

CONSTRUCTION SPECIFICATIONS



THIS SPECIFICATION IS PUBLISHED ANNUALLY AND IS ALIGNED WITH BCA VOLUME 2 OF THE NCC FOR CLASS 1 AND CLASS 10 BUILDINGS.

DEFINITIONS

Specifications are written descriptions of the required quality of the built product and its component products. Drawings are graphic descriptions which define quantity, position and sometimes quality. Schedules are written selections, often presented as tables, which form an appendix or addition to another document such as the specification or a drawing.

PURPOSE

The quality of a building project is dependent on the documentation included as part of the contract. The adoption of the National Construction Code (NCC) under State and Territory building regulation establishes a minimum level of quality of construction. Higher standards of construction and quality of workmanship are achieved through the contractual agreement between the owner and the builder and are not defined by the NCC or administered by the certifying or approval authority. The contract documents include the general conditions of contract, the schedules, the drawings and the specification which complement each other to express the owner's intentions to the builder.

The specification has many roles. It may be:

- A written record of design decisions taken.
- A document demonstrating compliance with statutory requirements.
- An estimating document.
- A tendering document.
- A legal (contractual) document.
- An on-site working document.
- A dispute settlement document.
- A project management tool.

THE FORM OF A SPECIFICATION

FRD SPECIFICATION is divided into work sections classified, numbered and sequenced according to the National Classification System which corresponds to Australian construction industry practice.

Where appropriate, each work section is divided into three parts:

- General including standards, definitions and submission requirements.
- Products including details of materials and components.
- Execution dealing with the fabrication, installation, erection and completion as part of a project.

METHODS OF SPECIFICATION

FRD SPECIFICATION uses the well-recognised methods of specifying by:

- Reference: Where an identifiable printed and published document is incorporated by reference. Such documents may be Australian Standards or manufacturer's technical manuals. The Australian standards referenced in FRD SPECIFICATION include those which are referenced in the NCC and are relevant to domestic work, have other statutory application, are important to the quality of materials and work in terms of public safety and long-term performance of the building and/or are widely accepted in the building industry.
- Performance: That is, by stating a desired end result and the criteria by which the result will be judged for its acceptability.

- Description: Detailing the materials, workmanship and installation procedures to be used.
- Direct: Specification stating a proprietary trade name product. The owner may specify particular brands or products on the drawings or in the schedules.

FRD SPECIFICATION is a reference specification and does not require editing or amendment. It is intended for inclusion, along with other documents such as drawings and schedules, as a condition of contract for the building works. It assumes all project specific design information is shown on the drawings or in schedules, including the requirements of the consent authority. The Preliminaries work section provides for the requirements of the drawings and schedules to override conflicting requirements of this reference specification.

National Construction Code

The National Construction Code (NCC), including State and Territory variations, is enforced by local authorities and controls domestic construction in Australia, along with the requirements of statutory authorities (e.g. electricity and water supply). This specification has been aligned with BCA Volume 2 of the NCC, but any local requirements must take precedence. FRD recommends that the users of this document have ready access to BCA Volume 2 for Class 1 and Class 10 Buildings. It is available online. Go to <https://ncc.abcb.gov.au/> to register.

Work Health and Safety (WHS)

Everyone at a workplace is responsible for complying with stringent Occupational Health and Safety legislation. However, the accountable person has primary control over the workplace and therefore the greatest WHS responsibility. A builder engaged to manage a project and organise the relevant sub-contractors is the accountable person and must make sure that they, their employees and sub-contractors work in a safe manner. An owner builder, engaging independent tradespeople as required, is the accountable person responsible for ensuring the tradespeople comply with safety standards. WHS legislation in some States and Territories also includes statutory obligations on designers in relation to WHS issues arising out of their designs during and after construction. It is important to note that WHS obligations differ in each State and Territory. Go to www.safeworkaustralia.gov.au to see WHS legislation for each.

Standards and tolerances

Check that the building work conforms to requirements of the drawings, schedules and this specification. Guide to Standards and Tolerances is a reference document of best construction practice available on the web, describing acceptable standards of workmanship for domestic building work.

Dispute resolution

Many building contracts include dispute resolution provisions and in most states, there are dispute resolution services provided and/or mandated under State legislation.

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PRELIMINARIES

GENERAL

1.1 THE SITE

Occupied premises

General: For the parts of the site designated as occupied premises:

- Allow occupants to continue in secure possession and occupancy of the premises for the required period.
- Maintain safe access for occupants.
- Arrange work to minimise nuisance to occupants and for their safety.
- Protect occupants against weather, dust, dirt, water or other nuisance, by such means as temporary screens.

Proposals: Submit details of proposed methods.

- Purpose of submission: For information.
- Timing of submission: Before commencement of work.

Reinstatement

Accessways and services: Do not obstruct or damage roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Determine the location of such services. Rectify immediately any obstruction or damage to such services and provide temporary services whilst repairs are carried out.

Trees and properties: Do not interfere with or damage trees and properties that are to remain on or adjacent to the site, including adjoining property encroaching onto the site. Rectify immediately any interference or damage to such trees and properties.

Existing services

Service to be continued: Repair, divert or relocate, as documented.

Trenches: If the existing service crosses the line of a required trench, or will lose support when the trench is excavated, provide permanent support for the existing service.

Redundant services: Remove redundant parts and make safe.

Interruptions to services: Minimise the number and duration of interruptions.

1.2 BUILDING THE WORKS

Order of precedence of documents

Precedence: Requirements of the schedules and drawings override conflicting requirements in this reference specification.

Survey marks

Definition: A survey peg, benchmark, 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 survey marks are disturbed or obliterated, immediately rectify.
Items supplied by owner

General: Materials and other items supplied free of charge to the contractor for installation in the execution of the works, as documented. Unload and take delivery, inspect for defects and take care of the items. If defects are found, advise. Return unused items to the owner.

1.3 MISCELLANEOUS

Contractor and owner to observe confidentiality **Publicity:** Do not issue information concerning the project for publication in the media without prior written approval of the owner.

COMMON REQUIREMENTS (0180)

GENERAL

1.1 PRECEDENCE

Requirement: Conform to 0180 Common requirements, as appropriate, in all worksections. **Schedules and drawings:** Requirements of the schedules and drawings override conflicting requirements in this reference specification.

Order of precedence: If there is conflict or inconsistency between the worksections of this specification, the requirements of worksections take precedence over 0180 Common requirements.

1.2 STANDARDS

General: Use referenced Australian or other standards (including amendments), and the NCC including state and territory variations which are current three months before the date of the contract.

Exception to current editions: If statutory requirements reference other editions or standards, conform to those other editions or standards.

1.3 INTERPRETATION

Abbreviations

General: For the purpose of this document the following abbreviations apply:

- BCA: National Construction Code Series Volume 2: Building Code of Australia Class 1 and Class 10 Buildings.
- NCC: National Construction Code.

Definitions

General: For the purposes of this specification, the following definitions apply:

- Contractor: Has the same meaning as builder and is the person or organisation bound to carry out and complete the work under the contract.
- Documented: Documented, as documented and similar terms mean contained in the contract documents.
- Hot dip galvanized: Zinc coated to AS/NZS 4680 after fabrication with coating thickness and mass to AS/NZS 4680 Table 1.
- Metallic-coated: Steel coated with zinc or aluminium-zinc alloy by a continuous or specialised process.
- Owner: Owner has the same meaning as client, principal or proprietor and is the party to whom the contractor is legally bound to construct the works.
- Professional engineer: To NCC Schedule 3.
- Proprietary: Identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Provide: Provide and similar expressions mean supply and install and include development of the design beyond that documented.
- Required: Required by the contract documents, the local council or statutory authorities.
- Supply: Supply, furnish and similar expressions mean supply only.

1.4 BUSHFIRE PRONE AREAS

Conformance: In areas designated as bushfire- prone, comply with statutory and local authority requirements.

Standard: To AS 3959.

Bushfire Attack Level (BAL): To AS 3959 and BCA 3.10.5, and as documented.

PRODUCTS AND MATERIALS

2.1 PROPRIETARY ITEMS

Manufacturer's or supplier's recommendations General: Provide and select, if no selection is given, transport, deliver, store, handle, protect, finish, adjust and prepare for use the manufactured items to the manufacturer's' or suppliers' recommendations.

Natural and treated timber durability table

Exposure	Natural timber	Treated timber	Remarks
	Required durability class to AS 5604	Required hazard class to the AS/NZS 1604 series	

Inside, above ground. Completely protected from the weather. Well ventilated	Class 4	H1	Treated timber resistant to lyctids. Untreated timber must be protected from termites
Inside, above ground. Protected from wetting with nilleaching. Well ventilated	Class 3	H2	Treated timber resistant to borers and termites. Untreated timber must be protected with a finish
Above ground, exposed to weather. Periodic moderate wetting and leaching	Class 2	H3	Treated timber resistant to borers, termites and moderate decay. Applicable to weatherboards, fascia's, pergolas (above ground), window joinery, framing and decking
In-ground	Class 1	H4 (Severe wetting and leaching)	Treated timber resistant to borers, termites and severe decay. Applicable to fence posts, greenhouses, pergolas (in- ground) and landscaping timbers
		H5 (Extreme wetting and leaching and/or critical uses)	Applicable to retaining walls, piling, house stumps, building poles, cooling tower fill

Proprietary items/systems/assemblies: Assemble, install or fix to substrate to the manufacturers' or suppliers' recommendations.

2.2 SUBSTITUTION

Identified proprietary items: Identification of a proprietary item does not necessarily imply exclusive preference for the identified item but indicates the necessary properties of the item.

Alternatives: If alternatives to the documented products, methods or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives.

2.3 TIMBER

Acclimatisation

General: Acclimatise timber fitouts by stacking them for two weeks in the in-service conditions with air circulation to all surfaces after the following are complete:

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

Unseasoned timber

General: If unseasoned timber is provided, or variation in moisture content is likely, make allowance for shrinkage, swelling and differential movement.

Durability

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

Natural durability class of heartwood: To AS 5604.

Preservative treatment: To the AS/NZS 1604 series.

Minimum requirement: To the Natural and treated timber durability table.

2.4 STEEL

Durability

General: Provide steel products protected from corrosion to suit the conditions of use.

Internal engineer designed steel members: Remove mill scale, rust, moisture and oil. Coat with a zinc phosphate primer to the manufacturer's instructions.

Built-in products below damp-proof course: Stainless steel 316 or engineered polymer.

Corrosion resistance

Atmospheric corrosivity category: As defined in AS 4312, the AS/NZS 2312 series and as documented.

Minimum external corrosion protection requirements for corrosive environments: Conform to BCA Volume 2.

Preparation and pre-treatment

Standard: To the AS 1627 series.

Galvanizing

General: Galvanize mild steel components (including fasteners) to AS/NZS 1214, AS 1397 or AS/NZS 4680, as appropriate, and in the following conditions:

- Exposed to weather.
- Embedded in masonry.
- Exposed to or in air spaces behind external leaves of masonry walls.
- In contact with chemically treated timber.

2.5 PROTECTIVE COATINGS

General

Environment: To AS 2312.1 clause 2.3. Coating designation: To AS 2312.1 Table 6.3.

CCA (copper chrome arsenic) treated timber

Greasing: Before placing bolts or other metal components in contact with CCA-treated timber, paint contact surfaces or coat in grease or a bituminous coating.

Unseasoned timber

General: Do not fix in contact with steel framing without fully painting the contact surfaces of timber and steel.

2.6 FASTENERS Self-drilling screws

Standard: To AS 3566.1.

2.7 VAPOUR BARRIER

General

Vapour barrier to slabs: To AS 2870 clause 5.3.3.

Minimum thickness: 0.2 mm.

2.8 DAMP-PROOF MEMBRANES

General (Damp-proof)

Damp-proof membrane: To AS 2870 clause 5.3.3.

Type: High impact resistant polyethylene film, minimum 0.2 mm thick. which has been pigmented and branded by the manufacturer.

EXECUTION

3.1 WALL CHASING

Holes and chases

General: Make holes and chases required in masonry walls so that the structural integrity of the wall is maintained. Do not chase walls with a fire- resistance level or an acoustic rating.

Parallel chases or recesses on opposite faces of a wall: Not closer than 600 mm to each other.

Chasing blockwork: Only chase core-filled hollow blocks or solid blocks which are not documented as structural.

Concrete blockwork chasing table

Block thickness (mm)	Maximum depth of chase (mm)
190	35
140	25
90	20

3.2 MOISTURE CONTENT

Flooring

General: Do not start installation of flooring unless:

- Concrete substrate: The moisture content of the concrete has been tested to AS 1884 Appendix A and values in clause A3.1.2 and A3.1.3 have been obtained.
- Plywood substrates and timber flooring products: The moisture content has been tested to AS/NZS 2098.1 for plywood and AS/NZS 1080.1 for timber and values obtained as follows:
 - Air-conditioned buildings: 8 to 10%.
 - Intermittently heated buildings: 10 to 12.5%.
 - Unheated buildings: 12 to 15%.

