 CLADDING COMBINED

0171 GENERAL REQUIREMENTS

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01 GENERAL

0171 General requirements

Maintenance records

General: Record in binders provided with the Operation and maintenance manuals.

Referenced documents: If referenced documents or technical work sections require that log books or records be submitted, include this material in the maintenance records.

Certificates: Include test and approval certificates.

Service visits: Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator. On completion of the visit, obtain the signature of the principal's designated representative on the record of the work undertaken.

Site control

General: Report to the principal's designated representative on arriving at and before leaving the site.

3.26 POST-CONSTRUCTION MANDATORY INSPECTIONS AND MAINTENANCE

General

Requirement: For the duration of the defects liability period, provide inspections and maintenance of safety measures required by the following:

- AS 1851.
- Other statutory requirements applicable to the work.

Records: Provide mandatory records.

Certification: Certify that mandatory inspections and maintenance have been carried out and that the respective items conform to statutory requirements.

Annual inspection: Perform an annual inspection and maintenance immediately before the end of the defects liability period.

4 SELECTIONS

4.1 WARRANTY SCHEDULE

General

Approval of installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, include the manufacturer's written approval of the installing firm with the warranty.

Warranty: Cover materials and workmanship in the form of interlocking warranties from the manufacturer or distributor and the installer except as marked ^{1A'} below.

Warranty for the works shall be for the following duration:

Name	Years Product and installation
Termite treatment	10
Cladding	15
Concrete paving	5
Sheet metal roofing and flashings	15
Glazed Partitions and Glass components	10
External cladding	20
Fall arrest system	20
Solid core doors	5
Door Hardware: Locks, latches, closers, general hardware fixtures	5
Remaining door hardware	10
Door seals	2
Acoustic Insulation	5
Partitions – framed and lined	5

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01 GENERAL

0171 General requirements

Ceiling	5
Ceramic Tiling	5
Wet area waterproofing	10
Pavement sealer	5
Exterior painting	15
Powdercoat finishes	20
External louvres	20
Mechanical Services	Refer to mechanical services specification
Electrical Services	Refer to mechanical services specification
Hydraulic Services	Refer to hydraulic services specification
Fire services, hydrants and plumbing	Refer to fire services specification

x - Applicable for warranty

^ - Both product and installation and workmanship are covered under Defects Liability Period under Principal terms of contract.

4.2 NOTICES SCHEDULE



Item	Minimum Notice
Offsite inspection	4 working days
Onsite inspection	2 working days

4.3 MAINTENANCE

Maintenance requirements schedule

Provision	Maintenance Period (months)	Requirement
Mechanical services	12 months minimum	As noted in PERIOD MAINTENANCE OF SERVICES

5 FIELD DATA CAPTURE

5.1 SCOPE OF WORK

Requirement

Provide Field Data Capture services and information in accordance with the requirements of the NSW Department of Education's EFSG.

As part of the further development of the NSW Department of Education Asset Management System, that Department requires scaled current plans and certain textual data for state schools within New South Wales.

The captured information will be utilised by the Department of Education for their graphic based asset management system which incorporates GIS (Geographic Information System) technology. The Department may also use the information for other purposes.

The scope of the work is for the field data capture of the work carried out under this Contract.

Field data capture for the existing buildings and site may be available from the Field Data Capture Contact Officer.

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04 ENCLOSURE

0431 Cladding – combined

0431 CLADDING – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide lightweight external wall cladding and associated work, as documented.

Location exposure severity

Exposure severity category: moderate

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0342 Light metal framing
- 0471 Thermal Insulation and pliable membranes

1.3 INTERPRETATION

Abbreviations

General: For the purposes of this work section the following abbreviations apply:

- AAC: Autoclaved aerated concrete.
- CCA: Copper chrome arsenate.
- CFC: Compressed fibre cement.
- EIFS: External insulated finishing system.
- FC: Fibre cement.
- LOSP: Light organic solvent preservative.

1.4 TOLERANCES

Permitted deviations

Profiled metal sheet cladding: To AS 1562.1 clause 4.2.3.

Flat sheet and panel cladding: To the manufacturer's recommendations.

Plank and weatherboard cladding: 5 mm from a 1.8 m straightedge or to the manufacturer's recommendations.

