Proposed Residential Development – Project File No: 199820 GJG
Project Name Ref - Steffan
Lot No: 1 Street No: 150 Church Lane Cranebrook NSW 2749
Site area – 32.88ha
Project Type – New Two storey dwelling on a concrete slab

Date 17/03/2021

GJ Gardner Homes

Zoned DM
Under PCC LEP 2010

GENERAL RESIDENTIAL CONSTRUCTION SPECIFICATION

1 GENERAL TEST

1.1 GENERAL

Preliminary use
This specification forms part of the contract and should not be read in conjunction with the other contract documents.

Prevailing documents
Where there is a difference between the plans and this specification, the plans will take precedence. The contractor must at all times maintain a legible copy of the plans and this specification bearing the Approval of the relevant Local Authority.

Size and Dimensions
All sizes and dimensions given in this specification are in millimetres unless otherwise stated and are nominal only.

Prime cost and Provisional Sums Items
Prime cost items and provisional sums items are listed in the schedule of works, (contract)

Signs. General: Provide a signboard displaying the Lot number, the builder's name, address and licence number, and the BCA accreditation authority, address and contact details, If required.

Occupied premises: General: For the parts of the site which are occupied premises:

-Allow occupants to continue in secure possession and occupancy of the premises for the require period.

-Make available safe access for the occupants.

-Arrange work to minimise nuisance to the occupants and ensure their safety.

-Protect occupants against weather, dust, dirt, water, or other nuisance, by such means as temporary screens where applicable.

Survey marks

Definition: The term 'survey mark' means a survey peg, bench mark, reference mark, signal, alignment, level mark or any other mark used or intended to be used for the purpose of setting out, checking or measuring the work.

Care of survey marks: Preserve and maintain the owner's survey marks in their true positions.

Rectification: If the owner's survey marks are disturbed or obliterated, immediately give notice and rectify the disturbance or obliteration.

Authorities

Authorities' approvals: If required, submit documents showing approval by the authorities whose requirements apply to the work.

Contractual relationships

General: Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in the documents referenced in this specification.

Rectification

Existing services

General: Attend to existing services.

Adjoining property

Notice: At least 10 working days before commencing work, submit to owners and occupants of adjoining property written notice of intention to commence work and an outline description of the type and extent of work.

Safety

Accidents: Promptly notify the contract builder of the occurrence of any accidents:

1.2 COMPLETION OF THE WORKS

Final cleaning

General: Before practical completion, clean throughout, including interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems. Remove waste and surplus materials.

Samples: Remove non-incorporated samples, prototypes and sample panels.

Reinstatement

General: Before practical completion, clean and repair damage caused by installation or use of temporary work and restore existing facilities used during construction to original condition.

Adjoining property

Evaluation: At practical completion, for properties described in the **Adjoining properties to be recorded schedule** inspect the properties with the builder and owners and occupants of the properties, recording any damage that has occurred since the pre-commencement inspection

Removal of plant

General: Within 10 working days after practical completion, remove temporary works and construction plant no longer required. Remove the balance before the end of the defects liability period.

1.3 STANDARDS

Current editions: General: Use referenced Australian or other standards.(including amendments), and

the BCA including State and Territory variations which are current three months before the date of the contract except where other editions or amendments are required by statutory authorities. Any local authority requirements take precedence.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the abbreviations given below apply.

- AS: Australian Standard.
- BCA: Building Code of Australia.
- CFC: Compressed fibre cement.
- CSIRO CMSE: ActivFire Register of Fire Protection Equipment
- DPC: Damp proof course.
- MS: Mild steel.
- MSDS: Material safety data sheets.
- NATA: National Association of Testing Authorities.
- NZS: New Zealand Standard.
- PCA: Plumbing Code of Australia.
- SS: Stainless steel.
- VOC: Volatile organic compound.

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Principal: 'Principal' has the same meaning as 'owner', 'client' and 'proprietor' and is the party to whom the Contractor is legally bound to construct the works.
- If required: A conditional specification term for work which may be shown on the drawings or be a legislative requirement.
- Required: Means required by the contract documents, the local council or statutory authorities.
- Provide: 'Provide' and similar expressions mean 'supply and install' and include development of the design beyond that documented.
- Proprietary: 'Proprietary' mean identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Professional engineer: A person who is listed on the National Professional Engineers Register (NPER) in the relevant discipline at the relevant time.
- Metallic-coated: Steel coated with zinc or aluminium-zinc alloy as follows:
  - Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.
  - Ferrous open sections zinc coated by an in-line process: To AS/NZS 4791.
  - Ferrous hollow sections zinc coated by a continuous or specialised process: To AS/NZS 4792.
- Supply: 'Supply', 'furnish' and similar expressions mean 'supply only'.
- Completion tests: Tests carried out on completed installations or systems before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements. The superintendent may direct that completion tests be carried out after the date for practical completion.

1.5 CONTRACTS AND FINANCE

Contractual relationships

General: Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in the documents referenced in this specification.

Current editions

General: Use referenced documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

1.6 AUTHORITIES AND ESTABLISHMENT

Existing services: General: Attend to existing services as follows,

-If the service is to be continued, Repair, divert or relocate as required. If such a service crosses the line of a require trench, or will lose support when the trench is excavated, provide permanent support for the existing service.

-If the service is to be abandoned, cut and seal or disconnect, and make safe.

1.7 BUSHFIRE PROTECTION

Conformance: In areas designated as bushfire prone, comply with statutory requirements.

Standard: AS 3959, in conjunction with SAA HB 36.

1.8 STATUTORY REQUIREMENTS

The building works

The building works shall be constructed ii accordance with:

The regulations and in particular with the Performance Requirements of the BCA, vol 2 and vol 1 where applicable, the conditions imposed by the relevant development consent or complying development certificate, and the commitments detailed in the current Basix certificate,(department of planning).

Compliance with requirements of Authorities

The Builder is to comply with the requirements of all legally constituted authorities having jurisdiction over the building works and the provisions of the home building act.

Electricity

Where there is no established power supply, the builder is to make arrangements for any electrical power to used in construction of the building works.

Sanitary accommodation

Prior to commencement of works, the builder shall provide toilet facilities to the site to local authority requirements.

2 PRODUCTS

2.1 GENERAL

Manufacturers' or suppliers' recommendations

Provide, including select, if no selection is given, transport, deliver, store, handle, protect, finish, adjust and prepare for use, manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Proprietary items/systems/assemblies: Assemble, install or fix to substrate in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or suppliers' written recommendations and instructions.

2.2 TIMBER

Durability

General: Provide timbers having natural durability appropriate to the conditions of use, or preservative-treated timber of equivalent durability.

Natural durability class of heartwood: To AS 5604.

Minimum requirements:

- Class 1: Timbers in contact with ground.
- Class 2: Timbers above ground, not in continuous contact with moisture, well ventilated, protected from moisture but exposed to the weather.
- Class 3: Timbers above ground, not in continuous contact with moisture, well ventilated, protected with a finish, and well maintained.
- Class 4: Timbers fully protected from moisture, indoors, above ground, and well ventilated.

Unseasoned timber

General: If unseasoned timber is used, or if variations in moisture are likely, allow for shrinkage, swelling and differential movement.

2.3 METALS

Coated steel

Electrogalvanizing ferrous hollow and open sections: To AS 4750.

Metallic-coated steel:

- Ferrous open sections zinc coated by an in-line process: To AS/NZS 4791.
- Ferrous hollow sections zinc coated by a continuous or specialised process: To AS/NZS 4792.

Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.

Steel wire: To AS/NZS 4534.

Stainless steel

Bars: To ASTM A276.

Plate, sheet and strip: To ASTM A240/A240M.

Welded pipe (round): To AS 1769.

Welded pipe (square): To ASTM A554.

2.4 FIXING

General

Suitability: If equipment and services are not suitable for fixing to non-structural building elements, fix directly to structure and trim around penetrations in non-structural elements.

Fasteners

Use proprietary fasteners capable or transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly.

REGULATORY REQUIREMENTS

NCC 2019 Complete Series

NCC 2019 Volume Two

NCC 2019 Guide to Volume One

Safe Movement and Access

Explanatory information:

A flight is the area of a stair that has a continuous slope created by the nosing line of treads. The length of a flight is limited to restrict the distance a person could fall down a stair.