3.3 FIXING

General

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

Fasteners

Sufficiency: Use proprietary fasteners capable of transmitting the loads imposed, and sufficient for the rigidity of the assembly.

3.4 FOOTPATH CROSSING

General

Requirement: Provide a footpath and kerb crossing to local authority requirements.

3.5 COMPLETION

General

Removal of temporary work, services and plant: Remove temporary work services and construction plant within 10 working days after occupation of the works.

Final cleaning: Remove rubbish and surplus material from the site and clean the works throughout including interior and exterior surfaces exposed to view. Vacuum clean carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems.

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

Warranties: Register with manufacturers, as necessary, and provide copies of manufacturers' warranties.

Instruction manuals: Provide the manufacturers' instruction manuals.

Operation: Make sure moving parts operate safely and smoothly.

Surveyor's certificate: Provide a certificate which confirms that the work, including boundary fences, has been correctly located.

Services layout: Provide a plan which shows the location of underground services.

Authorities' approvals: Provide evidence of approval of the local authority or principal accredited certifier and statutory authorities whose requirements apply to the work.

Keys: Provide two keys for each set of locks keyed alike and two keys for each lock keyed to differ.

TERMITE MANAGEMENT (0184)

GENERAL

1.1 STANDARDS

General

Standard: To AS 3660.1.

Termite caps, collars and sheeting

General: To AS 3660.1 Section 5.

Collars: To AS 3660.1 clauses 4.3.2.4.2 and 5.3.6.

Granular materials

Standard: To AS 3660.1 Section 6.

Termite management system notice

Signage: Permanently fix a durable notice in a prominent location to BCA 3.1.4.4.

Certification

Requirement: Submit installation certificate to AS 3660.1 Appendix A3.

1.2 SUBMISSIONS

Records

Dilapidation record:

- Before demolition: Submit to each owner of each adjacent property, a copy of the part of the record relating to that property and obtain their written agreement to the contents.
- Rectification work: Submit written acceptance of rectification works from the owner of each adjoining property affected.

EXECUTION

2.1 SUPPORT

Temporary support

Existing buildings: Until permanent support is provided, provide temporary support for sections of existing buildings which are to be altered and which normally rely for support on work to be demolished.

2.2 PROTECTION

Encroachment

General: Prevent the encroachment of demolished materials onto adjoining property, including public places.

Weather protection

General: If walls or roofs are opened for alterations and additions, or the surfaces of adjoining buildings are exposed, provide temporary covers to prevent water penetration. Provide covers to protect existing plant equipment and materials intended for re-use.

Security

General: If walls or roofs are opened for alterations or additions, provide security against unauthorised entry to the building.

2.3 DEMOLITION

Asbestos removal

Method: Use wet removal methods recommended in the Safe Work Australia Code of Practice - How to safely remove asbestos.

Dilapidation record

Purpose: Use the dilapidation record to assess the damage and rectification work arising from the demolition work.

Notice of completion

General: Give at least 5 working days' notice of completion of demolition so that adjacent structures may be inspected following completion of demolition.

SITE PREPARATION (0221)

EXECUTION

1.1 CONTROL AND PROTECTION

Erosion control

General: Plan and carry out the work so as to avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.

Dewatering

Requirement: Keep earthworks free of water. Prevent water flow over freshly laid work.

1.2 TREE PROTECTION

General

Protection: Protect from damage trees which are required to be retained. Provide a temporary fence or safety barrier if required by the local authority. Comply with local authority requirements for protection of trees.

Work near trees

Harmful materials: Keep the area within the dripline free of sheds and paths, construction material and debris.

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

1.2 SITE CLEARING

Extent

Requirement: Clear only areas to be occupied by works such as structures, paving, excavation, regrading and landscaping or other areas designated to be cleared.

Clearing and grubbing

Clearing: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble.

Turf: Remove turf to a depth just sufficient to include the root zone.

Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments or paving, and 300 mm below the finished surface in unpaved areas. Backfill holes remaining after grubbing with sand material to

prevent ponding of water. Compact the material to the relative density of the existing adjacent ground material.

Surplus material

Removal: Take possession of surplus material and remove it from the site.

Disposal

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

EARTHWORK (0222)

GENERAL

1.1 STANDARDS

General

Earthwork: To the recommendations of AS 3798.

1.2 INTERPRETATION

Definitions

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

- Bad ground: Ground unsuitable for the works, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground that is, or becomes, soft, wet or unstable.
- Rock: Monolithic material with volume greater than 0.3 m³ that cannot be removed until broken up by rippers or percussion tools.
- Site classification: To AS 2870 and BCA 3.2.4.
- Subgrade: The trimmed or prepared earth material on which the pavement, footing or slab is constructed. Generally taken to relate to the upper line of the earth material.
- Zone of influence: A foundation zone bounded by planes 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.

EXECUTION

2.1 REMOVAL OF TOPSOIL

General

Extent: Areas of cut or fill and areas occupied by structures, pavements and embankments.

Maximum depth: 200 mm.

Disposal: Remove topsoil unsuitable for re-use from the site to AS 3798 clause 6.1.8.

2.2 EXCAVATION

Extent

Site surface: Excavate the site to the levels and profiles required for the documented structures, pavements, filling and landscaping. Make allowance for compaction, settlement or heaving.

Footings: Excavate to the required sizes and depths. Confirm that the foundation conditions meet the design bearing capacity.

Crawl space: Provide a clear space under timber or steel bearers:

- Minimum clearance: 400 mm.

Bearing surfaces

Requirement: Provide even plane bearing surfaces for loadbearing elements including footings. Step to accommodate level changes. If supporting masonry, make the steps appropriate to the courses.

Existing footings

Requirement: If excavation is required within the zone of influence of an existing footing, provide supports to the footing sufficient to prevent damage arising from the works. Use methods including temporary shoring or underpinning.

Existing services

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Grading

External areas: Grade to give falls away from buildings, minimum 1:100.

Subfloor areas: Grade the ground surface under suspended floors to drain ground or surface water away from buildings without ponding.

2.3 PREPARATION FOR FILLING

Preparation

Stripping: Prepare the ground surface before placing fill (including topsoil fill), ground slabs or load bearing elements to AS 3798 clause 6.1.5. Remove material that inhibits or prevents satisfactory placement of fill layers, loose material, debris and organic matter.

2.4 PLACING FILL

Placement: To BCA 3.2.2.

Layers: Place fill in near-horizontal layers of uniform thickness no greater than 150 mm after compaction, deposited systematically across the fill area.

Moisture content: Adjust the moisture content of fill during compaction to achieve the required density.

Base preparation for under slab Vapour barrier or damp-proof membrane: Blind the surface with sufficient sand to cover any hard projections.

Dampen the sand just before placing the Vapour barrier.

SERVICE TRENCHING (0223)

PRODUCTS

1.1 FILL MATERIALS

Backfill material: To AS 3798 clause 4.4, free from stones larger than 100 mm maximum dimension and as follows:

- Next to services: Do not place any particles greater in size than 25 mm within 150 mm of services.
- Under paved areas and within 4 m of structures: Coarse sand, controlled low strength material or fine crushed rock.
- In reactive clay: In sites classified M, M-D, H1, H1- D, H2, H2-D, E or E-D to AS 2870, re-use excavated site material at a moisture content within $\pm 1\%$ of that of the adjoining in situ clay.

EXECUTION

2.1 EXCAVATING

Requirement: Excavate for underground services in conformance with the following:

- To required lines and levels, with uniform grades.
- Straight between access chambers, inspection points and junctions.
- With stable sides.

2.2 TRENCH BACKFILL

Place fill: To AS 3798 clause 6.2.2 and 6.2.6.

Timing: Backfill service trenches as soon as possible after laying and bedding the service, if possible, on the same working day.

Layers: Compact all material in layers not exceeding 150 mm compacted thickness. Compact each layer to the required relative compaction specified before starting the next layer.

2.3 SURFACE RESTORATION

Reinstatement: Reinstatement existing surfaces removed or disturbed by trench excavation to match existing and adjacent work.

LANDSCAPE – FENCES AND BARRIERS (0242)

PRODUCTS

1.1 TIMBER

Posts and rails

Hardwood: To AS 2082. Softwood: To AS 2858.

Pickets and palings

Hardwood: To AS 2796.1 Section 8.

Grade to AS 2796.2: Select. Softwood: To AS 4785.1 Section 7.

Seasoned cypress pine: To AS 1810 Section 5.

Preservative treatment

Timber type: Provide only timbers with preservative treatment appropriate to the Hazard class.

Cut surfaces: Provide supplementary preservative treatment to all cut and damaged surfaces.

CCA treated timber: If proposed to be used, provide details.

1.2 STEEL

Steel tubes

Posts, rails, stays and pickets: To AS/NZS 1163.

Grade: C350L0.

Post and rail finish: Hot dip galvanized.

1.3 COMPONENTS

Steel panel fencing

Steel framing: Zinc-coated or aluminium/zinc alloy coated steel to AS 1397.

Steel sheeting: Prepainted to AS/NZS 2728.

Timber fencing

General: Conform to the timber members in the

Timber fencing sizes table

Member	Preservative treated soft wood picket (mm)	Preservative treated soft wood paling/lap and cap (mm)	Hardwood or cypress pine paling/lap and cap (mm)
Maximum height	1200	1800	1800
End/corner gate posts	90 x 90	100 x 100	125 x 125 or 100 x 100
Intermediate posts	90 x 90	140 x 45 or 100 x 75	125 x 50 or 100 x 75
Maximum post spacing	2400	2400/2700*	2700*
Rails	70 x 40	75 x 50 or 100 x 38	75 x 50 or 100 x 38
Picket/palings size	70 x 19	75, 100 or 150* x 15	100 or 150* x 13
Capping	-	125 x 35	100 x 50
Concrete footing size (diameter x depth)	300 x 600	300 x 600	300 x 600
Earth footing size (diameter x depth)	200 x 600	250 x 600	250 x 600

* Three rail fences only

Gates

General: As documented.

Fencing for swimming pools

Design, construction and performance: To AS 1926.1.

Location of fencing for private swimming pools: To AS 1926.2.

EXECUTION

2.1 INSTALLATION

Requirement: Adopt local industry practices for set-out, clearing of vegetation, excavation, minimum footing size materials, components and erection.

LANDSCAPE – GARDENING (0250)

GENERAL

1.1 STANDARDS

Soils

Site and imported topsoil: To AS 4419. Potting mixes: To AS 3743.

Composts, soil conditioners and mulches: To AS 4454.

PRODUCTS

2.1 MATERIAL

Topsoil

Requirement: Topsoil containing organic matter, able to support plant life and free from stones, contaminants and weeds.

Source: If the topsoil of documented quality cannot be provided from material recovered from site, provide imported topsoil.

Turf

Description: Cultivated turf of even thickness, free from weeds and other foreign matter.

Supplier: A specialist grower of cultivated turf.

Plants

General: Provide plants in conformance with the local authority approval requirements.

EXECUTION

3.1 GENERAL

Weed eradication

Herbicide: Eradicate weeds using environmentally acceptable methods, such as a non-residual glyphosate herbicide in any registered formulae, at the recommended maximum application rate.

Watering

General: Comply with local restrictions.

Turf: Water immediately after laying turf until the topsoil is moistened to its full depth.
 Maintain moisture to this depth.
 Planting: Water as required to maintain planting to the completion of the contract.

PAVEMENT BASE AND SUBBASE (0271)

PRODUCTS

1.1 BASE AND SUBBASE MATERIAL

Granular material

Requirement: Provide unbound granular materials, including blends of two or more different materials which when compacted develop structural stability and are uniform in grading and physical characteristics.

Crushed rock

Requirement: Provide crushed rock as follows:

- Base: 20 mm nominal.
- Subbase: 40 mm nominal.

EXECUTION

2.1 SUBGRADE PREPARATION

Requirement: Prepare the subgrade to 0222 Earthwork.

2.2 PLACING BASE AND SUBBASE

Weak surfaces: Do not place material on a surface that is weakened by moisture and is unable to support, without damage, the construction plant required to perform the works.
 Spreading: Spread material in uniform layers without segregation.

Moisture content: Maintain wet mixed materials at the required moisture content before and during spreading. Add water to dry mixed materials through fine sprays to the entire surface of the layer after spreading, to bring the material to the required moisture content.

Compacted layer thickness: 200 mm maximum and 100 mm minimum. Provide layers of equal thickness in multilayer courses.

2.3 BASE AND SUBBASE COMPACTION

General

Construction operation: Compact each layer of fill to the required depth and density, as a systematic construction operation.

Minimum relative compaction table

Item description	Minimum dry density ratio (modified compaction) to AS 1289.5.2.1
Subbase	95%

Base	98%
------	-----

Compaction requirements

General: Apply uniform compactive effort, over the whole area to be compacted, until the required density is achieved or until failure is acknowledged.

Equipment: Use rollers appropriate to the materials and compaction requirements documented.