Structural steelwork for wall panels: ± 5 mm between bearing planes of adjacent supports.

1.5 SUBMISSIONS

Fire performance

Combustibility: Submit evidence of conformity to PRODUCTS, FIRE PERFORMANCE, Combustibility.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, FIRE PERFORMANCE, Fire hazard properties.

Fire-resistance level: Submit evidence of conformity to PRODUCTS, FIRE PERFORMANCE, Fire-resistance of building elements.

Operation and maintenance manuals

General: Submit manufacturer's published use, care and maintenance requirements.

Products and materials

Type tests: As appropriate for the project, submit evidence of conformity to the following:

- Metal cladding generally: Cladding and fastenings to AS 1562.1 clause 5.5 for resistance to wind pressures.
- Metal cladding in cyclonic regions to AS/NZS 1170.2: Cladding and fastenings to AS 1562.1 clause 5.6.

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- Plastic cladding: Cladding and fastenings to AS 1562.3 Section 5 for resistance to wind forces and resistance to impact.
- Insulated panel systems:
 - . Air infiltration test to AS/NZS 4284 clause 8.4 for test pressures of ± 150 Pa or ± 300 Pa as documented.
 - . Water penetration test by static pressure to AS/NZS 4284 clause 8.5 at test pressure of 300 Pa.
 - . Water penetration test by cyclic pressure to AS/NZS 4284 clause 8.6 at test pressure of 600 Pa.

Prototypes

General: Erect a prototype of each panel type, including at least one example of each component in the system to verify selections submitted as samples, to demonstrate aesthetic effects, to set quality standards for materials and execution and to verify performance, including wind loading.

Inclusions:

- Typical components, attachments to building structure and methods of installation.
- Window opening with cladding panel, trim and returns.
- Sealant filled joint.

Type: 1200 mm x 1200 mm

Location: To be incorporated as prototype for approval

Samples

Finish: Submit samples of the cladding material showing the range of variation available.

Sample size: 300x300mm.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, showing the following:

- Dimensioned elevations of all elements.
- Details of construction, connections and all support systems.
- Dimensions of all typical elements and of any special sizes and shapes.
- Provision for the exclusion and/or drainage of moisture.
- Jointing details and method of fixing between individual elements and between this installation and adjacent work, including adjustment.
- Sealant types and full size sections of all sealant-filled joints and backing rods.
- Provision for thermal movement.
- Provision for movement under seismic and wind loads.
- Sequence of installation.
- Co-ordination requirements with other work.
- Schedule of materials, finishes, componentry, hardware and fittings.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers.

Evidence of experience: Required for both supplier and installer

Seamed sheet metal cladding: Submit evidence of experience with non-ferrous cladding installation.

Warranties

Requirement: Refer to 0171 *General Requirements*.

Cladding materials: Submit the manufacturer's published product warranties.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Workshop assemblies before delivery to the site.
- Framing, sarking, vapour barrier and insulation before covering up or concealing.
- Completion of a prototype.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store and handle materials to the manufacturer's recommendations and the following:

- Protect materials including edges and surfaces from damage.
- Keep dry and unexposed to weather.
- Do not drag sheets or panels across each other or over other materials.
- AAC panels: Stack on edge, support off the ground and level to avoid sagging and damage to ends, edges and surfaces.
- Composite panels: Store unpacked panels by size in racks and protect from scratching, warping or bending.
- Sheeting: Stack flat and off the ground on at least 3 evenly placed bearers.
- Store metal materials away from uncured concrete and masonry on a level base.
- Do not store metal materials in contact with other materials which may cause staining, denting or other surface damage.
- Use gloves when handling pre-coated metal cladding material.

Components

Fasteners and ties: Type, size, corrosion resistance class and spacing to the cladding manufacturer's recommendations.

Flashings: To AS/NZS 2904.

Thermal Breaks

A metal framed building with external cladding attached to the metal frame, must have a thermal break installed between the metal frame and the external cladding; and consisting of a material with an R – Value of not less than 0.2

2.2 FIRE PERFORMANCE

Combustibility

Cladding: Tested to AS 1530.1.

Fire hazard properties

Group number: To AS 5637.1.

Bonded laminated materials: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread of Flame Index: 0.
- Smoke-Developed Index: ≤ 3 .