Figure 3.9.1.1

MEASUREMENT OF SLOPE RELATIONSHIP — Plan view

Diagram a. **Stair with 2 flights**

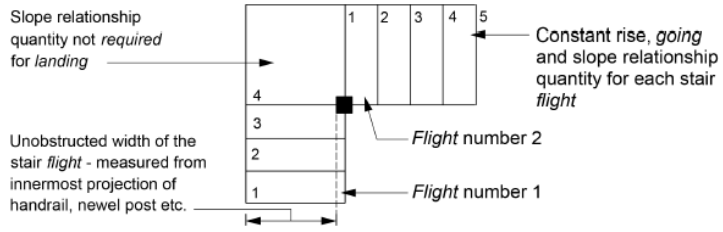


Diagram b. **Tapered treads — not more than 1 m wide**

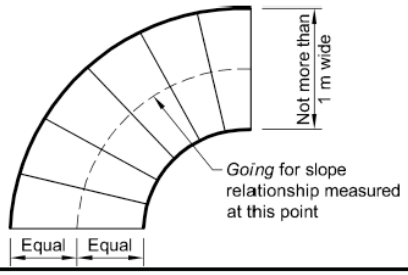


Diagram c. **Tapered treads — more than 1 m wide**

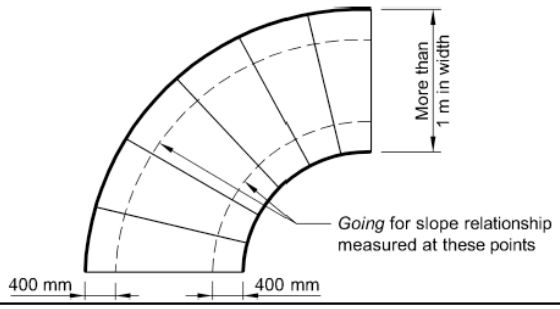


Table 3.9.1.1 RISER AND GOING DIMENSIONS (mm)

STAIR TYPE	RISER (R) (see Figure below)		GOING (G) (see Figure below)		SLOPE RELATIONSHIP (2R+G)	
	Max	Min	Max	Min	Max	Min
Stairs (other than spiral)	190	115	355	240	700	550
Spiral	220	140	370	210	680	590

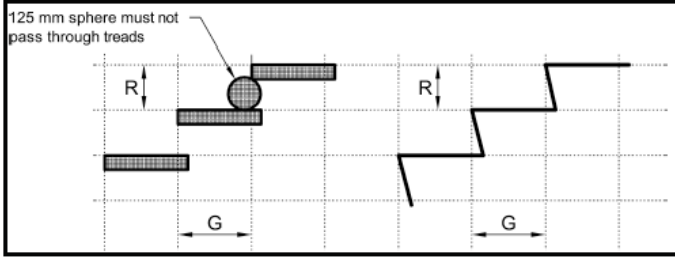
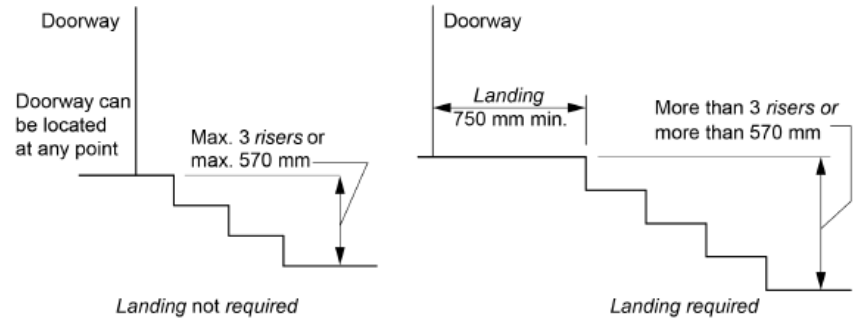


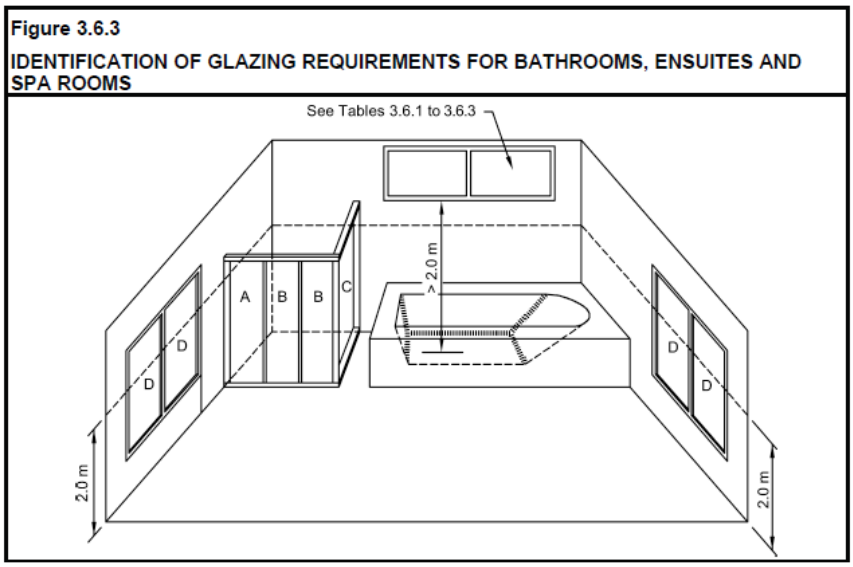
Figure 3.9.1.3
LANDINGS

Diagram b. **Threshold landing**



3.9.1.6 Thresholds

Where the threshold of a doorway is more than 230 mm above the adjoining surface it must incorporate steps having *riser* (R) and *going* (G) dimensions in accordance with 3.9.1.2.



Ventilation

Acceptable construction manual

3.8.5.0

(a) Except for an exhaust fan from a *sanitary compartment*, laundry or bathroom, *Performance Requirement* **P2.4.5** is satisfied for a mechanical ventilation system if it is installed in accordance with AS 1668.2.

(b) An exhaust fan from a *sanitary compartment*, laundry or bathroom must comply with the acceptable construction practice.

Acceptable construction practice

3.8.5.1 Application

Compliance with this acceptable construction practice satisfies *Performance Requirement* **P2.4.5** for ventilation.

3.8.5.2 Ventilation requirements

Ventilation must be provided to a *habitable room*, *sanitary compartment*, bathroom, shower room, laundry and any other room occupied by a person for any purpose by any of the following means:

(a) Openings, *windows*, doors or other devices which can be opened—

(i) with a ventilating area not less than 5% of the *floor area* of the room *required* to be ventilated

An exhaust fan or other means of mechanical ventilation may be used to ventilate a *sanitary compartment*, laundry or bathroom, or where mechanical ventilation is provided in accordance with **3.8.5.3(b)**, provided contaminated air exhausts—

(i) directly to outside the building by way of ducts; or

(ii) into a roof space that—

(A) is adequately ventilated by open eaves, and/or roof vents; or

(B) is covered by roof tiles without sarking or similar materials which would prevent venting through gaps between the tiles.

Explanatory information:

Except where mechanical ventilation is provided in accordance with **3.8.5.3(b)**, **3.8.5.2(c)** only applies where an exhaust fan or other means of mechanical ventilation is provided as the sole means of ventilation for a *sanitary compartment*, laundry or bathroom.

Barriers to Prevent Falls

(a) A continuous barrier must be provided along the side of—

(i) any roof to which general access is provided; and

(ii) any stairway or ramp; and

(iii) a floor, corridor, hallway, balcony, deck, verandah, mezzanine, access bridge or the like; and

(iv) any delineated path of access to a building, if the trafficable surface is 1 m or more above the surface beneath (see Figure 3.9.2.3).

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

(i) a retaining wall unless the retaining wall forms part of, or is directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings; or

(ii) a barrier provided to an openable window covered by 3.9.2.5.

NCC 2016 Building Code of Australia - Volume Two
3.9.2.3

Safe Movement and Access

3.9.2.3 Construction of barriers to prevent falls

(a) The height of a barrier *required* by 3.9.2.2 must be in accordance with the following:

(i) The height must not be less than 865 mm above the nosings of the stair treads or the floor of a ramp.

(ii) The height must not be less than—

(A) 1 m above the floor of any access path, balcony, *landing* or the like (see Figure 3.9.2.1); or

(B) 865 mm above the floor of a *landing* to a stair or ramp where the barrier is provided along the inside edge of the *landing* and does not exceed a length of 500 mm.

(b) A transition zone may be incorporated where the barrier height changes from 865 mm on the stair *flight* or ramp to 1 m at the *landing* (see Figure 3.9.2.2).

(c) Openings in barriers (including decorative balustrades) must be constructed so that they do not permit a 125 mm sphere to pass through it and for stairs, the opening is measured above the nosing line of the stair treads.

(d) A barrier to a stairway serving a non-*habitable room*, such as an attic, storeroom or the like that is not used on a regular or daily basis, need not comply with (c) if—

(i) openings are constructed so that they do not permit a 300 mm sphere to pass through; or

(ii) where rails are used, the barrier consists of a top rail and an intermediate rail, with the openings between rails not more than 460 mm.

(e) A barrier, except a window serving as a barrier, must be designed to take loading forces

Protection of Operable Windows

(a) A window opening must be provided with protection, if the floor below the window in a bedroom is 2 m or more above the surface beneath.

(b) Where the lowest level of the window opening is less than 1.7 m above the floor, a window opening covered by **(a)** must comply with the following:

(i) The openable portion of the window must be protected with—

(A) a device capable of restricting the window opening; or

(B) a screen with secure fittings.

(ii) A device or screen *required* by **(i)** must—

(A) not permit a 125 mm sphere to pass through the window opening or screen; and

(B) resist an outward horizontal action of 250 N against the— (aa) window restrained by a device; or (bb) screen protecting the opening; and

(C) have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden.

(c) A barrier with a height not less than 865 mm above the floor is *required* to an openable window—

(i) in addition to window protection, when a child resistant release mechanism is *required* by **(b)(ii)(C)**; and

(ii) where the floor below the window is 4 m or more above the surface beneath if the window is not covered by **(a)**.

An automatic fire detection and alarm system is to be installed in accordance with AS 3786 Smoke alarms using scattered light, transmitted light or ionization or listed SSL Register of Accredited Product. The detector units are to be connected to the 240 volt power supply, have suitable battery backup, be interconnected where there is more than one alarm and be located on or near the ceiling in the following locations:
. Between each area containing bedrooms and the remainder of the dwelling including any hallway associated with the bedrooms; or
. In any storey not containing bedrooms.
Prior to the issue of any occupation certificate, the owner/applicant must submit to the Principal Certifying Authority a copy of the smoke detector installation details and certificates (issued by the Electrician).

A swimming pool water recirculation system shall comply with AS 1926.3-2010 Swimming pool safety . Water recirculation system. Specific requirements for skimmer boxes and outlets apply.