CONCRETE PAVEMENT (0274)

GENERAL

1.1 STANDARDS

General

Specification and supply: To AS 1379. Materials and construction: To AS 3600. Residential pavements: To AS 3727.1.

Vapour barrier

Requirement: To AS 2870 clause 5.3.3.

Grading

General: Grade paving to even falls to drain away from buildings to drainage outlets without ponding.

Minimum fall for drainage:

- Vehicle traffic pavements: 1:40.
- Other pavements: 1:100.

PAVING – SAND BED (0276)

PRODUCTS

2.2 MATERIALS

Sand

Bedding and joint filling: Well-graded and free of deleterious materials such as soluble salts which may cause efflorescence.

Mortar

Mix proportions (cement: sand): 1:3.

EXECUTION

2.1 GENERAL

Preparation

General: Trim the subgrade to the required profile and to suit the thickness of pavement and sand bed. Compact to a firm, even surface.

Base course

General: Conform to 0271 Pavement base and subbase.

Edge restraint

Perimeter: If not provided by other structures, provide edge restraints to bedding and units.

Type: Bed units in mortar at least 40 mm thick.

Drainage: Position edge restraint and pavement so that the finished surface is slightly above the front edge of the edge restraint.

Bedding course

Preparation: Remove all loose material from the prepared base.

Geotextile: Place fabric between the base course and the bedding sand.

Bedding sand: Screed uncompacted sand over prepared base uniformly to achieve a 30 mm thick layer. Maintain sand at a uniform loose density and moisture content.

Grading

General: Grade pavement to even falls to drain away from buildings to drainage outlets without ponding.

Minimum fall for drainage:

- Vehicle traffic pavements: 1:40.
- Other pavements: 1:100.

Laying

General: Lay material on the screeded sand to the documented set-out and size.

CONCRETE (0310)

GENERAL

1.1 STANDARDS

General

Formwork design and construction: To AS 3610.1. Plywood formwork: To AS 6669.

Reinforced concrete construction: To AS 3600. Specification and supply of concrete: To AS 1379. Residential ground slabs and footings: To AS 2870.

Design

Formwork: The design of the formwork is the contractor's responsibility.

Vapour barrier or damp-proof membrane

Requirement: Conform to 0180 Common requirements.

BRICK AND BLOCK CONSTRUCTION (0331)

GENERAL

1.1 STANDARD

Materials and construction: To AS 4773.1 and AS 4773.2.

PRODUCTS

2.1 DURABILITY

General

Exposure environment: To AS 4773.1 clause 4.3. Exposure locations: To AS 4773.1 clause 4.4.

2.2 MATERIALS

Masonry units

Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.

Salt attack resistance grade: To AS 4773.2 Table 2.1.

Mortar materials

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.

Mortar mixes: To AS 4773.1 Table 3.1.

2.3 BUILT-IN COMPONENTS

General

Durability class of built-in components: To AS 4773.1 Table 4.1.

Steel lintels

Angles and flats: Sizes to AS 4773.1 Table 12.2.

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

Corrosion protection: To AS 2699.3. Galvanizing: Do not cut after galvanizing.

Wall ties

Standard: To AS 2699.1.

Type: A.

Corrosion protection: To AS 2699.1.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

EXECUTION

3.1 GENERAL

Mortar mixing

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

Protection

Masonry materials and components: Protect from ground moisture and contamination.

During construction: Cover the top surface of masonry to prevent the entry of rainwater and contaminants.

Bond

Type: Stretcher bond.

Clearance for timber frame shrinkage

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

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

Joining to existing

General: Provide a control joint where joining to existing structures. Do not tooth new masonry into existing work unless approved by a professional engineer.

Mortar joints

General: Set out masonry with joints of uniform width and the minimum of cutting of masonry units.

Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.

Face-shell bedded hollow units: Fill perpends solid. Cut mortar flush.

Joint thickness: 10 mm.

Finish: Conform to the following:

- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, do not rake more than 10 mm to give a key.

3.2 FACEWORK

Cleaning

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

Acid solution: Do not use.

Colour mixing

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

Sills and thresholds

General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.

Minimum size of unit: Three quarters full width.

3.3 SUBFLOOR WORK

Access openings

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

Air vent location

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

3.4 CAVITY WORK

Cavity width

General: Construct minimum cavity widths in conformance with the following:

- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the loadbearing frame and 25 mm minimum between the masonry leaf and sheet bracing.
- Walls must be wrapped prior to brickwork.

3.5 DAMP-PROOF COURSES

Location

General: Locate damp-proof courses as follows:

- 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 one course above. Project 10 mm beyond the external slab edge and turn down 45°.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fastened to the inner frame 75 mm above floor level.
- Internal walls built off slabs on ground in the first course 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 the full width of angles and intersections and 150 mm at joints. Step as necessary, but not more than two courses per step for brickwork and one course per step for blockwork. Sandwich damp-proof courses between mortar.

3.6 FLASHINGS

Location

General: Locate flashings as follows:

- Floors: Full width of outer leaf immediately above slab, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf two courses above for brick and one course for block. If 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 one course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame for masonry veneer. Extend at least 150 mm beyond the reveals on each side of the opening.
- Over lintels to openings in cavity walls: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf two courses above for brick and one course for block or turned up against the frame and fastened to it. Extend at least 150 mm beyond the ends of the lintels.
- At abutments with structural frames or supports: Vertically flash in the cavity from 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Vertically flash jamb extending 75 mm 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 where on lintels.

Pointing: Point up joints around flashings to fill voids.

Weepholes

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 perpend. Maximum spacing: 1200 mm.

Weephole guards: Provide access barrier.

LIGHT STEEL FRAMING (0342)

GENERAL

1.1 STANDARDS

General

Design, materials and protection: To AS/NZS 4600.

Residential and low-rise steel framing: To NASH-1 (National Association of Steel Housing) and NASH- 2 Standard.

EXECUTION

2.1 GENERAL

Frame fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: If not pre-punched, form holes by drilling or punching, conforming to the requirements of NASH-2.

Swarf: Immediately remove swarf and other debris from cold-formed steel framing.

Prefabricated wall frames and trusses

Assembly: Factory assemble wall frames and trusses.

Bracing: Provide details of bracing.

Certification: Obtain certification from a professional engineer for the erected frames.

Protection: Protect from damage or distortion during storage, transport and erection.

Provide temporary protection for members until permanent covering is in place

Site work

Requirement: On-site welded connections are not permitted.

Unseasoned or CCA treated timber

General: Do not fix in contact with framing without fully painting the timber and/or the steel.

Earthing

Permanent earthing to AS/NZS 3000: Required.

Protection

General: Restore coatings which have been damaged by welding or other causes.

Thoroughly clean affected areas back to base metal and coat with a zinc rich organic primer.

Metal separation: Install lagging to separate non-ferrous service pipes and accessories from the framing.

Grommets: Provide grommets to isolate piping and wiring from cold-formed steel framing.

Site cut holes: Provide plastic bushes or grommets to site cut holes.

Decks and balconies

Attachment to external walls: To BCA 3.10.6.

Vermin barriers

Requirement: Provide vermin barriers as follows:

- Brick veneer barrier: Close nail steel galvanized wire mesh, with a maximum aperture of 10 mm, to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

Anti-ponding boards

Standard: To AS 4200.2.

Fascia, valley and barge boards

Requirement: Fix fascia, valley gutter boards and barge boards in conformance with the manufacturer's recommendations.

LIGHT TIMBER FRAMING (0382)

GENERAL

1.1 STANDARDS

General

Residential timber framed construction: To AS 1684.2, AS 1684.3 or AS 1684.4, as appropriate.

Nail plated roof trusses: To AS 1720.5.

EXECUTION

2.1 GENERAL

Fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: Form holes by drilling.

Prefabricated wall frames and trusses

Assembly: Factory assemble wall frames and trusses.

Bracing: Provide details of bracing.

Certification: Obtain certification from a professional engineer for the erected frames.

Protection: Protect from damage or distortion during storage, transport and erection.

Provide temporary protection for members until permanent covering is in place

Timber fasteners

Metal washers: Provide washers to the heads and nuts of all bolts and coach screws.

Connectors: Press connector plates fully into the frame members. Knots not permitted in plate area.

Joints

Requirement: Locate joints only over supports:

- Minimum bearing of bearers: 50 mm.
- Minimum bearing of joists: 30 mm.

Priming

Steel: Before fixing, prime steel which is not galvanized or metallic-coated.

Decks and balconies

Attachment to external walls: To BCA 3.10.6.

Vermin barriers

Requirement: Provide vermin barriers as follows:

- Brick veneer barrier: Close nail 10 mm galvanized steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.
- External walls (not masonry veneer): Turn up at least 75 mm on the inside and tack. Project
- 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up at least 150 mm on the wet side and tack to studs.

Damp-proof course

Requirement: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as documented and as follows:

Flashings

Location: Provide flashings to external openings sufficient to prevent the entry of moisture.

Form trays at the ends of sill flashings.

Masonry veneer construction: Extend flashing across cavities and build into brickwork.

Anti-ponding boards

Standard: To AS 4200.2.

Fascia, valley and barge boards

Requirement: Fix fascia, valley gutter boards and barge boards.

DECKING, SHEET AND PANEL FLOORING (0383)

GENERAL

1.1 STANDARDS

General

Timber flooring and decking: To AS 1684.2, AS 1684.3 or AS 1684.4, as appropriate.

Slip resistance

Classification: To AS 4586.

PRODUCTS

2.1 DECKING

New timber decking

Standard:

- Preservative-treated softwood to AS 4785.1 Section 4.
- Hardwood to AS 2796.1 Section 4.

Composite decking

General: Proprietary composite decking boards, as documented.

2.2 SHEET FLOORING

Plywood

Standard: To AS/NZS 2269.0.

Plywood certified formaldehyde emission level to AS/NZS 2269.0: Class E1.

Grading:

- Surface grade: CD.
- Bond: Type A to AS/NZS 2754.1.

Durability: Preservative treatment to AS 1604.1 Table D1.

Particleboard

Particleboard: To AS 1860.1, Class 1.

Compressed fibre cement sheet

Standard: To AS/NZS 2908.2. Category: Minimum 4.

Classification:

- External: Type A.
- Internal: Type B.

Autoclaved aerated concrete (AAC) panels

Standard: To AS 5146.1.

Accessories: To the manufacturer's recommendations for the AAC panel system.

EXECUTION

3.1 PREPARATION

Timber decking on steel joists

General: Screw fix seasoned battens to the steel joists so that their top surfaces are aligned.

- Batten size: Minimum 35 mm thick.
- Spacing of fasteners: Less than 600 mm.

3.2 FIXING DECKING

Timber decking

Standard: To AS 1684.2, AS 1684.3 or AS 1684.4 as appropriate.

Installation: Lay in long lengths with the ends of each board firmly butted to the next and firmly in contact with the joists. Stagger the end joints and locate them centrally over joists.

Gap between edges of seasoned boards: Minimum 4 mm.

Minimum number of spans across support: 3. Nailing:

- General: Make sure the boards are in contact with the joists at the time of nailing, particularly where boards are machine nailed. If nails are to be less than 10 mm from ends of boards, pre-drill nail holes 0 to 1 mm undersize.
- Top nailing: Double nail at each bearing with nails driven flush. Offset nails at intermediate fixings or skew nail 10° in opposite directions.

Sealing: Apply one coat of water repellent preservative and one coat of finish coat to top surface of joists and all surfaces of boards before fixing.

Composite decking

Installation: To manufacturer's recommendations.

3.3 FIXING SHEET FLOORING

Particleboard flooring

Installation: To AS 1860.2.

Plywood flooring

Installation: To AS 1684.2, AS 1684.3 or AS 1684.4, as appropriate.

Compressed fibre cement flooring

General: To manufacturer's recommendations.

Installation: Lay the length of the sheets at right angles to the joists. Stagger the end joints and locate centrally over joists. Apply adhesive to edges of sheets and firmly butt join together.

Minimum number of spans across supports: 2.

Fixing: Pre-drill screw holes with 1 mm clearance over screw diameter and countersink. Fix with corrosion-resistant countersunk screws.

Spacing of fasteners:

- Sheet edge and intermediate: Less than 450 mm.

- Corners and sheet edges: At least 12 mm from sheet edges and 50 mm from corners.

Wet area flooring: Stop screw heads with sealant.

3.4 AAC PANEL FLOORING

Standard

General: To AS 5146.3.

Subfloor

Requirement: Conform to AS 5146.3 Table 3.4 for maximum joist spacing.

Cutting

General: Do not cut panels, except in documented locations.

Cut edges: Protect exposed reinforcing with anti- corrosion agent to manufacturer's recommendations.

AAC panel installation

Requirement: Install panels to manufacturer's recommendations and as follows:

- Minimum end bearing length: Greater of 60 mm or span / 80.
- Minimum edge bearing length: 60 mm.
- Apply construction adhesive between the panels and the joists and screw fix the panels to the joists. Conform to AS 5146.3 Section 6.
- Progressively apply AAC adhesive to joints between adjacent panels.
- Fit panels snugly together to fully bed adhesive.