Insulation materials: Tested to AS/NZS 1530.3. Fire hazard indices as follows:

- Spread-of-Flame Index: ≤ 9 .
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5 .

Fire-resistance of building elements

Fire-resistance level: Tested to AS 1530.4.

2.3 COMPRESSED FIBRE CEMENT (CFC) SHEETS

General

Requirement: Proprietary compressed fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 5.

Quality: Smooth and even with factory sealed edges, free of imperfections such as chips.

Edge profile: Square.

Sealant and bond breaking tape: To the manufacturer's recommendations.

on one or both sides with a cementitious base coat and finish coat.

2.4 FIBRE CEMENT (FC) SHEETS

General

Requirement: Proprietary single faced fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Sealant and bond breaking tape: To the manufacturer's recommendations.

2.5 PROFILED SHEET METAL

General

Requirement: Proprietary profiled sheet metal cladding.

Design and installation: To AS 1562.1.

3 EXECUTION

3.1 PREPARATION

Substrates or framing

Requirement: Before fixing cladding, check the alignment of substrates or framing and adjust if required.

Flexible underlay: Check that the underlay is restrained.

3.2 INSTALLATION

General

Fixing method: As documented or to one of the following fixing methods to the manufacturer's recommendations:

- Steel framing: Screw.
- Timber framing: Nail or screw.
- Minimum penetration for profiled metal sheets: 30 mm for timber framing.

Horizontal cladding surface:

- Minimum slope: 1:15.
- Staining: Slope away from visible vertical facade areas to prevent staining.

Defective components: Do not install component parts which are defective, including warped, bowed, dented, abraded or broken members.

Damaged parts: Remove and replace damaged members during installation.

Accessories and trim

Requirement: Provide accessories and trim required to complete the installation, or as documented.

Corner flashing for profiled and seamed metal sheets: Finish off at corners with purpose-made folded flashing strips.

Metal separation

Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either of the following methods:

- Apply an anti-corrosion, low moisture transmission coating to contact surfaces.
- Insert a separation layer.

Incompatible metal fixings: Do not use.

Proprietary systems or products

Product fixing: Fix proprietary systems to the manufacturer's recommendations.

3.3 CFC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented, allowing a joint gap of 10 mm between panels.

Joints

Control joint:

- Locate between the panel and fixing system and the supporting structure, as documented.

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- Sheet edges: Square cut.
 - Sealant: Do not apply finish coating over joint sealants.
- Prefinished metal backing/jointing strip: Fix proprietary backing strip to the rear face of the panel with proprietary closed cell self-adhering foam and horizontal gasket.
- Seal the joint with a 3 mm epoxy fillet.

Vertical joints: Vertical gasket or prefinished jointing strip to framing member.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Screw fix to proprietary framing supports at centres to the manufacturer's recommendations.

Concealed fixings:

- Predrill oversized holes.
- Countersink so that the top of the screw is 2 to 3 mm below the surface.
- Finish: Stop screw heads with epoxy filler. Smooth and level upon application and sand flush after curing.

3.4 FC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented.

Joints

Control joints:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Corrosion resistant nails or screws to the manufacturer's recommendations.

Eaves and soffit lining: Fix at 150 mm centres to soffit bearers at a maximum of 450 mm centres.

3.5 PROFILED SHEET METAL CLADDING

Installation

Fixing start location: submit proposal in shop drawings.

Swarf: Remove swarf and other debris as soon as it is deposited.

Ground clearance: Maintain documented clearance.

Cutting sheets: Wherever possible, factory cut to length. Do not use an abrasion disc.

Accessories: Provide material with the same finish as cladding sheets.

3.6 COMPLETION

Reinstatement

Extent: Repair or replace damage to the cladding. If the work cannot be repaired satisfactorily, replace the whole area affected.

Touch up: If it is necessary to touch up minor damage to pre-painted metal cladding, do not use spray paints.

Cleaning

Requirement: Remove excess debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidation.

Protection: Remove protective coatings using methods required by the manufacturer after completion.

Panels: Clean surfaces with soft, clean cloths and clean water to the manufacturer's recommendations.

Warranties

Requirement: Cover materials and workmanship in the form of interlocking warranties from the supplier and installer.

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- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

Refer to drawings and schedules.