Exhaust fans must be discharged directly or via a shaft or duct to outdoor air or to

a roof space that is ventilated in accordance with Part 3.8.7.4 of the Building Code of Australia.

Deck attachments

Where a deck or balcony relies upon an external wall of a building for support, the method of attachment, including fixings, to the external wall must comply with Part 3.10.6.2 of the Building Code of Australia. If the wall cladding is removed to attach a waling plate, openings in the external wall cladding must be flashed in accordance with Part 3.10.6.3 of the Building Code of Australia.

Stair treads

Stair treads must have a surface or a nosing strip with a slip-resistance classification that are suitable to the surface conditions and not less than that listed in Table 3.9.1.3 of the Building Code of Australia. Written evidence of compliance is to be submitted to the Principal Certifying Authority prior to the issue of any Occupation Certificate.

Bracing to any deck more than one (1) metre off the ground must be provided in accordance with Part 3.10.6.4 of the Building Code of Australia.

Pliable building membrane

A pliable building membrane in an external wall must be a vapour permeable membrane, be located on the exterior side of the primary insulation layer of wall assemblies and be installed in accordance with AS4200.2 to comply with Part 3.8.7.2 of the Building Code of Australia.

0184 TERMITE MANAGEMENT

1 GENERAL

1.1 AIMS

Responsibilities
Provide termite management materials and systems.

1.2 STANDARD

General
Termite barriers: To AS 3660.1.

1.3 INSPECTION

Notice
Inspection: Give sufficient notice so that inspection may be made of the completed termite barriers.

1.4 TESTS

Chemical soil barriers – reticulation systems
Type testing: To AS 3660.1 Appendix E.

2 PRODUCTS

2.1 NON-CHEMICAL BARRIERS

Concrete slab barrier
Standard: To AS 3660.1 Section 4.

Termite cap and strip shields
Standard: To AS 3660.1 Section 5.

Woven stainless steel mesh barriers
Standard: To AS 3660.1 Section 6.

Graded stone particles barriers
Standard: To AS 3660.1 Section 7.

2.2 CHEMICAL SOIL BARRIERS

General
Standard: To AS 3660.1 Section 8.

Spray application
Reticulation systems

2.3 NON-SOIL MATRIX BARRIERS

Concrete slab barrier
Description: Composite membrane incorporating a termiticide.

Brickwork
Description: Bedding mortar incorporating a termiticide.

Application: Brick bed and perpends as follows:

- Cavity walls built off a concrete slab on ground.
- Buildings with typical raft infill (footing) or formed void slab construction.
- Permanent barrier in sub-floor brickwork and brick piers.

Assessment criteria
Standard: To AS 3660.3.

3 EXECUTION

3.1 NON-CHEMICAL BARRIERS

Concrete slab barrier
Standard: To AS 3660.1.

Termite cap and strip shields
Standard: To AS 3660.1

Woven stainless steel mesh barriers
Standard: To AS 3660.1

Graded stone particles barriers
Standard: To AS 3660.1

3.2 CHEMICAL SOIL BARRIERS

General
Standard: To AS 3660.1.

3.3 COMPLETION

Termite barrier notice
Provide a durable notice permanently fixed in a prominent location to BCA B1.4 (i) (ii) or clause 3.1.3.2(b) and AS 3660.1 Appendix A.

Completion inspection
At the end of the defects liability period, inspect the termite control systems and submit a report on their efficacy and status.

4 SELECTIONS

4.1 SCHEDULE

Termite barriers schedule Final application to Builders selection

Barrier designation	TB1	TB2	TB3
Location	Floor slab		
Slab	Floor slab		
Slab penetrations	Floor slab	Termiguard or equal	
Slab control joints and footing/slab joints	Floor slab	Termiguard	
Under slabs	Floor slab	Slab edge	

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Barrier designation	**TB1**	**TB2**	**TB3**
Building perimeters	Metal Shield		
Under suspended floors	Na:	Metal shield	
Timber poles and posts	Na:	clear	

Certification by supply and or selection by builder

0221b SITE MANAGEMENT

1 GENERAL

SUBMISSIONS

Soil erosion and sediment control plan
Waste management plan
Site preparation
Mulching: Submit details of provisions for mulching cleared vegetation.

1.1 INSPECTION

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

- Enclosures to trees to be retained.
- Trees to be removed.

2 EXECUTION

2.1 CONTROL AND PROTECTION

Air quality control
General: Protect adjoining owners, residents and the public against dust, dirt and water nuisance and injury. Use dust screens and watering to reduce the dust nuisance.

Lighting of fires
Prohibition: Do not light fires.

Vegetation and fauna
Wild life protected: All native.

Trees to be removed: Inspect to establish if nesting native fauna are present. If present give notice.

Pruning: To AS 4373.

Water quality
Wash out: Ensure that wash out does not enter waterways or stormwater drains.

Cross connection: Ensure that there are no cross connections between the stormwater and the public sewerage system.

Dewatering
General: Keep groundworks free of water. Provide and maintain slopes, crowns and drains on excavations and embankments to ensure free drainage. Place construction, including fill, masonry, concrete and services, on ground from which free water has been removed. Prevent water flow over freshly laid work.

Disposal: Dispose of water legally.

2.2 TRUCK CONTAMINATION

Truck contamination precautions
Covers: Use tarpaulins to prevent the dropping of materials on public roads.

2.3 TREE PROTECTION

Work near trees
Harmful materials: Keep the area within the dripline free of sheds and paths, construction material and debris. Do not place bulk materials and harmful materials under or near trees. Do not place spoil from excavations against tree trunks. Prevent wind-blown materials such as cement from harming trees and plants.

Work under trees: Do not remove topsoil from, or add topsoil to, the area within the dripline of the trees.

2.4 SITE CLEARING

Extent
General: Clear only the following site areas:

- Areas to be occupied by works such as structures, paving, excavation, regrading and landscaping.
- Other areas designated to be cleared.

Contractor's site areas: If not included within the areas documented above, clear generally only to the extent necessary for the performance of the works.

2.5 SEDIMENT FILTERS

General
Inspection: For displacement, undercutting, over-topping and soil buildup, after each rain event. Effect repairs immediately.

Removal: When the upslope areas have been permanently stabilised.

Silt fence
Description: A temporary barrier of geotextile filter fabric, supported on wire or mesh fencing in order to filter sediment from stormwater flow.

Slopes: If filter is at toe of a slope, locate fence 1500 – 2000 mm away from slope, to provide access for maintenance and to allow coarse sediment to drop out of suspension before reaching sediment filter.

Performance: Retain soil found on site but with openings large enough to permit drainage and prevent clogging.

Backfilling: Backfill trench over toe of fabric and compact soil.

2.6 DISPOSAL OF MATERIALS

Disposal
Spoil: Remove cleared and grubbed material from the site and dispose of legally.

Burial: Bury concrete and other inorganic fragments as follows:

- Location: Beyond built or paved areas.
- Depth: > 600 mm from finished ground level to the top of the object.
- Compaction: Eliminate voids.

2.7 CLEANING UP

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Siteworks generally

Progressive cleaning: Keep the work under the contract clean and tidy as it proceeds and regularly remove from the site.

0222b EARTHWORK

1 GENERAL

1.1 INTERPRETATION

Definitions

- Standard: To AS 1348.
- Description and classification of soils: To AS 1726.
- Line of influence: A line extending downward and outward from the bottom edge of a footing, slab or pavement and defining the extent of foundation material having influence on the stability or support of the footings, slab or pavement.

2 EXECUTION

2.1 REMOVAL OF TOPSOIL

General

Extent: Areas to be cut and areas to be filled and areas to be occupied by structures, pavements, embankments and the like.

Maximum depth: 200 mm.

Re-use of removed topsoil

2.2 EXCAVATION

Extent

Site surface: Excavate over the site to give correct levels and profiles as the basis for structures, pavements, filling and landscaping. Make allowance for compaction or settlement.

Footings: Excavate for footings, pits, wells and shafts, to the required sizes and depths. Confirm that bearing capacity is adequate.

Crawl space: Provide clear space under timber floor bearers.

- Minimum clearance: 400 mm.

Disposal of excess excavated material

General: Remove excess excavated material from the site and dispose of legally.

2.3 BEARING SURFACES

General

General: Provide even plane bearing surfaces for loadbearing elements including footings. Step to accommodate level changes. Make the steps to the appropriate courses if supporting masonry.

2.4 REINSTATEMENT OF EXCAVATION

General

Requirement: If the excavation exceeds the required depth, or deteriorates, reinstate to the correct depth, level and bearing value.

2.5 PLACING FILL

General

Layers: Place fill in near-horizontal layers of uniform thickness, deposited systematically across the fill area.

Extent: Place and compact fill to the designated dimensions, levels, grades, and cross sections so that the surface is always self draining.

0301s PILING

1 GENERAL

Design
General: Design by Structural Engineer.

1.1 STANDARD

General
Design and performance: To AS 2159.
Materials and installation: To AS 2159.

0310b CONCRETE – COMBINED

1 GENERAL

1.1 STANDARDS

General
Formwork design and construction, formed surfaces: To AS 3610.
Profiled steel sheeting including shear connectors: To AS 2327.1.
Specification and supply of concrete: To AS 1379.
Concrete materials and construction: To AS 3600.
Concrete structures for retaining liquids: To AS 3735.

2 PRODUCTS

2.1 POLYMERIC FILM UNDERLAY

Standard
Vapour barriers and damp-proofing membranes: To AS 2870.

Location
General: Under slabs on ground including integral ground beams and footings, provide a vapour barrier or, in areas prone to rising damp or salt attack, a damp-proofing membrane.