Control joints

Requirement: Provide minimum 10 mm wide control joints as follows:

- Spaced at maximum 8 m centres in floors up to 100 mm thick.
- Where AAC panels abut adjacent building elements.

Slip joints

General: Provide slip joints to allow for differential movement as documented.

Sealant

Locations: Install fire-resisting and acoustic sealant as documented and as follows:

- At all control joints.
- At services penetrations.

ROOFING (0421)

PRODUCTS

1.1 COMPONENTS

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Insulation spacers

Description: Proprietary spacer system to prevent excessive compression of insulation between roof sheeting and framing.

1.2 MATERIALS

Sheet metal roofing

Standard: To AS 1562.1.

Corrosion protection: To BCA Table 3.5.1.1.

Roof tiling

Standard: To AS 2049.

Accessories: Compatible with the tiles and necessary to complete the tiling.

Plastic sheet roofing

Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.2.

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.

Polycarbonate: To AS 4256.5.

Skylights

Standard: To AS 4285.

Skylights (roof lights) in bushfire-prone areas: To AS 3959.

Roof windows

Standard: To AS 4285.

Type: A proprietary window system for non-vertical installation in roofs pitched between 15° and 85°.

Roof windows (roof lights) in bushfire-prone areas: To AS 3959.

Roof ventilators

General: A proprietary roof ventilator system, including framing, fixing, trim, seals, accessories and flashings.

Finish: Match adjacent roofing.

Roof plumbing goods

Standard: To AS/NZS 3500.3.

Flashing and capping

Standard: To AS/NZS 2904.

EXECUTION

2.1 GENERAL

Installation

General: To the manufacturer's recommendations. Sheet metal roofing: To AS 1562.1.

Roof tiling: To AS 2050.

Plastic sheet roofing: To AS 1562.3.

Ventilation of roof space

General: To BCA 3.8.7.4.

2.2 ROOF PLUMBING

Jointing sheet metal rainwater goods

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

Flashings and capping's

Upstands: Flash projections above or through the roof with two part flashings consisting of an apron flashing and an over-flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Wall abutments: Provide over flashings where roofs abut walls, stepped to the roof slope in masonry and planked cladding, otherwise raking and as follows:

- In masonry: Build into the full width of the outer leaf. Turn up within cavity, sloping inward across the cavity and fixed to or built in to the inner leaf at least 75 mm above.

Gutters

Minimum slope of eaves gutters: 1:200. Minimum width overall of valley gutters: 400 mm.

Eaves gutter overflow measures: To BCA 3.5.3.4.

Downpipes

General: Prefabricate downpipes to the required section and shape where possible. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains.

Downpipe support: Provide supports and fixings for downpipes.

CLADDING (0431)

PRODUCTS

1.1 MATERIALS

Autoclaved aerated concrete (AAC) panels

Requirement: Proprietary AAC panels. Standard: To AS 5146.1.

Joint adhesive: Proprietary adhesive to manufacturer's recommendations.

Control joints: At all external and internal corners, adjacent to all openings and at maximum 6 m centres.

Fibre cement (FC) planks

Requirement: Proprietary system of single faced fibre cement building planks.

Standard: To AS/NZS 2908.2. Type A Category 3. Plank thickness: 7.5 mm.

Joints and edges: PVC-U extrusion. Corners: Preformed metal joining pieces.

Fibre cement (FC) sheets

Standard: To AS/NZS 2908.2.

Cladding, eaves and soffit linings: Type A Category 3.

Compressed cladding: Type A Category 5.

Sheet cladding: A proprietary system of single faced fibre cement sheets:

- Arrangement: Set out in even panels with joints coinciding with framing.
- Sheet thickness: 6 mm.
- Joints, corners and edges: PVC-U extrusion. Eaves lining: Single faced fibre cement:
- Sheet thickness: 4.5 mm.
- Joints: PVC-U extrusion.

Hardboard planks

Requirement: Proprietary wet process fibreboard planks.

Standard: To AS/NZS 1859.4. Classification: Exterior.

Plank thickness: 9.5 mm.

Joints and edges: PVC-U extrusions.

External corners: Preformed metal joining pieces. Internal corners: Scribe.

Plastic sheets

Requirement: Proprietary plastic sheets.

Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.4.

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.

Polycarbonate: To AS 4256.5.

Profiled sheet metal

Standard: To AS 1562.1.

1.2 COMPONENTS**Flashing material**

Standard: To AS/NZS 2904.

EXECUTION**2.1 GENERAL**

Installation: To the manufacturer's recommendations.

WINDOWS AND GLAZED DOORS (0451)

GENERAL

1.1 STANDARDS

General

Selection and installation: To AS 2047.

Glazing

Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.

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

PRODUCTS

2.1 GENERAL

Glass

Safety glass: To AS/NZS 2208.

Aluminium frame finishes Powder coating: To AS 3715. Anodising: To AS 1231:

- Thickness:
 - . Internal: 15 microns.
 - . External: 20 microns.

Flashings

Standard: To AS/NZS 2904.

Window labelling and certification

Requirement: To AS 2047 Section 8.

Protection of openable windows

Fall prevention: To BCA 3.9.2.6 and BCA 3.9.2.7. Testing: To AS 5203.

2.2 COMPONENTS

Insect screens

Aluminium framed insect screens: Provide aluminium extruded or folded box frame 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.

Bushfire screens and seals

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

Standard: To AS 3959.

Security screens

Security grilles and screen doors: To AS 5039. Installation: To AS 5040.

2.3 HARDWARE**Hardware documented generically**

General: Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use, compatible with associated hardware, and fabricated with fixed parts firmly joined.

EXECUTION**3.1 INSTALLATION****Preglazing**

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, drips, storm moulds, joint sealant and pointing to prevent water from penetrating the building between frames and the building structure under prevailing service conditions, including normal structural movement of the building.

Fixing

Packing: Pack behind fixing points with durable full width packing.

Prepared masonry openings: If fixing of timber windows to prepared anchorages is by fastening from the frame face, conceal the fasteners by sinking the heads below the surface and filling the sinking flush with a material compatible with the surface finish.

Trim

General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the window frames. Install to make neat and clean junctions between frames and the adjoining building surfaces.

DOORS AND ACCESS PANELS (0453)

PRODUCTS**1.1 DOOR FRAMES****Aluminium frames**

Construction: Assembled from aluminium sections, including accessories such as buffers, pile strips, strike plates, fixing ties or brackets and cavity flashing, with provision for fixing documented hardware.

Timber frames

Hardwood: To AS 2796.1.

- Grade: Select.

Softwood: To AS 4785.1.

- Grade: Select. Joints:
- Morticed head and through tenons.
- Trenched head:
- . Bare faced tenons on jambs.
- . Full let-in jambs.

Construction: Assembled from timber sections, with provision for fixing documented hardware including rebates for door seals, where documented.

1.2 DOORS

General

Doors: Proprietary products manufactured for interior or exterior applications and for the finish required.

Flush panel doors

General: Provide flush panel doors of balanced construction.

Tolerances

Standard: To AS 2688 clauses 4.1 and 5.3.

Security screen doors

Standard: To AS 5039.

Bushfire screens and seals

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

Standard: To AS 3959.

1.3 SLIDING INTERNAL DOORS

Face mounted

General: Provide overhead track supports and head and jamb linings appropriate to the arrangement of the door, and removable pelmets at the head to allow access to the wheel carriages for adjustment.

Wheel carriages: Fully adjustable precision ball race type providing smooth, quiet operation.

Cavity sliding

Door assemblies: Proprietary product comprising steel and timber frame construction with rigid steel top, base and rear supporting members and incorporating the overhead door track, ball race type wheel carriages, guides, stops, split jamb linings and removable pelmet.

1.4 ANCILLARY MATERIALS

Flashings

Standard: To AS/NZS 2904.

EXECUTION

2.1 GENERAL

Security screen doors

Installation: To AS 5040.

Ceiling access

General: Trim an opening and provide a loose access panel of minimum size 600 x 400 mm.

Under floor access

Requirements: Provide a frame and a door, minimum size 620 mm wide x 600 mm high, complete with padbolt.

Priming

General: Prime timber door leaves on top and bottom edges before installation.

2.2 FRAMES

Timber frames

Building into masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: Use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Back screw twice to jambs at each fixing.

Heads of fasteners: Conceal where possible, otherwise sink the head below the surface and fill the sinking flush with a material compatible with the surface finish.

Finishing

Trim: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the door frames. Install to make neat and clean junctions between the frame and the adjoining building surfaces.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, drips, storm moulds, caulking and pointing to prevent water from penetrating the building between the door frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

OVERHEAD DOORS (0454)

GENERAL

1.1 STANDARD

General

Garage doors: To AS/NZS 4505.

DOOR HARDWARE (0455)

PRODUCTS

1.1 COMPONENTS

Hinges

Requirement: Provide 3 hinges for external doors and door leafs over 2040 mm in height and 600 mm in width. Conform to the Hinges table.

Hinges table

Size of door (mm x mm)	Number of hinges (per door leaf)	Size of hinges (steel)
2040 x 920	3	100 x 75 x 2.5 mm
2040/2400 x 1020	4	100 x 100 x 2.5 mm

Locksets

External doors: Push-button key and knob set and a double-cylinder dead bolt to each door.

Internal doors:

- Generally: Passage sets.
- Bathrooms, showers and toilets: Privacy sets.
- Sliding patio doors and windows: Key-lockable surface mounted bolts.

Keying

Requirement: Key doors (excluding garage doors) alike and key windows alike.

EXECUTION

2.1 INSTALLATION

Supply

Delivery: Deliver door hardware items, ready for installation, in individual complete sets for each door, as follows:

- Clearly labelled to show the intended location.
- In a separate dust and moisture proof package.
- Including the necessary templates, accessories, fixings and fixing instructions.

Mounting height

Door lockset mounting heights: 1000 mm above finished floor to centreline of spindle.

Locks

Cylinders: Fix vertically and with consistent key alignment.

Door stops

Fixing: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

GLASS COMPONENTS (0467)

GENERAL

1.1 SUBMISSIONS

Certification

Barrier design: Submit a professional engineer's certificate confirming conformance with AS/NZS 1170.1 clause 3.6.

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

PRODUCTS

2.1 MIRRORS

Reflective surface

Type: Silver layer deposited on the glass or glazing plastic.

Protective coatings: Electrolytic copper coating at least 5 microns thick, and 2 coats of mirror backing and edge sealing paint having a total dry film thickness of at least 50 microns.

Safety glass mirrors

Type: Grade A safety glass to AS 1288. Safety compliance: To AS/NZS 2208.

2.2 SHOWER SCREENS

General: Proprietary system comprising frames of extruded aluminium, stainless steel, or PVC-U, assembled around safety glass to form fixed panels and sliding, hinged or pivoted doors.

Glass: To AS 1288 clause 5.8.

2.3 GLASS BARRIERS

Requirement: To AS 1288 Section 7. Glass: Grade A safety glass.

THERMAL INSULATION AND PLUABLE MEMBRANES (0471)

GENERAL

1.1 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definition applies:

- Pliable building membrane: To AS/NZS 4200.1 and equivalent to sarking-type materials as defined in the NCC.

PRODUCTS

2.1 MATERIALS

Thermal insulation

General: To AS/NZS 4859.1.

Pliable building membrane

Standard: To AS/NZS 4200.1 and BCA 3.12.1.1.

EXECUTION

3.1 GENERAL

Thermal insulation

Standard: To AS 3999 and BCA 3.12.1.1.

Pliable building membrane

Standard: To AS 4200.2 and BCA 3.12.1.1.

3.2 FLOORS

Under suspended framed floors

Fibre batts: Fit tightly between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

Below concrete slab on ground

Rigid cellular insulation boards:

- Laying pattern: Stretcher bond, with edges tightly butted.
- Damp-proof membrane: Lay over insulation.

3.3 WALLS

Framed walls

Fibre batts: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

Thermal break strips: To steel or timber framing with lightweight external cladding:

- Screw fixing: Button head screws at 1 m centres.
- Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

Vapour permeable (breathable) membrane

Requirement: Provide a vapour permeable membrane behind the external facing material that does not provide permanent weatherproofing or that may be subject to condensation forming on the internal face, including the following:

- Boards or planks fixed vertically or diagonally.

- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.
- Unpainted or unsealed cladding.
- Masonry veneer.

Installation: Run the vapour permeable membrane horizontally on the outer face of external wall framing, over the flashing, from the bottom plate up. Pull taut over the framing and fix to framing members. Seal across the wall cavity at the top.

Horizontal laps: At least 150 mm wide, lapped to make sure water is shed to the outer face of the membrane.

3.4 CEILINGS

Framed ceilings

Fibre batts: Fit tightly between framing members.

3.5 ROOFS

Metal roofs

Fibre batts: Fit tightly between framing members.

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

Combined fibre blanket and reflective insulation: Lay facing reflective insulation face downward.

Thermal break strips: Provide to steel framing supporting sheet metal roofing.

Pliable building membranes

Sarking membrane:

Location: Provide sarking under tile and shingle roofing.