Installation
General: Lay over the base, lap joints at least 200 mm and seal the laps and penetrations with waterproof adhesive tape. Face the laps away from the direction of concrete pour. Take the underlay up vertical faces past the damp proof course where applicable, and tape fix at the top. Patch or seal punctures or tears before pouring concrete. Cut back as required after concrete has gained strength and forms have been removed.

Base preparation
General: According to base type, as follows:

- Concrete working base: Remove projections above the plane surface, and loose material.

2.2 STEEL DECKING

General

Material: Hot-dipped zinc-coated sheet steel to AS 1397, minimum G500-Z350.

Profiled steel sheeting composite formwork

Minimum steel grade: G550.

2.3 REINFORCEMENT

Fibre reinforcement

Reference: CIA CPN35.

Protective coating

General: For concrete elements containing protective coated reinforcement, provide the same coating type to all that element's reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules, and protect other embedded metals with a suitable coating.

Steel reinforcement

Standard: To AS/NZS 4671.

- Ductility grade: Class N.

Tie wire

General: To be annealed steel 1.25 mm diameter (minimum).

External and corrosive applications: Galvanized.

2.4 CONCRETE PLACING AND COMPACTION

Compaction

Methods: Use immersion and screed vibrators accompanied by hand methods as appropriate to remove entrapped air and to fully compact the mix.

Vibrators: Do not allow vibrators to come into contact with set concrete, reinforcement or items including pipes and conduits embedded in concrete. Do not use vibrators to move concrete along the forms. Avoid over-vibration that may cause segregation.

2.5 CONCRETE CURING

General

Curing: Cure continuously from completion of finishing until the total cumulative number of days or fractions of days, during which the air temperature in contact with the concrete is above 10°C, is at least the following, unless accelerated curing is adopted:

- Fully enclosed internal surfaces/Early age concrete: 3 days.
- Other concrete surfaces: 7 days.

End of curing period: Prevent rapid drying out at the end of the curing period.

Protection: Maintain at a reasonably constant temperature with minimum moisture loss, during the curing period.

Slip joints

Requirement: If concrete slabs are supported on masonry, provide proprietary slip joints.

2.6 FORMED SURFACES

General

General: Provide formed concrete finishes in conformance.

Curing

General: If forms are stripped when concrete is at an age less than the minimum curing period, commence curing exposed faces as soon as the stripping is completed.

Evaluation of formed surfaces

General: If evaluation of formed surface tolerance or colour is required, complete the evaluation before surface treatment.

- Grout floated finish: Remove the forms while the concrete is green. Dampen the surface and spread a slurry, using hessian pads or sponge rubber floats. Remove surplus slurry and work until a uniform colour and texture are produced.

Smooth rubbed finish: Remove the vertical face forms while the concrete is green. Wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produced.

Surface repairs

Surface repair method: If surface repairs are required, submit proposals.

General

General: Strike off, screed and level slab surfaces to finished levels, to the tolerance class noted in the **Unformed surface finishes schedule**.

2.7 COMPLETION

Formwork removal

Extent: Remove formwork, other than steel reinforcement decking, including formwork in concealed locations, but excepting lost formwork.

Timing: Do not disturb forms until concrete is hardened enough to withstand formwork movements and removal without damage.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.

Loading

General: Do not erect masonry walls or other brittle elements on beams and slabs while they are still supported by formwork.

General: If 'starter bars' and other items project from cast concrete for future additions and are exposed to the weather, provide details of protection.

0331b BRICK AND BLOCK CONSTRUCTION

1 GENERAL

1.1 CROSS REFERENCES

1.2 STANDARD

General

Materials and construction: To AS 3700.

1.3 INSPECTION

Notice

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

- Unit type, colour and texture.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Reinforcement type and diameter.
- Positioning of reinforcing before grouting.
- Control joints, ready for insertion of joint filler.
- Damp-proof courses, in position.
- Flashings, in position.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

1.4 TOLERANCES

Masonry construction

Conformance: Conform to AS 3700 Table 11.1.

2 PRODUCTS

2.1 MATERIALS

Bricks and blocks

Standard: To AS/NZS 4455.

Minimum age of clay bricks: 7 days.

Mortar materials

Admixtures:

- Admixtures: To AS 3700 clause 10.4.2.4.

Lime: To AS 1672.1.

Portland cement: To AS 3972.

- Type: GP.

Masonry cement: To AS 1316.

Mortar mix table

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
Masonry cement				
M3	1:0:4	1:0:4	n/a	No
M4	1:0:3	n/a	n/a	No
Portland cement				
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
	1:0:5	1:0:5	1:0:5	Yes

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
	1:0:4	1:0:4	1:0:4	Yes

2.2 COMPONENTS

Steel lintels

Angles and flats: To AS/NZS 3679.1.

Cold formed proprietary lintels: Designed to AS/NZS 4600.

Corrosion protection: To AS/NZS 2699.3.

Galvanizing: Do not cut after galvanizing.

Wall ties

Standard: To AS/NZS 2699.1.

Connectors and accessories

Standard: To AS/NZS 2699.2.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Mortar mixing

General: Measure volumes accurately to achieve the specified proportions. Machine mix for at least six minutes.

Bond

Type: Stretcher bond. Unless noted otherwise

Clearance for timber frame shrinkage

General: In timber frame brick veneer construction, leave clearances between window frames and brick sill and between roof frames and the brick veneer as follows:

- Additional clearance: Accommodate additional shrinkage of unseasoned floor timbers.
- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.

Joining to existing

General: If jointing to existing work is required, provide a straight joint. Do not tooth new masonry into existing work.

Monolithic structural action

General: Provide brick or block header units, except in stretcher bond facework, to AS 3700 clause 4.11.2.

Spacing: 600 mm maximum.

Location:

- At engaged piers.
- At engagement of diaphragms with the leaves in diaphragm walls.
- At intersections of flanges with shear walls.
- At intersections with supporting walls and buttresses.

- Between leaves in solid masonry construction.

2.3 FACEWORK

Cleaning
General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not use an acid solution. Do not erode joints if using pressure spraying.

Colour mixing
Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and 'banding'.

Commencement
General: Commence at least 1 full course for blockwork, or 2 full courses for brickwork, below adjacent finished level.

Double face walls
Selection: Select face units for uniform width and double-face qualities in single-leaf masonry with facework both sides.

Preferred face: Before starting, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

Perpends
General: If it is proposed to use other than vertically aligned perpends in alternate courses, provide details.

Sills and thresholds
General: Solidly bed sills and thresholds and lay them so that the top surfaces drain away from the building.

Set out: Set out so that no unit is cut smaller than three quarters full width.

2.4 SUBFLOOR WORK

Access openings
General: In internal walls, leave door width openings beneath doorways to give access to underfloor areas.

Air vent locations
General: Provide air vents to give adequate cross ventilation to the space under ground floors.

Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the vents in the external leaves.

Location: Below damp-proof course to internal and external walls.

Air vent types
Blockwork:

- Concrete framed: Bronze wire mesh in concrete frame 390 x 190 mm.
- Vent blocks: Purpose-made vent blocks.

Brickwork:

- Concrete framed: Bronze wire mesh in concrete frames, 470 x 160 mm.
- Cut brick: 2 cut bricks laid vertically and evenly spaced in a 230 mm wide x 2 course high opening, backed with bronze wire mesh built in.
- Terra cotta: Perforated, 230 x 160 mm.

2.5 CAVITY WORK

Cavity clearance
General: Keep cavities clear at all times.

Cavity fill
General: Fill the cavity to 1 course above adjacent finished (ground) level with mortar. Fall the top surface towards the outer leaf.

Cavity width
General: Provide minimum cavity widths in conformance with the following:

- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the load bearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

Openings
Care: Do not close the cavity at the jambs of external openings.

Wall ties connectors and accessories
Protection: Install to prevent water passing across the cavity.

2.6 DAMP-PROOF COURSES

Location
General: Provide damp-proof courses as follows:

- At timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.
- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:

- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Installation
General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork. Sandwich damp-proof courses between mortar.

- Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

2.7 FLASHINGS

Location

General: Provide flashings and weatherings as follows:

- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block. Where the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.
- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame. Extend at least 150 mm beyond the reveals or each side of the opening..
- Over lintels to openings: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above above for brick and 1 course above for block or turned up against the inner frame and fasten to it. Extend at least 150 mm beyond the lintels. Extend at least 50 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Full height flash extending 75 mm beyond the closure into the cavity, interleaved with the sill and head flashing at each end. Fix to jambs.
- At roof abutments with cavity walls: Cavity flash immediately above the roof and over-flash the roof apron flashing.

Installation

General: Sandwich flashings between mortar except on lintels or shelf angles. Bed flashings, sills and copings in one operation to maximise adhesion.

Pointing: Point up joints around flashings, filling voids.

Weepholes

See AS 3959 for building in bushfire prone areas; all vents and weep holes require a corrosion resistant wire mesh to prevent ingress of embers.Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

Form: Open perpends.

Maximum spacing: 1200 mm.

2.8 WALL TIES

Classification

Durability Classification to AS/NZS 2699.1:

Corrosion protection: To BCA Table 3.3.3.1.

Location

Provide wall ties spacing in conformance with AS 3700 clause 4.10 *Wall ties* or BCA Figure 3.3.3.1 as follows:

- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

Installation

Embedment: At least 50 mm into mortar ensuring that mortar cover is 15 mm minimum to the outside face of the mortar.

2.9 CONTROL OF MOVEMENT

Joints

General: By Engineer Provide joints as follows:

2.10 REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes

General: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each grouted core.

Location: Locate on the side of the wall which is to be rendered or otherwise concealed.

Cleaning: Rod cores to dislodge mortar fins protruding from the blocks and mortar droppings from reinforcement. Remove through the clean-out blocks.

Grouting

Commencement: Do not commence until grout spaces have been cleaned out and the mortar joints have attained sufficient strength to resist blow-outs.

Height of lift: Limit the height of individual lifts in any pour to ensure that the grout can be thoroughly compacted to fill all voids and ensure bond between grout and masonry.

Compaction: Compact by vibration or by rodding.

Topping up: On the completion of the last lift, top up the grout after 10 min to 30 min, and vibrate or rod to mix with the previous pour.

2.11 LINTELS

Location

General: Provide 1 lintel to each wall leaf in conformance with the **Lintel schedule**.

Installation

General: Do not cut on site. Keep lintels 10 mm clear of heads of frames.

Steel lintels: Pack mortar between any vertical component and supported masonry units. For angles install the long leg vertical.

Minimum bearing each end:

- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm ≤ 3000 mm: 150 mm.
- Span > 3000 mm: 200 mm.

Propping: To prevent deflection or excessive rotation, temporarily prop lintels until the masonry reaches its required strength.

Protection

Steel lintels: Steel lintels shall be hot dip galvanized (after fabrication).

2.12 BAGGING

Preparation

General: Cut joints flush before bagging.

Dry bagging

Application: Apply laying mortar to the surface using a hessian bag or similar. Flush up irregularities, but leave a minimum amount of mortar on the surface.

Preparation: Cut joints flush before bagging.

Textured bagging
Application: Apply laying mortar to the surface using a sponge float. Flush up irregularities, but leave approximately 2 mm of mortar on the surface. When initial set is reached, texture using a hand bristle brush.

0342 LIGHT STEEL FRAMING

1 GENERAL

1.1 STANDARDS

General
Design, materials and protection: To AS/NZS 4600.
Residential and low-rise steel framing: To NASH (National Association of Steel Housing) Standard.

0382 LIGHT TIMBER FRAMING

1 GENERAL

1.1 STANDARDS

Framing: To AS 1684 Parts 2, 3 or 4, as appropriate.
Design: To AS 1720.1.

0421 ROOFING – COMBINED

1 GENERAL

1.1 PERFORMANCE CRITERIA

Location exposure severity
Exposure severity category:
Bushfire prone areas
Level of construction to AS 3959: Seal all voids and ridges

1.2 SHEET METAL ROOFING

Standards
Design and installation: To AS 1562.1.

1.3 ROOF TILING

Materials
Standard: To AS 2049.

1.4 SEAMED SHEET METAL ROOFING

Type
Seamed sheet metal roofing laid on flush finished continuous plywood decking over an underlayer and separation layer.

1.5 ROOF PLUMBING

General
Standard: To AS/NZS 3500.3.

~~1.6 GLAZED ROOFING~~

~~**Description**~~
~~General: Provide sloped overhead glazing fixed to glazing bars or directly to the roof framing. Provide the necessary trim, flashings and sealants.~~
~~Glass selection and installation: To AS 1288.~~

~~1.7 PLASTIC SHEET ROOFING~~

~~**Materials**~~
~~Unplasticised polyvinyl chloride (UPVC) sheet: To AS 4256.2.~~
~~Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.~~
~~Polycarbonate: To AS 4256.5.~~

1.8 SKYLIGHTS

Standard
General: To AS 4285.

Skylights (rooflights) in bushfire prone areas: To AS 3959 clause 3.9.1.4.

Description

General: A proprietary skylight system including framing, fixing, trim, accessories and flashings.

1.9 INSTALLATION

Protection

General: Keep the roofing and rainwater system free of debris and loose material during construction, and leave them clean and unobstructed on completion. Repair damage to the roofing and rainwater system.

Touch up: If it is necessary to touch up minor damage to prepainted metal roofing, do not overspray onto undamaged surfaces.

1.10 BUILDING ELEMENTS

Ridges and eaves

Treat ends of sheets as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- Provide pre-cut notched eaves flashing and bird proofing where necessary.
- Close off ridges with purpose-made ridge fillers of closed cell polyethylene.

1.11 TILING

Installation

Standard: To AS 2050.

Setting out: Set out the roof to give an even tile gauge in each course, with full or saw cut tiles at verges.

Bedding and pointing: Bed and point accessories, including ridges, hips and verges, in coloured mortar.

- Colour: To match the tiles and accessories.

Tile verge: Finish the verge with cover tiles pointed to the roof tiles. Screw fix to the barge board with round head galvanized screws.

Pointed verge: Bed and point tiles on 100 x 5 mm fibre cement pointing strip.

1.12 ROOF PLUMBING

Jointing sheet metal rainwater goods

Butt joints: Make joints over a backing strip of the same material.

Soldered joints: Do not solder aluminium or aluminium/zinc-coated steel.

Sealing: Seal fasteners and mechanically fastened joints. Fill the holes of blind rivets with silicone sealant.

0431b CLADDING – COMBINED

1 GENERAL

Notice
Inspection: Give sufficient notice so that the framing, sarking, vapour barrier and insulation may be inspected before they are covered up or concealed.

2 PRODUCTS

2.1 SHEET METAL CLADDING

General
Type: Provide a proprietary system of preformed sheet and purpose-made accessories.
Pre-painted and organic film/metal laminate products: To AS/NZS 2728.

2.2 HARDBOARD PLANKS

Wet-processed fibreboard (including hardboard)
Standard: To AS/NZS 1859.4.

2.3 FIBRE CEMENT PLANKS

Fibre cement
Standard: To AS/NZS 2908.2.

2.4 TIMBER WEATHERBOARDS

Timber
Hardwood: To AS 2796.1.
Seasoned cypress pine: To AS 1810.
Softwood: To AS 4785.1.

2.5 FIBRE CEMENT CLADDING

Fibre cement
Standard: To AS/NZS 2908.2.

2.6 AAC CLADDING

Panel cladding
Type: A proprietary system of aerated autoclaved cement (AAC) panels.

~~2.7 PLASTIC CLADDING~~

~~Materials~~
~~Unplasticised polyvinyl chloride (uPVC) sheet: To AS 4256.4.~~
~~Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.~~
~~Polycarbonate: To AS 4256.5.~~

~~2.8 COMPONENTS~~

~~Flashings~~
~~Standard: To AS/NZS 2904.~~

~~**2.9 PLASTIC CLADDING**~~

~~**Installation**~~
~~Standard: To AS 1562.3.~~

~~**2.10 AAC CLADDING**~~

~~**Panel cladding**~~
~~General: Provide a proprietary system of AAC panels.~~
~~Joints: Thin bed adhesive, to the recommendations of the AAC manufacturer.~~
~~Control joints: At all external corners, adjacent to all openings and at maximum 6 m centres.~~

0451 AWS ALUMINIUM WINDOWS AND DOORS

1 GENERAL

1.1 STANDARDS

General
Selection and installation: To AS 2047.

Glazing
Glass type and thickness: To AS 1288, where no glass type or thickness is nominated.
Materials and installation: To AS 1288.
Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.
Terminology for work on glass: To AS/NZS 4668.

2 PRODUCTS

2.1 GENERAL

Standards
Flashings: To AS/NZS 2904.
Extrusions: To AS/NZS 1866.

2.2 GLASS

Glass types and quality
Standard: To AS/NZS 4667.

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Safety glazing materials
Standard: To AS/NZS 2208.

Safety glasses
Standard: To AS/NZS 2208.

Opacified glass
Glass with an opacifier permanently bonded to the inner face.

2.3 INSECT SCREENS

Aluminium framed screens

Provide proprietary aluminium screen sections with mesh fixing channel, mitred, staked and screwed at corners. Provide an extended frame section where necessary to adapt to window opening gear.

- Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

2.4 BUSHFIRE SCREENS AND SEALS

Requirement

Protection: Protect glazed windows and doors from the ingress of embers.

Standard: To AS 3959.

3 EXECUTION

3.1 INSTALLATION

Standard: To AS 4145.2.

0467 GLASS COMPONENTS

1 GENERAL

1.1 STANDARDS

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Terminology for work on glass: To AS/NZS 4668.

0471 INSULATION AND SARKING MEMBRANES

1 GENERAL

1.1 STANDARDS

Installation of mineral wool insulation

Comply with the ICANZ Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

Marking: Deliver mineral wool products to site in packaging labelled FBS-1 BIO-SOLUBLE INSULATION.

1.2 SUBMISSIONS

Fire hazard properties

General: Submit evidence of conformance with the following:

- Fire hazard indices for all materials when tested in conformance with AS/NZS 1530.3, including, if the material has a reflective facing, scoring and blackening to AS/NZS 1530.3 clause A6:
  - Spread of flame index: 0.
  - Smoke developed index: ≤ 3.
- Facing materials: Flammability index < 5 when tested in conformance with AS 1530.2.
- Combustibility of insulation materials and facing: Not deemed combustible as determined by AS 1530.1.

Thermal properties

General: Submit evidence of conformance with AS/NZS 4859.1.

2 PRODUCTS

2.1 INSULATION MATERIALS

Fire hazard properties

General: Fire hazard indices for all materials when tested in conformance with AS/NZS 1530.3:

- Spread of flame index: 0.
- Smoke developed index: ≤ 3.

Bulk and reflective insulation

Cellulosic fibre (loose fill): To AS/NZS 4859.1 Section 5.

Mineral wool blankets and cut pieces: To AS/NZS 4859.1 Section 8.

Polyester: To AS/NZS 4859.1 Section 7.