Vapour barrier:

Installation: Lay over the roof framing with sufficient sag to allow the bulk insulation to achieve its full thickness. Overlap all edges 150 mm and seal all joints with pressure sensitive adhesive tape.

LINING (0511)

GENERAL

1.1 STANDARDS

Plasterboard

Standard: To AS/NZS 2588.

Fibre cement

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B, Category 2. Minimum thickness: 4.5 mm.

EXECUTION

2.1 SHEET LINING

Installation

Gypsum plasterboard: To AS/NZS 2589.

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.
- If required to support fixtures.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

External corner joints: Make joints over metallic- coated steel corner beads.

Control joints: Provide purpose-made metallic- coated control joint beads at not more than 12 m centres in plasterboard linings or 7.2 m centres in fibre cement lining in walls and ceilings and to coincide with structural control 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.

JOINERY (0551)

PRODUCTS

1.1 MATERIALS

Joinery timber

Hardwood for trim: To AS 2796.1. Hardwood for furniture: To AS 2796.3. Seasoned cypress pine: To AS 1810. Softwood for trim: To AS 4785.1.

Softwood for furniture: To AS 4785.3.

Finished sizes for milled timber: Not less than the documented dimension unless qualified by a term such as nominal, out of or ex, 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.

Wet process fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

Particleboard

Standard: To AS 1859.1.

Dry process fibreboard (including medium density fibreboard)

Standard: To AS/NZS 1859.2.

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

Certification

Timber based products: Label panels under the authority of a recognised certification scheme applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Plywood certified formaldehyde emission class to AS/NZS 2270 and AS/NZS 2271: E1.

Reconstituted wood-based panel certified formaldehyde emission class to AS/NZS 1859 series: E1.

High pressure decorative laminate (HPDL) sheets

Standard: To AS/NZS 2924.1.

Minimum thickness: Conform to the following:

- For horizontal surfaces fixed to a continuous substrate: 1.2 mm.
- For vertical surfaces fixed to a continuous substrate: 0.8 mm.
- For post formed laminate fixed to a continuous substrate: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

HPDL sheet application table

Class to AS/NZS 2924.1	Application
HGS or HGP	Kitchen work-tops
VGS or VGP	Kitchen front panels
VLS	Other vertical locations

1.2 JOINERY ASSEMBLIES

Standard: To AS 4386.

1.3 WARDROBE, CUPBOARD AND DRAWER UNITS**Plinths, carcasses, drawer fronts, shelves and doors**

Material: Select from the following:

- Overlaid high moisture resistant particleboard.
- Overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Adjustable shelves: Support on proprietary pins in holes bored at equal spacing of 32 mm centres vertically.

Fasteners: Conceal with finish.

Drawer fronts: Rout for drawer bottoms.

Drawer and door hardware

Hinge types: Concealed metal hinges with the following features:

- Nickel plated.
- Adjustable for height, side and depth location of door.
- Integrated soft and self-closing action.
- Hold-open function.

Slides: Metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Integrated soft and self-closing action.
- Closure retention.
- White thermoset powder coating or nickel plated.

Hardware

Requirement: Provide details of handles and locks.

1.4 WORKING SURFACES

Laminated benchtops

Material: High moisture-resistant particleboard or medium density fibreboard.

Finish: High pressure decorative laminate sheet.

Exposed edges: Extend laminate over shaped nosing, finishing more than 50 mm back on underside. Splay outside corners at 45°.

Minimum thickness: 32 mm.

Balance underside: Extend laminate to the undersides of benchtops if subject to excessive moisture from equipment such as dishwashers.

Stone or engineered stone benchtops

General: Provide stone or engineered 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 to AS/NZS 2208.

Stainless steel: Type 304, No. 4 finish.

EXECUTION

2.1 JOINERY

General

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

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

Fasteners

Installation: Secure plinths and carcasses to floors, walls, or both at not more than 600 mm centres.

Visibility: Do not provide visible fasteners except in the following locations:

- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Adhesives

General: Provide adhesives to transmit the loads imposed and for the rigidity of the assembly, without causing discolouration of finished surfaces.

Finishing

Junctions with structure: Scribe plinths, benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of structure.

Edge strips: Finish exposed edges of sheets with edge strips which match sheet faces.

Benchtops

Installation: Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joints with sealant matching the finish colour and clamp with proprietary mechanical connectors.

Edge sealing: Seal to walls and carcasses with a sealant, which matches the finish colour.

Glass splashbacks

Adhesive: Fix with non-acidic silicone adhesive. Apply at the rate recommended by the manufacturer.

Installation: Clean the back of the glass panel and apply walnuts of adhesive together with double sided adhesive tape for temporary support, and affix directly to the substrate.

2.2 TRIM**General**

Requirement: Provide timber or medium density fibreboard trim, such as beads, skirtings, architraves, mouldings and stops to make neat junctions to openings and between components, finishes and adjacent surfaces.

Proprietary items: Provide complete with installation accessories.

Fixing

To masonry walls: Wall plugs at 600 mm centres, maximum.

To stud walls: Nail to plate or framing at 600 mm centres, maximum.

MISCELLANEOUS FIXTURES AND APPLIANCES (0572)

PRODUCTS

1.1 COMPONENTS

Requirement: Provide kitchen and laundry appliances, and bathroom and other fixtures as documented.

1.2 PROPRIETARY STAIR SYSTEM

Materials, design and construction: To BCA 3.9.1. Balustrades: To BCA 3.9.2.

Requirement: Provide details of stairs, including proposed finishes, before fabrication and/or construction.

RENDERING AND PLASTERING (0611)

PRODUCTS

1.1 MATERIALS AND COMPONENTS

Aggregates

Sand: Fine, sharp, well-graded sand with a clay content between 1% and 5% and free from efflorescing salts.

Cement

Standard: To AS 3972. Type: GP.

Lime

Limes for building: To AS 1672.1.

Mixes

General: Select a mix proportion to suit the conditions of application.

Measurement: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

Plaster mixing: Machine mix for 3 to 6 minutes.

Strength of successive coats: Make sure successive coats are no richer in binder than the coat to which they are applied.

Mix proportion table - Cement render, by volume

Mix type	Substrate		Upper and lower limits of proportions by volume		
			Cement	Lime	Sand
- Single or multi-coat systems with integral finishing treatments	CRS	Dense and smooth concrete and masonry	1	0	3
			1	0.5	4.5
- Base coats in multi-coat	CRM	Regular clay or concrete masonry	1	0.5	4.5
			1	1	6

systems with cement or gypsum finishes	CRW	Lightweight concrete masonry and other weak substrates	1 1	1 2	6 9
Second coat - internal	CRF	Cement render base coats	1 1	1 2	6 9
Second coat - external	CRF	Cement render base coats	1 1	1 2	5 6

Lath

General: Provide a proprietary product for use with plaster.

Internal: Expanded metal to AS 1397 coating class Z350, minimum.

External: Stainless steel or PVC-U.

Beads

General: Provide a proprietary product for use with plaster.

Internal: Metallic-coated sheet AZ 150, minimum. External: Stainless steel or PVC-U.

Water

General: Clean and free from any deleterious matter.

EXECUTION

2.1 PREPARATION

Substrates

General: Provide substrates as follows:

- Clean and free from any deposit or finish which may impair adhesion of plaster.
- If framed or discontinuous, support members in full lengths without splicing.
- If solid or continuous, remove excessive projections and fill voids and hollows with plaster stronger than the first coat and not weaker than the substrate.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not plaster substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 2 mm of the laitance and expose the aggregate then apply a bonding treatment.

Painted surfaces: Remove paint and hack the surface at close intervals.

Untrue substrates: If the substrate is not sufficiently true for conformity with the thickness limits for the plaster system or has excessively uneven suction resulting from variations in the composition of the substrate, apply additional coats without exceeding the thickness limits for the substrate or system.

Beads

Location: Fix beads as follows:

- Angle beads: At all external corners.

- Drip beads: At all lower terminations of external plaster.
- Beads for control of movement: At all control joints.
- Stop beads: At all terminations of plaster and junctions with other materials or plaster systems.

Joints in beads: Provide dowels to maintain alignment.

Mechanical fixing to substrate: ≤ 300 mm centres.

Bonding treatment

General: If bonding treatment is required, throw a wet mix onto the background. Mix proportions to the following:

- Cement plaster (cement: sand): 1:2.
- Gypsum plaster (gypsum: sand): 1:2.

Curing: Keep continuously moist for 5 days or more and allow to dry before applying plaster coats.

Thickness: $\geq 3 < 6$ mm.

Embedded items

General: If there are water pipes and other embedded items, sheath them to permit thermal movement.

Lath

Location: Provide lath as follows:

- Chases: If chases or recesses are 50 mm wide or greater, fix metal lath extending 75 mm or more beyond each side of the chase or recess.
- Masonry and concrete substrates: If mechanical key cannot be attained by scabbling and bonding, fix metal lath.
- Metal and other non-porous backgrounds: Fix metal lath to provide a key.

Weepholes

Requirement: Keep opening free of plaster. Maintain consistent opening size.

2.2 APPLICATION

Control joints

General: Provide joints in the finish to coincide with control joints in the substrate. Make sure that the joint in the substrate is not bridged during plastering.

Size:

- Depth: Extend the joint right through the plaster and reinforcement to the substrate.
- Width: 3 mm, or the same width as the substrate joint, whichever is greater.

Damp-proof courses: Do not continue plaster across damp-proof courses.

Plastering on metal lath: Provide control joints to divide the plastering area into rectangular panels 10 m² or less.

V-joints: Provide V-joints, cut right through the plaster to the substrate, at the following locations:

- Abutments with metal door frames.

- Abutments with other finishes.
- Junctions between different substrates.

Tolerances

General: Finish plane surfaces within a tolerance of 6 mm in 2400 mm, determined using a 2400 mm straightedge placed anywhere in any direction.

Finish corners, angles, edges and curved surfaces within equivalent tolerances.

Plaster thickness table

Substrate	Cement render, total thickness of single or multi-coat work (mm)
Brickwork and blockwork	12 min
Lightweight concrete and blocks	12 min
Metal lath measured from the face of the lath.	18 min

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.

WATERPROOFING – WET AREAS (0621)

GENERAL

1.1 STANDARDS

Waterproofing wet areas

Standard: To AS 3740.

PRODUCTS

2.1 PRODUCTS

Membranes

Standard: To AS/NZS 4858.

Membrane system

Requirement: Proprietary membrane system suitable for the intended internal waterproofing.

Shower tray

General: Applied jointless shower tray, with upstands at least 50 mm higher than the hob upstands. Ensure fall in tray to floor waste.

EXECUTION

3.1 PREPARATION

Substrates

General: Prepare substrates as follows:

- Clean and remove any deposit or finish which may impair adhesion of membranes.
- If walls or floors are framed or discontinuous, make sure support members in full lengths without splicing.
- If floors are solid or continuous remove excessive projections and fill voids, hollows and cracks.

Concrete substrates: Cure for at least 28 days.

Bond breakers

Requirement: After the priming of surfaces, provide bond breakers at all wall/floor, hob/wall junctions and at control joints where the membrane is bonded to the substrate.

3.2 INSTALLATION

Ambient conditions

Requirement: Do not install in conditions outside the manufacturer's recommendations.

Protection

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage, and an overlaying finish is installed.

Extent of waterproofing

Waterproof or water-resistant surfaces: To the requirements of BCA 3.8.1.2.

Drainage connections

Floor wastes: Turn membrane down 50 mm minimum into the floor waste leak control flanges and adhere to form a waterproof connection.

Vertical membrane terminations

Upstands:

- Shower areas with hobs and step-downs: Minimum 150 mm above the finished tile level of the shower area or 25 mm above the maximum retained water level, whichever is the greater.
- Shower areas without hobs: Minimum 150 mm above the highest finished tile level of the floor within the shower area.

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.

Door jambs and architraves

Requirement: If the bottom of doorjambs and architraves do not finish above the floor tiling, waterproof their surfaces below tile level to provide a continuous seal between the perimeter flashing to the wall/floor junction and the water stop angle.

Showers with hobs

Masonry or concrete hob: Extend membrane over the hob and into the room at least 50 mm.

Metal hob: Provide metal angle with height at least 15 mm above the finished floor level of the floor outside the shower. Terminate the membrane within 5 mm from the top of the angle. Seal the gap between the shower screen and the angle.

Unenclosed showers

Requirement: Extend membrane at least 1500 mm into the room from the shower rose outlet on the walls and floor.

Curing of liquid membrane systems

General: To the manufacturer's instructions. Curing: Allow membrane to fully cure before tiling.

Overlaying finishes on membranes

Requirement: Protect waterproof membranes with compatible water-resistant surface materials that do not cause damage to the membrane.

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

3.3 COMPLETION

Protection

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

Reinstatement

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

CERAMIC TILING (0631)

GENERAL

1.1 STANDARDS

Tiling

General: Conform to the recommendations of AS 3958.1.

Slip resistance

Stair treads, ramps and landings: Classification to AS 4586.