Polystyrene (extruded rigid cellular sheets): To AS 1366.4.

Polystyrene (moulded rigid cellular sheets): To AS 1366.3.

Polyurethane (rigid cellular sheets): To AS 1366.1.

Polyurethane (sprayed): To ASTM D6694.

Reflective insulation: To AS/NZS 4859.1 Section 9.

Wet processed fibreboard (including softboard): To AS/NZS 1859.4.

Wool: To AS/NZS 4859.1 Section 6.

Standards Mark: Required.

Sarking membranes

Standard: To AS/NZS 4200.1.

Thermal performance: To AS/NZS 4859.1 Section 9.

Fasteners and supports

General: Metallic-coated steel.

Mesh support to roof insulation

Metallic-coated steel wire netting: To AS 2423 Section 4.

Welded safety mesh: To AS/NZS 4389.

3 EXECUTION

3.1 GENERAL

Bulk insulation
Installation: To AS 3999 and BCA clause J1.2.

Sarking membrane
Standard: To AS/NZS 4200.2.

3.2 FLOOR INSULATION

Bulk installation
Batts: Fit tightly between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

Reflective sarking membrane
Fixing: Install as follows:

To timber: Proprietary fixings or metallic-coated clouts or staples at 300 mm maximum centres.

3.3 WALL INSULATION

Bulk installation
Batts: Friction fit between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

Wall sarking membrane
- Behind external cladding in bushfire prone areas to AS 3959.
- Masonry veneer.

3.4 ROOF INSULATION

Roof sarking locations
Location: Provide sarking under tile and shingle roofs.

Sarking membrane
Roof sarking:
- Installation to AS 2050.

Bulk insulation – metal roofs
Batts: Fit tightly between framing members.

Blanket for sound insulation: Install over the roof support frame, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.

0511b LINING

4 GENERAL

4.1 INSPECTION

Notice
Inspection: Give sufficient notice so that inspection may be made of substrate or framing before installation of linings.

4.2 TOLERANCES

Surface
Flatness, twist, winding and bow: ≤ 1.5 mm deviation from a 1.5 m straightedge placed in any position.

5 PRODUCTS

5.1 MATERIALS AND COMPONENTS

Plasterboard
Standard: To AS/NZS 2588.

Fibre cement
Standard: To AS/NZS 2908.2.

Minimum thickness: 4.5 mm.

6 EXECUTION

6.1 SHEET LINING

Supports
General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceeds the recommended spacing.
- Where direct fixing of the plasterboard is not possible due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.

Transverse walls: Locate noggings as follows:

- At least 150 mm from the horizontal joint.
- Ensure that noggings do not protrude beyond the face of studs.

Conditions
Do not commence lining work until such time as the building or zone in question is enclosed and weathertight and all wet trades have been completed.

Ceiling linings
General: Do not install until at least 14 days after the timber roof structure is fully loaded.

Control joints: Install purpose-made metallic-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural movement joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

6.2 CEILING ACCESS

General

Location: Provide personnel access ways to each separate ceiling space.

Opening size: Maximise the space available within a 600 x 600 mm ceiling grid.

0551 JOINERY

1 PRODUCTS

2 PRODUCTS

2.1 JOINERY MATERIALS AND COMPONENTS

Visible work

Clear finished timber and veneer: Ensure all visible surfaces are free of branding, crayon or chalk marks and of blemishes caused by handling.

Joinery timber

Hardwood: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood: To AS 4785.3.

Finished sizes: For milled timbers actual dimensions which are at least the required dimensions, except for dimensions qualified by a term such as ‘nominal’ or ‘out of’ to which industry standards for finished sizes apply.

Plywood

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality C or D.

Non-structural glued laminated timber

Standard: AS 5067.

Wet processed fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

Particleboard

Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

Dry-processed fibreboard (including medium density fibreboard)
Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

Decorative overlaid wood panels
Standard: To AS/NZS 1859.3.

Certification
General: Brand panels under the authority of a recognised certification program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Certification programs:

- Plywood and blockboard: Engineered Wood Products Association of Australia (EWPAA) Quality Control and Product Certification Scheme.
- Wet processed fibreboard, dry processed fibreboard, particleboard and decorative overlay wood panels: Australian Wood Panels Association AWPA JAS-ANZ Scheme.

Plywood certified formaldehyde emission level to AS/NZS 2098.11:

Wood panel certified formaldehyde emission level to AS/NZS 4266.16:

High-pressure decorative laminate sheets
Standard: To AS/NZS 2924.1.

2.2 VENEERS

Timber veneer
Veneer quality: To AS/NZS 2270.

2.3 DOMESTIC KITCHEN ASSEMBLIES

Standard
General: To AS/NZS 4386.1.

2.4 WORKING SURFACES

Stone facings
General: Provide stone slabs within the visual range of the approved samples. Repair mud veins or lines of separation that are integral to the selected pattern with resin fillers and back lining.

Splashbacks
Glass: 6 mm toughened colourback glass with a factory applied opaque coating to the back.

- Standard: To AS/NZS 2208.

3 EXECUTION

3.1 JOINERY

General
Joints: Provide materials in single lengths whenever possible. If joints are necessary make them over supports.

Framing: Frame and trim where necessary for openings, including those required by other trades.

Finishing
Junctions with structure: Scribe, plinths, benchtops, splashbacks, ends of cupboards, kickboards and

returns to follow the line of structure.

Joints: Scribe internal and mitre external joints.

Matching: For surfaces which are to have clear or tinted finish, arrange adjacent pieces to match the grain and colour.

Hygiene requirements: To all food handling areas and voids at the backs of units to all areas, seal all carcass junctions with walls and floors, and to cable entries, with silicone beads for vermin proofing. Apply water resistant sealants around all plumbing fixtures and ensure the sealants are fit for purpose.

Acclimatisation

General: Acclimatise the joinery items by stacking it in the in-service conditions with air circulation to all surfaces after the following construction operations are complete:

- Airconditioning operational.
- Lighting operational.
- Site drainage and stormwater works are complete.
- Space fully enclosed and secure.
- Wet work complete and dry.

3.2 COMPLETION

Maintenance manual

General: Submit manufacturer's published recommendations for service use.

0554 STAIRS, LADDERS AND WALKWAYS

1 EXECUTION

1.1 GENERAL

Notice

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

- Shop fabricated or assembled items ready for delivery to the site.

General

Materials, design and construction: To AS 1657.

Set out

- General: Set out stair rod to give uniform risers and uniform treads respectively in each flight.
- Commencement of shop or site welding.
- Site erected assemblies on completion of erection, before applying finishes.
- Steel surfaces prepared for, and immediately before, site applied finishes.

Access for maintenance: To AS 1657.

Design for access and mobility:

- General requirements – new building work: To AS 1428.1.
- Tactile indicators: To AS 1428.4.

Balustrades for Class 1 and Class 10 buildings: To BCA clause 3.9.2.

Joinery timber

Hardwood: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood: To AS 4785.3.

Plywood

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality C or D.

Non-structural glued laminated timber

Standard: AS 5067.

Carpet finish

Fixing: Adhesive method.

Laying method: Apply the floor covering continuously to the treads and risers.

Rubber finish

Smallest tiles: Half tile.

Nosing tiles: Purpose-made matching tread, nosing and riser tile. Accurately scribe, cut and fit to perimeters. Close butt seams.

Vinyl finish

Preformed: Provide purpose-made vinyl stair finish combining riser, nosing and tread in the one element. Lay each step consecutively with the joint at the bottom of each riser.

Formed in situ: Fit the sheet vinyl to each tread, and to the riser above, in one piece, coved in the angle. Accurately scribe, cut and fit to stair nosings and perimeters.

0611 PLASTERING

2 GENERAL

2.1 MATERIALS AND COMPONENTS

Accessories

Beads: To be metal proprietary sections manufactured to be fixed to substrates and/or embedded in the plaster to form and protect plaster edges and junctions.

Lath: To be a proprietary product manufactured from raised expanded metal for use with plaster.

- Mass/unit area: ≥ 1.84 kg/m^2.
- Material thickness: ≥ 0.70 mm.
- Mesh size: 9.5 x 28.6 mm.

Plaster for autoclaved aerated concrete

General: To be a proprietary product manufactured for use with the wall system.

Bonding products

General: To be proprietary products manufactured for bonding cement-based plaster to solid substrates.

Cement

Standard: To AS 3972.

- Type: GP.

Lime

Limes for building: To AS 1672.1.

Metal lath: Expanded metal to AS 1397.

Water

General: To be clean and free from any deleterious matter.

2.2 COMPLETION

Cornices

General: Accurately cut and mitre corners. Match and align ornament. Unless required, or full lengths are not available, do not make butt joints in the length of a cornice.

Installation: Butter edges, mitres and joins for the full length of the cornice with adhesive:

Mechanical fixing: If projection across ceiling ≥ 400 mm, provide additional mechanical fixing:

- Fixing centres: ≤ 600 mm.

Curing

General: Prevent premature or uneven drying out and protect from the sun and wind.

Keeping moist: If a proprietary curing agent is not used, keep the plaster moist as follows:

- Base coats and single coat systems: Keep continuously moist for 2 days and allow to dry for 5 days before applying further plaster coats.
- Finish coats: Keep continuously moist for 2 days.

0612b CEMENTITIOUS TOPPINGS

1 GENERAL

2 PRODUCTS

2.1 PRODUCTS

Admixtures
Standard: To AS 1478.1.

Reinforcement
Standard: To AS/NZS 4671.

Cement
Standard: To AS 3972.

Concrete
Standard: To AS 1379.

Topping not reinforced:

- Class: Normal.

0621 WATERPROOFING – WET AREAS

1 GENERAL

1.1 STANDARDS

Wet areas
Standard: To AS 3740.

2 PRODUCTS

2.1 PRODUCTS

Membranes
Standard: To AS/NZS 4858.

Membrane systems
General: To be a proprietary membrane systems having one of the following stating that the system is suitable for the intended wet area waterproofing, as follows:

- A current appraisal report issued by either CSIRO Building Products and Systems Appraisals.
- A current BRANZ report.

Shower tray
General: Purpose-made jointless shower tray, with wall upstands at least 50 mm higher than the hob upstands. Set hob masonry on the inside of the tray hob upstands.

3 EXECUTION

3.1 APPLICATION

Protection
General: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Drains
Floor wastes: Turn membrane down onto the floor waste puddle flanges, and adhere.

Hobs
General: Extend membrane over the hob and into the room at least 50 mm. For hobless showers extend 1800 mm into the room.

Curing of liquid applied systems
General: To the manufacturers instructions.

Curing: Allow membrane to fully cure before tiling.

Membrane terminations
Edge protection: Provide > 150 mm upturns.

Anchoring: Secure sheet membranes along the top edge.

Edge protection: Protect edges of the membrane.

Waterproofing above terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using tiler's angle and finish overlaps.

Membrane vertical penetrations
Pipes, ducts, and vents: Provide separate sleeves for all pipes, ducts, and vents and have fixed to the substrate.

Membrane horizontal penetrations
Sleeves: Provide a flexible flange for all penetrations, bonded to the penetration and to the membrane.

Overlaying finishes on membranes
Compatibility: If a membrane is to be overlayed with another system such as tiles, pavers or acoustic insulation, provide an overlaying system that is compatible with and not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar requires to be bonded to the membrane, provide sufficient movement joints in the topping or bedding mortar to reduce the movement over the membrane.

3.2 COMPLETION

Protection
General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranty
Waterproofing: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

0631b CERAMIC TILING

1 GENERAL

1.1 STANDARDS

Tiling

General: Comply with the recommendations of those parts of AS 3958.1 and AS 3958.2.

- Type test slip resistance of tiles to AS/NZS 4586.
- Site test completed surfaces to AS/NZS 4663.

1.2 TOLERANCES

Completed tiling

Standard: To AS 3958.1 clause 5.4.6 Tile finish and joints.

2 EXECUTION

2.1 APPLICATION

Preparation of Substrates

Preparation: To AS 3958.1 section 4.

2.2 TILING GENERALLY

Sequence

General: Fix wall tiles before floor tiles.

Falls and levels

General: Grade floor tiling to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls. Where falls are not required lay level.

Fall, general: 1:100 minimum.

Fall, in shower areas: 1:60 minimum.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

0651b RESILIENT FINISHES

PRODUCTS

2.3 MATERIALS

Wet processed fibreboard (hardboard) underlay

Standard: To AS/NZS 1859.4.

Classification: General purpose medium board, manufactured specifically as flooring underlay.

Thickness: 5.5 mm.

0652b CARPETS

1 PRODUCTS

1.1 MATERIALS

1.2 CARPET

Tolerances
Standard: To AS 1385.

1.3 CARPET TILES

Carpet tiles
Type: 'Non-stick', non-curling tiles capable of being taken up without damage and then relaid in different positions.

Marking: On the back, showing recommended direction of laying.

Carpet tile tolerances:

- Edge dimensions: ± 2 mm.
- Squareness: Maximum difference of 2 mm between lengths of diagonals.

1.4 UNDERLAYS

Standard
General: To AS/NZS 2455.1.

Fibre cement underlay
Thickness: 5 mm minimum.

1.5 LAYING CARPET

Standard
General: To AS/NZS 2455.1.

0655 TIMBER FLOORING

1 GENERAL

1.1 TOLERANCES

Tolerances
Maximum deviation of the finished floor surface: 3 mm under a 3 m straight edge laid in any direction.

2 PRODUCTS

2.1 GENERAL

Adhesive

General: Provide adhesives to the as follows:

Ventilation: Provide adequate ventilation appropriate for moisture curing.

3 EXECUTION

3.1 PREPARATION

Storage

General: Deliver timber flooring to site in unbroken wrapping or containers and store so that its moisture content is not adversely affected. Do not store on the background until the moisture content of the background is suitable for the installation of the floor. Do not store in areas of wet plaster.

Acclimatisation

- General: After the following construction operations are complete, acclimatise the flooring by stacking it in the in-service conditions for a minimum period of two weeks with air circulation

3.2 FLOOR FIXING

Adhesive

General: Use a urethane elastomer adhesive in addition to nails as follows:

- Continuously supported flooring: 4 mm beads at 300 mm spacing at right angles to run of flooring.
- Intermittently supported flooring: 6 mm bead along each joist or batten.

Strip flooring

Installation: Lay in straight and parallel lines with each board firmly butted to the next and firmly bedded on the subfloor. Cramp sufficient only to bring the boards together and no more than 800 mm of flooring at any one time.

Adhesive: Apply adhesive in addition to nailing over softwood joists or underlay.

Set-out: Locate joints in boards so that they are evenly and symmetrically distributed and as follows:

- Butt joints: Centrally on supports.
- End-matched joints: Not in adjacent boards.
- Minimum number of spans across supports: 2.

Movement control joints

Perimeters: Provide 12 mm wide joints against vertical building elements.

Between underlay sheets: 6 mm.

0656 FLOOR SANDING AND FINISHING

1.1 STANDARD

Floor sanding and finishing

General: To AS 4786.2.

0671b PAINTING

1 GENERAL

1.1 STANDARDS

Painting
General: Comply with the recommendations of those parts of AS/NZS 2311

2 PRODUCTS

2.1 PAINTING MATERIALS

Quality: If the product is offered in a number of levels of quality, provide premium quality lines.

Combinations
General: Do not combine paints and stopping/filling compounds from different manufacturers in a paint system.

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Putty and fillers
Material: To the recommendation of the paint system manufacturer, as suitable for the substrate and compatible with the primer.

3 EXECUTION

3.1 PREPARATION

Standard
General: To AS/NZS 2311 Section 6.

Paint application
General: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's recommended drying period has elapsed.

Priming before fixing
General: Apply one coat of wood primer (2 coats to end grain) to the back of the following before fixing in position:

- External fascia boards.
- Timber door and window frames.
- Bottoms of external doors.
- Timber board cladding.
- Associated trims and glazing beads.

Sanding
Clear finishes: Sand the sealer using the finest possible abrasive (no coarser than 320 grit) and avoid cutting through the colour. Take special care with round surfaces and edges.

0702 MECHANICAL DESIGN AND INSTALL

1 GENERAL

1.1 STANDARDS

General

Mechanical ventilation: To AS/NZS 1668.1 and AS 1668.2, as required by the Building Code of Australia.

Refrigeration systems: To AS/NZS 1677.2 and the recommendations of SAA HB 40.1 and SAA HB 40.2.

Microbial control: To AS/NZS 3666.1, AS/NZS 3666.2 and the recommendations of SAA HB 32.

Energy efficiency: Conform to the BCA.

2 PRODUCTS

2.1 AIRCONDITIONING EQUIPMENT

Standards

Ducted airconditioners: To AS/NZS 3823.1.2.

Non-ducted airconditioners: To AS/NZS 3823.1.1.

2.2 ELECTRIC DUCT HEATERS

General

Standard: To AS/NZS 3102.

3 EXECUTION

3.1 DUCTWORK

Standard

Ductwork: To AS 4254.

Rigid duct

Material: Metallic-coated sheet steel to AS 1397, coating class G2/Z275.

Flexible duct

Material: Alumidised fabric clamped on formed metal helix with insulation blanket wrapped around duct and covered with an outer vapour barrier.

Installation: Install flexible duct as straight as possible with minimum number of bends. Maximise bend radius. Check for and rectify any crushed flexible duct.

Support: To AS 4254. Limit sag to < 40 mm/m.

Duct insulation

General: Insulate ducts to reduce heat gain and prevent condensation. Provide continuous vapour barrier around ducts carrying conditioned air. Insulate flexible connections on ducts carrying air below ambient temperature.

Cleaning

Clean interior of ductwork progressively during installation.

Insulation and sealing: Notwithstanding the class of building, conform to BCA Specification J5.2.

3.2 MAINTENANCE

General

Provide corrective and preventative maintenance on the installation.

0802 HYDRAULIC DESIGN AND INSTALL

1 GENERAL

1.1 STANDARDS

General

Plumbing and drainage: To AS/NZS 3500.0, AS/NZS 3500.1, AS/NZS 3500.2, AS/NZS 3500.3 and AS/NZS 3500.4 and the Plumbing Code of Australia.

Authorised products: Listed in the WaterMark Product Database, unless otherwise required by the Network Utility Operator.

http://www.watermark.standards.org.au/.Copper pipe and fittings-installation and commissioning: To AS 4809.

Gas: To AS 5601.

Microbial control: To AS/NZS 3666.1 and AS/NZS 3666.2.

Labelling

Water efficiency labelling: Provide only products conforming to and labelled to the Water Efficiency Labelling Scheme (WELS).

2 EXECUTION

2.1 INSTALLATION

Piping

General: Install piping in straight lines, plumb and to uniform grades. Arrange and support the piping so that it remains free from vibration and water hammer, while permitting movement in both structure and services. Keep the number of joints to a minimum. Prevent direct contact between incompatible metals.