PRODUCTS

2.1 MATERIALS

Adhesives

Standard: To AS ISO 13007.1.

PVA (polyvinyl acetate)-based adhesives: Do not use in wet areas or externally.

Mortar materials

Cement type to AS 3972: GP.

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.

Bedding mortar

Mix proportion (cement: sand), by volume: Select proportions from the range 1:3 to 1:4 for satisfactory adhesion. Provide minimum water.

Water

General: Clean and free from any deleterious matter.

Grout

Cement-based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.

Terracotta tiles: Provide proprietary polymer modified grout.

General purpose cement-based grout: Mix with fine sand. Provide minimum water consistent with workability.

Pigments for coloured grout: Colourfast fillers compatible with the grout material. For cement-based grouts, provide lime-proof natural or synthetic metallic oxides compatible with cement.

EXECUTION

3.1 APPLICATION

Preparation of substrate

General: Conform to the following:

- Clean off any deposit or finish which may impair adhesion or location of tiles.
- Compatible with all components of floor system.

Floor finish dividers

General: Finish tiled floors at junctions with differing floor finishes with a corrosion-resistant metal dividing strip fixed to the substrate. If changes of floor finish occur at doorways, make the junction directly below the closed door.

Bath ventilation

General: If required, ventilate the space below fully enclosed baths with at least 2 vermin proofed ventilating tiles.

Falls and levels

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

Fall, general: 1:100 minimum.

Fall, in shower areas: 1:80 minimum.

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

Sealant joints

General: Provide sealant joints filled with silicone sealant and finish flush with the tile surface where tiling joins sanitary fixtures and at internal corners of walls.

RESILIENT FINISHES (0651)

GENERAL

1.1 STANDARDS

Installation: To AS 1884.

PRODUCTS

2.1 MATERIALS

Wet process fibreboard (hardboard) hard underlay

Standard: To AS/NZS 1859.4.

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

Thickness: 5.5 mm.

EXECUTION

3.1 PREPARATION

Substrates

General: To AS 1884 Section 3.

Concrete substrates

Substrate rectification: Conform to the following:

- Surface treatments: Mechanically remove any incompatible surface treatments, including the following:
 - Sealers and hardeners.
 - Curing compounds.
 - Waterproofing additives.
 - Surface coatings and contamination.
- Surface quality: Remove projections and fill voids and hollows with a self-smoothing self-levelling compound compatible with the adhesive. Allow filling or levelling compound to dry to manufacturer's recommendations.

Cleaning: Remove loose materials or dust.

Timber, plywood and particleboard substrates

Substrate rectification: Remove projections. If conformance to a planeness tolerance of 4 mm in 2 m determined using a 2 m straightedge cannot be achieved, provide an underlay in brick pattern with joints avoiding substrate joints.

Cleaning: Remove oil, grease, traces of applied finishes and loose materials or dust.

3.2 INSTALLATION

General

Fixtures: Remove door stops and other fixtures, and refix in positions undamaged on completion of the installation.

Sheet set-out

General: Set out sheets to give the minimum number of joints. Position joints away from areas of high stress. Run sheet joints parallel with the long sides of floor areas, vertically on non-horizontal surfaces.

Tile set-out

General: Set out tiles from centre of room. If possible, cut tiles at margins only to give a cut dimension of at least 100 mm x full tile width. Match edges and align patterns. Arrange the cut tiles so that any variation in appearance is minimised.

Plank set-out

General: Set out planks from the centre of the room. Align patterns, texture and grain in one direction.

Joints

Non-welded: Butt edges together to form tight neat joints showing no visible open seams.
Chemical welding: Apply seaming compound 100 mm wide to the substrate centrally under the seam. Roll the seam until the compound is forced up into the joint. Clean off flush using a damp cloth.

Junctions

General: Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

3.3 COMPLETION

Protection

Finished floor surface: Keep traffic off floors for minimum 24 hours after laying or until bonding has set, whichever period is the longer. Avoid contact with water for minimum 7 days.

Cleaning

General: Clean the finished surface. Buff and polish. Before the date for practical completion, mop and leave the finished surface clean and undamaged on completion.

CARPETS (0652)

PRODUCTS

1.1 MATERIALS

Carpet

Minimum grade: Residential Medium Duty under the Australian Carpet Classification Scheme. Total VOC emission tested to ISO 10580: <0.5 mg/m²/h.

Wet process fibreboard (hardboard) hard underlay

Standard: To AS/NZS 1859.4.

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

Thickness: 5.5 mm.

Soft underlay

Standard: To AS 4288.

Hot-melt adhesive tapes

General: Glass fibre and cotton thermoplastic adhesive-coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicon-coated release paper.

Preformed carpet grippers

General: Architectural plywood carpet grippers with 3 rows of corrosion-resistant angled pins of length appropriate to the carpet type to AS 2455.1 clause 1.5.4.

Edge strips

Location: At exposed edges of the carpet, and at junctions with different floor finishes or finishes of a different thickness. Where edge strips occur at doorways, locate the junctions directly below the closed door.

EXECUTION

2.1 PREPARATION

Substrates

Cleaning concrete surfaces: Mechanically remove the following surface treatments:

- Sealers and hardeners.
- Curing compounds.

Cleaning timber surfaces: Remove oil, grease and traces of applied finishes.

Concrete substrate rectification: Remove projections and fill voids and hollows with a levelling compound compatible with the adhesive.

Timber substrate rectification: Remove projections. If conformance to a flatness tolerance of 6 mm in 3000 mm, determined using a 3000 mm straightedge placed anywhere in any direction cannot be achieved, fix a hardboard underlay in brick pattern with joints avoiding substrate joints.

Fixtures: Remove door stops and other fixtures and refix in position undamaged on completion of the installation.

2.2 LAYING CARPET

Standard

General: To AS 2455.1.

MULTILAYED BOARD FLOORING (0654)

PRODUCTS

1.1 MATERIALS

Flooring panels

General: Provide proprietary flooring system, as documented.

Material

Description: Multilayered board flooring with a decorative layer of timber bonded over supporting layers beneath.

Floating flooring underlay

General: If the flooring is not provided with an integrated underlay, provide proprietary closed cell foam sheeting, with acoustic properties if required, compatible with the subfloor, any levelling compound and the documented flooring.

Adhesive fixed flooring acoustic underlay General: Provide proprietary acoustic underlay, if required, compatible with the subfloor, any levelling compound and the documented flooring, fixed to subfloor with compatible adhesive.

Adhesive

Requirement: Polyurethane or polymer adhesive, to the flooring manufacturer's recommendations, compatible with the subfloor, underlay and documented flooring.

Ventilation: Provide adequate ventilation appropriate for moisture curing.

EXECUTION

2.1 GENERAL

Storage and handling

General: Deliver flooring to site in unbroken boxes. Store in dry conditions, a minimum 100 mm above the subfloor. Storage conditions are to be equivalent to those suitable for the installation of the floor. Do not store in areas with wet plaster or paint.

Subfloor cleaning

Requirement: Prior to installation remove loose material, dust and any deposits or existing finishes from the subfloor that may impair adhesion, any adhesive performance or the location and functioning of expansion or control joints.

Rectification: Conform to the following:

- Solid or continuous subfloors: Remove excessive projections and fill voids and hollows with a self-smoothing levelling compound compatible with the flooring including any adhesive.
- Plywood and particleboard subfloors: If required to achieve a smooth finish, sand joints between sheets.
- Existing timber flooring subfloors: Remove cupping, rough material and surface finishes by rough sanding.

2.2 INSTALLATION

Trial set-out

General: Prepare a trial panel set-out to each area, as follows:

- Maximise the size of equal margins of cut panels.
- Locate control joints.

Laying multilayered board flooring

Method: To the manufacturer's recommendations.

Expansion and control joints

General: Provide joints as follows:

- Against vertical building elements: Provide allowance for expansion, to manufacturer's recommendations.

TIMBER FLOORING (0655)

PRODUCTS

1.1 GENERAL

Storage and handling

General: Deliver timber flooring to site in unbroken plastic wrapping or packs. Store in dry conditions preferably in the installation location, a minimum 100 mm above the subfloor to the supplier or manufacturer's recommendations. Storage conditions are to be equivalent to those suitable for the installation of the floor. Do not store in areas of wet plaster or paint.

Adhesive

Requirement: A flooring adhesive (polyurethane or polymer) to the flooring manufacturer's recommendations, compatible with the subfloor, underlay and documented flooring.

1.2 STRIP FLOORING

New timber

General: Conform to the Grading table.

Grading table

Product	Standard	Grade
Hardwood	AS 2796.2	High Feature Grade if available for the species selected, otherwise Select Grade
Seasoned cypress pine	AS 1810	1
Softwood - pinus ssp	AS 4785.2	Appearance
Softwood - other	AS 4785.2	Select

Recycled timber

Standard: To FWPA PN06.1039.

Grading: To Section 5.1.

EXECUTION

2.1 FIXING TIMBER FLOORING

Battens for strip flooring on steel joists

General: Fix seasoned battens along the steel joists with countersunk screws so that their top surfaces are aligned.

- Batten size: Minimum 35 mm thick.

- Spacing of fasteners: < 600 mm.

Control joints

Unless otherwise specified by the flooring manufacturer:

- Perimeters: Provide 10 mm wide expansion joints against vertical building elements.
- Strip flooring: For floors greater than 6000 mm wide allow for expansion using one of the following methods:
 - Expansion gaps: Partially cramp strip flooring to allow a 1 mm gap every 600 mm or 1.5 mm every metre.
 - Intermediate expansion joints: Divide floors into maximum widths of 6000 mm with expansion joints 12 mm wide filled with cork.

Strip flooring

General: Blend floorboards to ensure a relatively even distribution of the colour range and grade features throughout the floor.

Installation: Lay in straight and parallel lines with each board firmly butted to the next and firmly in contact with the subfloor. If laid over joists or battens, cramp as required to bring the boards tight at edges. Secret nailing will generally pull board edges tight.

Strip flooring direct mechanically fixed to joists:

- Fix in accordance with AS 1684.
- Top nail or secretly fix boards up to 85 mm wide. Top nail wider boards.
- When top nailing, boards 80 mm to 135 mm require 2 nails at each joist crossing. Punch nails 3 mm below finished surfaces.
- With plain end flooring, if nails are to be less than 12 mm from ends of boards, pre-drill nail holes 0.8 mm undersize.
- When secret fixing use one staple or cleat angled at 45° through the base of the tongue. For boards of 130 mm cover width or greater, consult the flooring manufacturer.
- For both secret fixing and top nailing use a 6 to 10 mm bead of polyurethane adhesive along each joist.
- Strip flooring direct mechanically fixed to battens:
- Top nail or secretly fix boards up to 135 mm. Top nail wider boards to 35 mm (min) thick seasoned battens.
- When top nailing, boards 80 mm to 135 mm require 2 nails at each batten crossing. Punch nails 3 mm below finished surfaces. Wider boards require 3 nails.
- With plain end flooring, if nails are to be less than 12 mm from ends of boards, pre-drill nail holes 0.8 mm undersize.
- When secret fixing use one staple or cleat angled at 45° through the base of the tongue. For boards of 130 mm cover width or greater, consult the flooring manufacturer.
- For both secret fixing and top nailing use a 6 to 10 mm bead of polyurethane adhesive along each batten.

2.2 COMPLETION

Protection

General: Provide protection as follows:

- Floors: With MDF taped at all butt joints. Do not cover with sheet plastic.
- Stair treads: Full MDF or plywood casing.

FLOOR SANDING AND FINISHING (0656)

GENERAL

1.1 STANDARDS

Timber flooring - sanding and finishing: To AS 4786.2 and the recommendations of ATFA Solid Timber Flooring Industry Standard.

PAINTING (0671)

GENERAL

1.1 STANDARDS

General: To the recommendations of those parts of AS/NZS 2311 referenced in this worksection.

PRODUCTS

2.1 PAINTING MATERIAL

Handling

Delivery: Deliver paints to the site in the manufacturer's labelled and unopened containers.

Low VOC emitting paints

VOC limits for low odour/low environmental impact paint types:

- Primers and undercoats: < 65 g/litre.
- Low gloss white or light coloured latex paints for wall areas: < 16 g/litre.
- Coloured low gloss latex paints: < 16 g/litre.
- Gloss latex paints for timber doors and trims: < 75 g/litre.

Combinations

General: Do not combine products from different manufacturers in a 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.

Tinting

General: Provide only products which are colour tinted by the manufacturer or supplier.

EXECUTION

3.1 PREPARATION

Order of work

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for the installation of fittings, floor sanding and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

Protection

General: Before painting, clean the area and protect from dust contamination. Use drop sheets and masking agents to protect surfaces, including finished surfaces and adjacent surfaces during painting.

Fixtures and furniture: Remove door furniture, switch plates, light fittings and other fixtures before painting, and refix in position on completion of painting.

Substrate preparation - generally

General: Prepare substrates to receive the painting systems.