Concealment: If practicable, conceal piping and fittings requiring maintenance or servicing so that they are accessible within non-habitable enclosed spaces such as roof spaces, subfloor spaces and ducts. Keep pipelines in subfloor spaces at least 150 mm above ground and ensure access can be provided throughout for inspection. Provide at least 25 mm clearance between adjacent pipelines (measured from the piping insulation where applicable).

Cover plates: Where exposed piping emerges from wall, floor or ceiling finishes, provide cover plates of stainless steel or non-ferrous metal finished to match the piping.

Differential movement: If the geotechnical site investigation report predicts differential movements between buildings and the ground in which pipes are buried, provide movement control joints in the pipes.

Pipe support materials: To be the same as the piping or galvanized or non-ferrous metals, with bonded PVC or glass fibre woven tape sleeves where needed to separate dissimilar metals.

Finishes

General: Finish exposed piping, including fittings and supports, as follows:

- In internal locations such as toilet and kitchen areas: Chrome plate copper piping to AS 1192 service condition 2, bright.
- Externally and steel piping and iron fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking.

Prime steel piping and iron fittings.

Valves: Finish valves to match connected piping.

2.2 COLD AND HEATED WATER

Heated water temperature

Standard: To AS/NZS 3500.4.

2.3 WATER HEATERS

General: Provide water heaters as documented.

Standard

Electric water heaters: To AS/NZS 4692.1.

Minimum energy performance: To AS/NZS 4692.2.

Gas hot water heaters: To AS 4552. If a flue damper is available for the water heater supplied, provide one.

Solar water and heat pump systems

General: Provide a proprietary automatic water heater comprising solar collector and storage container, with or without supplementary heating unit and including connections, controls and necessary fittings.

Standard: To AS/NZS 2712.

2.4 RAINWATER STORAGE SYSTEMS

Standards

Metal tanks and rainwater goods: To AS/NZS 2179.1.

Design and installation: To the recommendations of SAA HB 230.

Polyethylene tanks

Standard: To AS/NZS 4766.

Support: Trim and compact the ground and place a level bed of sand at least 50 mm thick.

Coated steel tanks

Material:

- Top and sides: Metallic-coated steel with polymer film to AS 2070 on the inside and prepainted on the outside.
- Base: Metallic-coated steel with polymer film to AS 2070 on inside and outside.

Support: Fully support the tank on a self draining timber or concrete base.

Corrosion protection:

- Prevent contact with dissimilar metals.
- Arrange so that no part of the tank is below ground level and so that adjacent ground surfaces fall away from the tank.
- Do not use sharp objects inside the tank. Remove swarf with a magnet if drilling or cutting.

Bladder tanks

Type: Proprietary plastic bladder type.

Material: Polymer conforming to AS 2070, resistant to puncture and microbial attack.

Support: Locate on level base free from sharp objects. Install with manufacturer's supporting frame.

Relief: Provide over-pressurising relief and air vent.

First flush diverter

General: Provide a first flush diverter. Arrange to drain completely.

Sizing: Select for ≥ 20L/100 m^2 rainwater catchment area.

Construction: Corrosion resistant and compatible with the rainwater plumbing and tank.

Discharge: Discharge waste water from the first flush diverter either:

- If permitted by the local authority, onto grassed areas away from tank and building footings.
- To the stormwater installation.

Rainwater filtration

Tank inlet: Provide an easily cleanable filter to treat rainwater prior to the entry to the tank.

Mesh size: ≤ 1 mm.

2.5 STORMWATER

Cleaning

General: During construction, use temporary covers to openings and keep the system free of debris.

Pipe laying

General: Lay pipelines with the spigot ends in the direction of flow.

Downpipe connections

General: Turn up drain branch pipelines to finish 50 mm above finished ground or pavement level.

Pits

Cover levels: Locate the top of covers or gratings, including frames as follows:

- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Set to receive the runoff without ponding.

Stormwater drains

General: Provide stormwater drains to connect downpipes, surface drains, subsoil drains and drainage pits to the outlet point or point of connection.

Downpipe connections: Turn up branch pipelines with bends to meet the downpipe, finishing 50 mm (nominal) above finished ground or pavement level. Seal joints between downpipes and drains.

Encasement

General: If necessary, encase the pipeline in concrete at least 150 mm above and below the pipe and 150 mm each side or the width of the trench, whichever is the greater.

Concrete: Grade N20 to AS 1379.

Lined surface drains-half round pipe

General: Provide surface drains lined with half round pipe, including bedding and jointing.

Lined surface drains-grated trenches

General: Provide precast or cast in situ concrete lined trenches with bitumen coated cast-iron or galvanized steel gratings.

Subsoil drains

General

General: Provide subsoil drains to intercept groundwater seepage and prevent water build-up behind walls and under floors and pavements. Connect subsoil drains to surface drains or to the stormwater drainage system as applicable.

Connection: Connect subsoil drains to the stormwater drainage system.

Jointing: Provide tees, couplings or adaptors at junctions of subsoil pipes to AS 2439.1.

Filters: UV resistant geotextile material with a permeability ≥ 10 times that of the native soil and capable of retaining particles of 0.25 mm size. Securely fit or join the sock at each joint.

2.6 SANITARY PLUMBING AND DRAINAGE

Wet area floors

General: Where drainage connections pass through wet area floors, terminate 4 mm below the substrate surface.

2.7 GAS

Standards

Reticulated gas systems: To AS 5601.

Industrial and commercial gas-fired appliances: To AS 3814.

LPG storage

Location and installation of LPG cylinders and tanks: To AS/NZS 1596.

Hoods: Provide a weatherproof protective steel cover to the valve and regulators of 450 L capacity tanks, together with hinge pins, padlock and key.

Certificate holders: On LPG tanks provide a galvanized steel pipe for storage of current storage system approval and test certificates. Fit one end with a brass plug and the other with a threaded brass cap. Weld to the support member of the tank or cylinder. Mark the threaded cap with the phrase 'LPG CERTIFICATES'.

Portable appliance connections

Type: Self-sealing, chrome plated.

0902 ELECTRICAL DESIGN AND INSTALL

1 GENERAL

1.1 STANDARDS

General

General: To AS/NZS 3000 Part 2 unless otherwise documented.

Electrical systems: To AS/NZS 3008.1.1 and SAA HB 301.

Degrees of protection (IP code): To AS/NZS 60529.

EMC: To AS/NZS 61000.

Telecommunications systems: To AS/ACIF S008, AS/ACIF S009, AS/NZS 3080, SAA HB 243 and SAA HB 29.

2 EXECUTION

2.1 GENERAL

General

Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements.

Fixing: If non-structural building elements are not suitable for fixing equipment and services to, fix directly to structure and trim around holes or penetrations in non-structural elements.

Installation: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Suspended ground floors: Keep all parts of services under suspended ground floors > 150 mm clear of the ground surface. Make sure services do not impede access.

Installation of ceiling mounted appliances

Connections: Appliances: Provide flush mounted outlets on the ceiling next to support brackets.

Mounting: Mount appliances independent of ceiling tiles and suspended ceiling material.

2.2 LOW VOLTAGE POWER SYSTEMS

General

General: Provide a complete operational low voltage power system, comprising the following and as documented:

- Supply from network distributor.
- Metering.
- Consumers mains.
- Submains.
- Final subcircuits.

Accessories

General: Provide the following and as documented:

- General power outlets.

- Isolating switches.
- Three phase outlets.

Wiring systems
Standard: To AS/NZS 3013.

2.3 SWITCHBOARDS

General
General: Provide proprietary switchboards to the following and as documented:

- Main switchboard.
- Distribution boards.

Rated short-circuit currents: Design for the maximum prospective symmetrical r.m.s. current values at rated operational voltage, at each assembly incoming supply terminal, excluding effects of current limiting devices.

Standards
Standard: To AS/NZS 3439.1 and AS/NZS 3439.3.

Statutory authority's equipment
General: Refer to network distributor service rules to determine their requirements. Install equipment supplied by the network distributor, and provide wiring to complete the installation.

2.4 SWITCHBOARD COMPONENTS

Protective devices
General: Select and adjust protective devices to grade and coordinate for overcurrent, and earth faults.

Switch-isolator and combination fuse-switch units
Standard: To AS/NZS 60947.1 and AS/NZS 3947.3.

Moulded case and miniature circuit breakers
Moulded case breakers: To AS/NZS 60947.1, AS 2184 and AS 60947.2.

Miniature circuit breakers: To AS/NZS 60898.1 or AS 3111.

Residual current devices
Integral type: Incorporate earth leakage in circuit breaker protection operation. To AS/NZS 61009.1.

Maximum tripping current: 30 mA.

Fuses with enclosed fuse links
Standards: To AS/NZS 60269.1, AS/NZS 60269.2.0 and AS/NZS 60269.2.1.

Contactors
Standard: To AS/NZS 60947.4.1.

2.5 LIGHTING

Minimum energy performance standards
General: To AS/NZS 4783.2 and AS/NZS 4782.2.

Lamps
Lamps: Provide all luminaires complete with lamps and accessories.

Verify operation: Install lamps in all luminaries and verify correct operation before completion

Standards:

- Fluorescent: To AS 4782.1.
- Incandescent: To AS 2325.
- Tungsten halogen: To IEC 60357.
- Dimmers.
- Automatic control systems.

2.6 AUTOMATIC FIRE DETECTION

General

General: Provide a fully operational, system, tested and commissioned in accordance with the AS 1670 series and AS 7240.

Installation

General: Install detectors so they can be easily inspected and tested in situ, and readily withdrawn for service.

Integral smoke detector/alarm units: To AS 1670.6.

3 ADDITIONAL NOTES