Cleaning: Clean down the substrate surface. Do not cause damage to the substrate or the surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, using methods including the following:

- Removal of bruises.
- Removal of discolouration, including staining by oil, grease and nail heads.
- Bleaching where necessary to match the timber colour sample.
- Puttying.
- Fine sanding, with the last abrasive no coarser than 220 grit, so that there are no scratches across the grain.

Unpainted surfaces

Standard: To AS/NZS 2311 Section 3.

Previously painted surfaces

Preparation of a substrate in good condition: To AS/NZS 2311 clause 7.4.

Preparation of a substrate in poor condition: To AS/NZS 2311 clause 7.5.

Preparation of steel substrates with protective coatings: To AS 2312.1 Section 8 and AS 1627.1.

3.2 PAINTING

Light levels

General: ≥ 400 lux.

Paint application

Standard: To AS/NZS 2311 Section 6.

Timing: 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.
- Associated trims and glazing beads.
- Timber board cladding.

Spraying

General: If the paint application is by spraying, use conventional or airless equipment that conforms to the following:

- Satisfactorily atomises paint being applied.
- Does not require paint to be thinned beyond the maximum amount recommended by the manufacturer.
- Does not introduce oil, water or other contaminants into the applied paint.

Paint with known health hazards: Not permitted on site.

Sanding

Clear finishes: Sand the sealer, using abrasive no coarser than 320 grit, without cutting through the colour. Take special care with round surfaces and edges.

Repair

Requirement: Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up new damaged decorative paintwork or misses with the paint batch used in the original application.

Repair of galvanizing

Cleaning: For galvanized surfaces which have been subsequently welded, or which have been welded, prime the affected area.

Primer: Type 2 organic zinc rich coating for the protection of steel to AS/NZS 3750.9.

Services

General: Paint new services and equipment if not embedded, except chromium, anodised aluminium, GRP, PVC-U, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

Wet paint warning

Notice: Place in a conspicuous location and do not remove until the paint is dry.

3.3 PAINT SYSTEMS

Paint system description

Primers and undercoats: Provide primers and undercoats recommended by the manufacturer of the selected final coat as suitable for the substrate and the final coat.

Number of coats: Unless specified as one or two coat systems, each paint system consists of at least 3 coats.

Paint final coat table

Final coat	Applicable Australian Standard
Gloss latex	AS 3730.10
Stain, lightly pigmented	AS 3730.28
Latex stain, opaque	AS 3730.16
Paving	
Paving paint, semi-gloss	AS 3730.29
Paving paint, gloss	AS 3730.29

MECHANICAL DESIGN AND INSTALL (0702)

GENERAL

1.1 DESIGN

Air conditioning design

Outside design conditions: Use outdoor design conditions listed in AIRAH DA09, Table 1 or Table 1A for the following:

- The location geographically closest to the site.
- Comfort (or non-critical process) conditions. Inside design conditions:
- Summer: 24°C dry bulb, 50% relative humidity.
- Winter: 21°C dry bulb.

Heating and cooling performance: Maintain the air-conditioned spaces, as measured at the points of control, within the documented cooling indoor design conditions at the highest cooling and heating loads due to the combination of loads imposed by the outside design

conditions, countering solar loads, loads due to system and other losses, and building fabric, lighting and internal equipment loads.

Building fabric loads: Allow for loads from the construction documented.

Temperature variation: Limit the temperature difference in air-conditioned spaces served by the same zone or system to 2°C as follows:

- Between any 2 points in the space from floor level to 1500 mm above floor level.
- More than 2000 mm from cooking equipment and more than 1000 mm from any other appliance.
- When outside conditions are in the range specified above.
- After the plant has been operating for one hour.
- With the temperatures measured in the same 5-minute period.

Zoning: Divide the systems into temperature-controlled zones to meet the specified permissible limits in temperature variation and the system divisions documented.

Fresh air: Supply fresh air to spaces with air conditioning systems via the air handling system.

Heating: Reverse cycle.

Ambient noise emitted: Lower than the level that can be heard within a habitable room in any neighboring residential premises, regardless of whether any door or window to that room is open.

PRODUCTS

2.1 AIR CONDITIONING EQUIPMENT

Standards

Ducted air conditioners: To AS/NZS 3823.1.2. Non-ducted air conditioners: To AS/NZS 3823.1.1. Controls

General: Provide the following functions:

- Temperature control for each zone located to accurately sense zone temperature.
- Fan speed selection for multi and variable speed fans.
- Day/night zone changeover if scheduled.
- Time switch for each system with ≥ 6 temperature programs per day, separate programs for each day of the week, manual set point over ride and Vacation temperature set back.

HYDRAULIC DESIGN AND INSTALL (0802)

GENERAL

1.1 STANDARDS

Plumbing and drainage: To the AS/NZS 3500 series.

EXECUTION

2.1 INSTALLATION

Connections to mains

General: Excavate to locate and expose the connection points and connect to the Network Utility Operator mains. On completion, backfill and compact the excavation and reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

Piping

Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.

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

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

2.2 FINISHES

General

Exposed piping: 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 or worn fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for required identification marking. Prime steel piping and iron fittings.
- Valves: Finish valves to match connected piping.

2.3 COLD AND HEATED WATER

General: To AS/NZS 3500.1 and AS/NZS 3500.4.

Water heaters

Location: Locate water heaters where they can be maintained or replaced without damaging adjacent structures, fixtures or finishes.

Tariff: Install so that the heating system qualifies for the tariff concession or subsidy offered by the statutory authority.

Isolating valves: Provide isolation valves to water heaters.

Types:

- Electric storage water heaters: To AS/NZS 4692.1.

- Energy performance: To AS/NZS 4692.2.
- Gas storage water heaters: To AS/NZS 5263.1.2. If a flue damper is available for the water heater supplied, provide one.
 - Energy performance: To AS/NZS 4552.2.
- Solar water heaters: To AS/NZS 2712.
- Heat pump water heaters: To AS/NZS 2712.
 - Safety: To AS/NZS 60335.2.40.
 - Performance evaluation: To AS/NZS 5125.1.
- Gas instantaneous water heaters: To AS/NZS 5601.1.
- Electric instantaneous water heaters: To AS/NZS 60335.2.35.

Heated water temperature

Standard: To AS/NZS 3500.4.

2.4 STORMWATER

Standards

General: To AS/NZS 3500.3.

Downpipe connections

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

Subsoil drains

Requirement: 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.

Trench width: Minimum 450 mm.

Subsoil drains: Provide proprietary perforated plastic pipe.

Filter fabric: Provide a polymeric fabric formed from a plastic yarn containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Filter sock: Provide a polyester permeable sock capable of retaining particles of 0.25 mm size. Securely fit or join the sock at each joint.

Pits

Metal access covers and grates: To AS 3996.

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.

2.5 WASTEWATER

General: To AS/NZS 3500.2.

Cleaning

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

Septic tanks

Standard: To AS/NZS 1546.1.

Vent pipes

Requirement: Provide upstream and downstream vents to AS/NZS 3500.2.

Staying to roof: If fixings for stays penetrate the roof covering, seal the penetrations and make watertight.

Terminations: Provide bird-proof vent cowls made of the same material and colour as the vent pipe.

2.6 RAINWATER STORAGE SYSTEMS

Design, installation, maintenance and repairs: To the recommendations of SA HB 230.

Metal rainwater goods: To AS/NZS 2179.1.

Rotationally molded tanks: To AS/NZS 4766.

Water filters for drinking water: To AS 3497 and the requirements of the statutory authorities having jurisdiction.

2.7 FUEL GAS

Reticulated gas systems: To AS/NZS 5601.1.

Buried pipes

Warning tape: During backfilling, lay plastic warning tape 300 mm above and for the full length of buried gas pipes.

Type: Minimum 100 mm wide, with GAS PIPE UNDER marked continuously.

Commissioning

General: On completion of installation and testing, turn on isolating and control valves and purge and charge the installation.

ELECTRICAL DESIGN AND INSTALL (0902)

GENERAL

1.1 DESIGN

Maximum demand and spare capacity Maximum demand: Calculation method to AS/NZS 3000 Appendix C. Submit a copy of the calculations.

Spare capacity: Provide the following:

- > 10% spare capacity in mains and submains.
- > 25% spare capacity in final subcircuits. Spare poles: $\geq 25\%$ for future circuits.

Protection

Fault protection: Automatic disconnection to AS/NZS 3000 clause 2.4.

1.2 STANDARDS

Electrical installation: To AS/NZS 3000. Selection of cables: To AS/NZS 3008.1.1.

Communications cable systems: To AS/CA S008, AS/CA S009 and AS/NZS 11801.1.

EXECUTION

2.1 GENERAL

Applications and compliance

General: Submit all necessary applications for electricity supply. Liaise with the electricity distributor and comply with the Electricity Distributor's Service and Installation Rules (ED S&IR).

Consumers mains and metering

General: Provide consumers mains, associated services and all necessary fault and overload current protection equipment to AS/NZS 3000 Section 3 and the ED SI&R. Connect consumer mains to the electricity distributor mains.

Switchboards

Standard: To AS/NZS 61439.1 and AS/NZS 61439.3.

Construction: Enclosed type with a hinged lid.

Protective devices: Provide circuit breakers and residual current devices.

Material: Metallic-coated sheet steel.

Location: Verify that the location selected is compliant before proceeding.

Accessories

General: Provide accessories necessary for a complete installation including but not limited to switches, dimmers, socket outlets, and telecommunications outlets. Provide accessories of the same size and material and from the same manufacture.

Mounting: Flush mount accessories to the wall (or ceiling) unless noted otherwise. Provide proprietary wall boxes in masonry and wall brackets in stud walls.

Wiring

Sequence of work: Install conduits and cables before the installation of wall and ceiling linings, and before any external landscaping works.

Installation: Do not penetrate damp-proof courses. Run wiring in cavity tied against inner brick surface.

Minimum conduit diameter: 20 mm.

Conduits for future use: Provide a non-metallic drawstring having a breaking strain > 100 kg.

Labelling

General: Provide labels including control and circuit equipment ratings, functional units, notices for operational and maintenance personnel, incoming and outgoing circuit rating, sizes and origin of supply.

Telecommunications cables: Label telecommunications cables, cross connects and outlets in accordance with the requirements of AS/NZS 11801.1.

Earthing systems

Protective earthing system with a multiple earth neutral (MEN) connection: To AS/NZS 3000 Section 5.

Luminaires

Standard: To AS/NZS 60598.1.

Non-specified luminaires: Provide a bayonet cap batten holder and lamp at each lighting point location where no luminaire is documented.

Minimum energy performance standards:

- General: To AS 4782.2 and AS/NZS 4783.2.
- Self-ballasted lamps: To AS 4847.2.

Appliances

General: Provide final subcircuits and terminate at fixed appliances, hot water units, packaged air conditioning and other plant and equipment.

Isolation switch: Provide isolating switch adjacent to equipment.

Telecommunications

General: Liaise with the telecommunication services carrier.

Installations requiring telephony only: To AS/CA S009.

Communications cable systems for small office/home office: Category 6, to AS/CA S009, AS/NZS 11801.1, AS 11801.4 and AS/NZS 14763.2.

Television systems

General: Provide a digital television distribution system to AS/NZS 1367 and conforming to the recommendations of Australian Communications and Media Authority (ACMA).

Antennas: Provide and locate antennas to receive all locally available free-to-air television stations.

External network: Liaise with each external communications carrier and determine the services and site access requirements for the network connection.

Intruder alarm system

General: Provide intruder alarm system to AS/NZS 2201.1.

Smoke detection system

General: Provide smoke alarms to BCA 3.7.5. Connect smoke alarms to mains power.

2.2 COMPLETION

Testing and certification

Electrical installations: Test to AS/NZS 3017. Submit a certificate showing test results and certifying compliance with AS/NZS 3000.

Communications cable systems: To AS 11801.4. Submit a certificate showing test results and certifying compliance with AS 11801.4. Submit ACMA Telecommunications Cabling Advice (TCA1) form.

Television and audio systems: To AS/NZS 1367. Test the complete television and audio system. Submit a certificate showing test results and certifying compliance.

REFERENCED DOCUMENTS

The following documents are incorporated into this work section by reference:

AS/CA S008	2020	Requirements for customer cabling products
AS/CA S009	2020	Installation requirements for customer cabling (Wiring Rules)
AS/NZS 1080		
AS/NZS 1080.1	2012	Timber - Methods of test Moisture content
AS/NZS 1163	2016	Cold-formed structural steel hollow sections
AS/NZS 1170		
AS/NZS 1170.1	2002	Structural design actions Permanent, imposed and other actions
AS 1192	2004	Electroplated coatings - Nickel and chromium
AS/NZS 1214	2016	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) (ISO 10684:2004, MOD)
AS 1231	2000	Aluminium and aluminium alloys - Anodic oxidation coatings
AS 1288		
AS 1289	2021	Glass in buildings - Selection and installation Methods of testing soils for engineering purposes
AS 1289.5.2.1	2017	Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using modified compactive effort
AS/NZS 1367	2016	Coaxial cable and optical fibre systems for the RF distribution of digital television, radio and in-house analog signals in single and multiple dwelling installations
AS 1379	2007	Specification and supply of concrete
AS 1397	2021	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1546		On-site domestic wastewater treatment units
AS/NZS 1546.1	2008	Septic tanks
AS 1562		
AS 1562.1	2018	Design and installation of sheet roof and wall cladding Metal
AS 1562.3	2006	Plastics
AS/NZS 1604		
AS/NZS 1604.1	2021	Preservative-treated wood-based products Products and treatment
AS 1627		Metal finishing - Preparation and pretreatment of surfaces
AS 1627.1		
AS 1672	2003	Removal of oil, grease and related contamination Limes and limestones
AS 1672.1	1997	Limes for building
AS 1684		
AS 1684.2	2021	Residential timber-framed construction Non-cyclonic areas
AS 1684.3	2021	Cyclonic areas
AS 1684.4		
AS 1720	2010	Simplified - Non-cyclonic areas Timber structures
AS 1720.1	2010	Design methods
AS 1720.5	2015	Nail plated timber roof trusses
AS 1810	1995	Timber - Seasoned cypress pine - Milled products
AS/NZS 1859		Reconstituted wood-based panels - Specifications
AS 1859.1	2017	Particleboard
AS/NZS 1859.2	2017	Dry process fibreboard

AS/NZS 1859.3	2017	Decorative overlaid wood panels
AS/NZS 1859.4		
AS 1860	2018	Wet process fibreboard Particleboard flooring
AS/NZS 1860.1	2017	Specifications
AS 1860.2	2006	Installation
AS 1884	2021	Floor coverings - Resilient sheet and tiles - Installation practices
AS 1926		Swimming pool safety
AS 1926.1	2012	Safety barriers for swimming pools
AS 1926.2	2007	Location of safety barriers for swimming pools
AS 2047	2014	Windows and external glazed doors in buildings
AS 2049	2002	Roof tiles
AS 2050	2018	Installation of roof tiles
AS 2082	2007	Timber - Hardwood - Visually stress-graded for structural purposes
AS/NZS 2098		
AS/NZS 2098.1	2006	Methods of test for veneer and plywood Moisture content of veneer and plywood
AS/NZS 2179		Specifications for rainwater goods, accessories and fasteners
AS/NZS 2179.1		
AS 2201	2014	Metal shape or sheet rainwater goods, and metal accessories and fasteners Intruder alarm systems
AS/NZS 2201.1	2007	Client's premises - Design, installation, commissioning and maintenance
AS/NZS 2208		
AS/NZS 2269	1996	Safety glazing materials in buildings Plywood - Structural
AS/NZS 2269.0	2012	Specifications
AS/NZS 2270	2006	Plywood and blockboard for interior use
AS/NZS 2271	2004	Plywood and blockboard for exterior use
AS/NZS 2311	2017	Guide to the painting of buildings
AS/NZS 2312		Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 2312.1	2014	Paint coatings
AS 2455		
AS 2455.1	2019	Textile floor coverings - Installation practice General
AS/NZS 2588	2018	Gypsum plasterboard
AS/NZS 2589	2017	Gypsum linings - Application and finishing
AS 2601	2001	The demolition of structures
AS 2688	2017	Timber and composite doors
AS 2699		
AS 2699.1	2020	Built-in components for masonry construction Wall ties
AS 2699.3	2020	Lintels and shelf angles (durability requirements)
AS/NZS 2712	2007	Solar and heat pump water heaters - Design and construction
AS/NZS 2728	2013	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
AS/NZS 2754		
AS/NZS 2754.1	2016	Adhesives for timber and timber products Adhesives for manufacture of plywood and laminated veneer lumber (LVL)
AS 2796		Timber - Hardwood - Sawn and milled products
AS 2796.1	1999	Product specification
AS 2796.2	2006	Grade description
AS 2796.3	1999	Timber for furniture components
AS 2858	2008	Timber - Softwood - Visually stress-graded for structural purposes

AS 2870	2011	Residential slabs and footings
AS/NZS 2904	1995	Damp-proof courses and flashings
AS/NZS 2908		
AS/NZS 2908.2	2000	Cellulose-cement products Flat sheets
AS/NZS 2924		
AS/NZS 2924.1	1998	High pressure decorative laminates - Sheets made from thermosetting resins Classification and specifications
AS/NZS 3000	2018	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008		
AS/NZS 3008.1.1	2017	Electrical installations - Selection of cables Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions
AS/NZS 3017	2007	Electrical installations - Verification guidelines
AS 3497	2021	Drinking water treatment systems - Design and performance requirements
AS/NZS 3500		Plumbing and drainage
AS/NZS 3500.1	2021	Water services
AS/NZS 3500.2	2021	Sanitary plumbing and drainage
AS/NZS 3500.3	2021	Stormwater drainage
AS/NZS 3500.4		
AS 3566	2021	Heated water services Self-drilling screws for the building and construction industries
AS 3566.1	2002	General requirements and mechanical properties
AS 3600		
AS 3610	2018	Concrete structures Formwork for concrete
AS 3610.1	2018	Specifications
AS 3660		
AS 3660.1	2014	Termite management New building work
AS 3700	2018	Masonry structures
AS 3715	2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys
AS 3727		Pavements
AS 3727.1		
AS 3730	2016	Residential Guide to the properties of paints for buildings
AS 3730.1	2006	Latex - Interior - Flat
AS 3730.2	2006	Latex - Interior - Semi-gloss
AS 3730.3	2006	Latex - Interior - Low gloss
AS 3730.6	2006	Solvent-borne - Interior/exterior - Full gloss enamel
AS 3730.7	2006	Latex - Exterior - Flat
AS 3730.8	2006	Latex - Exterior - Low gloss
AS 3730.9	2006	Latex - Exterior - Semi-gloss
AS 3730.10	2006	Latex - Exterior - Gloss
AS 3730.12	2006	Latex - Interior - Gloss
AS 3730.16	2006	Latex - Self-priming timber finish - Exterior
AS 3730.27	2006	Clear coatings for interior timber floors
AS 3730.28	2006	Wood stain - Solvent-borne - Exterior
AS 3730.29	2006	Solvent-borne - Exterior/interior - Paving paint
AS 3740	2021	Waterproofing of domestic wet areas
AS 3743	2003	Potting mixes
AS/NZS 3750		Paints for steel structures

AS/NZS 3750.9	2009	Organic zinc-rich primer
AS 3798	2007	Guidelines on earthworks for commercial and residential developments
AS/NZS 3823		Performance of electrical appliances - Airconditioners and heat pumps
AS/NZS 3823.1.1	2012	Non-ducted air conditioners and heat pumps - Testing and rating for performance (ISO 5151:2010, MOD)
AS/NZS 3823.1.2	2012	Ducted air conditioners and air-to-air heat pumps - Testing and rating for performance (ISO 13253:2011, MOD)
AS 3958		Ceramic tiles
AS 3958.1	2007	Guide to the installation of ceramic tiles
AS 3959	2018	Construction of buildings in bushfire-prone areas
AS 3972	2010	General purpose and blended cements
AS 3996	2019	Access covers and grates
AS 3999	2015	Bulk thermal insulation - Installation
AS 4145		Locksets and hardware for doors and windows
AS 4145.2		
AS/NZS 4200	2008	Mechanical locksets for doors and windows in buildings Pliable building membranes and underlays
AS/NZS 4200.1	2017	Materials
AS 4200.2		
AS 4256	2017	Installation Plastic roof and wall cladding materials
AS 4256.2	2006	Unplasticized polyvinyl chloride (uPVC) building sheets
AS 4256.3	2006	Glass fibre reinforced polyester (GRP)
AS 4256.4	2006	Unplasticized polyvinyl chloride (uPVC) wall cladding boards
AS 4256.5	2006	Polycarbonate
AS 4285	2019	Roof lights
AS 4288	2003	Soft underlays for textile floor coverings
AS 4312	2019	Atmospheric corrosivity zones in Australia
AS 4386	2018	Cabinetry in the built-in environment - Commercial and domestic
AS 4419	2018	Soils for landscaping and garden use
AS 4454	2012	Composts, soil conditioners and mulches
AS/NZS 4455		
AS/NZS 4455.1	2008	Masonry units, pavers, flags and segmental retaining wall units
AS/NZS 4455.3	2008	Segmental retaining wall units
AS/NZS 4505		
AS/NZS 4552	2012	Garage doors and other large access doors Gas fired water heaters for hot water supply and/or central heating
AS/NZS 4552.2	2010	Minimum energy performance standards for gas water heaters
AS 4586	2013	Slip resistance classification of new pedestrian surface materials
AS/NZS 4600	2018	Cold-formed steel structures
AS/NZS 4667	2000	Quality requirements for cut-to-size and processed glass
AS/NZS 4680	2006	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4692		Electric water heaters
AS/NZS 4692.1	2005	Energy consumption, performance and general requirements
AS/NZS 4692.2	2005	Minimum Energy Performance Standard (MEPS) requirements and energy labelling
AS/NZS 4766	2020	Rotationally molded buried, partially buried and non-buried storage tanks for water and chemicals
AS 4773		Masonry in small buildings
AS 4773.1	2015	Design
AS 4773.2		

AS/NZS 4782	2015	Construction Double-capped fluorescent lamps - Performance specifications
AS 4782.2	2019	Minimum Energy Performance Standard (MEPS)
AS/NZS 4783		
AS/NZS 4783.2	2002	Performance of electrical lighting equipment - Ballasts for fluorescent lamps Energy labelling and minimum energy performance standards requirements
AS 4785		Timber - Softwood - Sawn and milled products
AS 4785.1	2002	Product specification
AS 4785.2	2002	Grade description
AS 4785.3	2002	Timber for furniture components
AS 4786		
AS 4786.2	2005	Timber flooring - Sanding and finishing
AS/NZS 4847		Self-ballasted lamps for general lighting services
AS 4847.2	2019	Minimum energy performance standard (MEPS)
AS/NZS 4858	2004	Wet area membranes
AS/NZS 4859		Thermal insulation materials for buildings
AS/NZS 4859.1		
AS 4934	2018	General criteria and technical provisions Incandescent lamps for general lighting services
AS 4934.2	2021	Energy performance and marking requirements
AS 5039	2008	Security screen doors and security window grilles
AS 5040	2003	Installation of security screen doors and window grilles
AS/NZS 5125		Heat pump water heaters - Performance assessment
AS/NZS 5125.1		
AS 5146	2014	Air source heat pump water heaters Reinforced autoclaved aerated concrete
AS 5146.1	2015	Structures
AS 5146.3	2018	Construction
AS 5203	2016	Protection of openable windows/ fall prevention – Test sequence and compliance method
AS/NZS 5263		
AS/NZS 5263.1.2	2020	Gas appliances Gas fired water heaters for hot water supply and/or central heating
AS/NZS 5601		Gas installations
AS/NZS 5601.1	2013	General installations
AS 5604	2005	Timber - Natural durability ratings
AS 6669	2016	Plywood - Formwork
AS 11801		
AS/NZS 11801.1	2019	Information technology - Generic cabling for customer premises General requirements (ISO/IEC 11801-1:2017, MOD)
AS 11801.4	2019	Single-tenant homes (ISO/IEC 11801-4:2017, MOD)
AS ISO 13007		
AS ISO 13007.1	2020	Ceramic tiles Grouts and adhesives - Terms, definitions and specifications for adhesives
AS/NZS 14763		
AS/NZS 14763.2	2020	Information Technology - Implementation and operation of customer premises cabling Planning and installation (ISO/IEC 14763-2 (ED. 2.0) MOD)
AS/NZS 60335		Household and similar electrical appliances - Safety
AS/NZS 60335.2.35	2013	Particular requirements for instantaneous water heaters
AS/NZS 60335.2.40	2019	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
AS/NZS 60598		Luminaires

AS/NZS 60598.1		
AS/NZS 61439	2017	General requirements and tests (IEC 60598-1, Ed. 8.0 (2014) MOD) Low-voltage switchgear and control gear assemblies
AS/NZS 61439.1	2016	General rules (IEC 61439-1, Ed. 2.0 (2011), MOD)
AS/NZS 61439.3	2016	Distribution boards intended to be operated by ordinary persons (DBO) (IEC 61439- 3, Ed 1.0 (2012), MOD)
SA HB 28	1997	Design of residential slabs and footings
SA HB 109	1998	Slabs and footings for reinforced masonry slabs
SA HB 230	2008	Rainwater tank design and installation handbook
AIRAH DA09	1998	Air conditioning load estimation
BCA 2.6	2019	Performance provisions - Energy efficiency
BCA Figure 3.0.1	2019	Acceptable construction - Structural provisions - Determinations of individual actions - Wind regions
BCA 3.1.3.0	2019	Acceptable construction - Site preparation - Drainage - Application
BCA 3.1.4.4	2019	Acceptable construction - Site preparation - Termite risk management - Durable notice
BCA 3.2.2	2019	Acceptable construction - Footings and slabs - Preparation
BCA 3.2.4	2019	Acceptable construction - Footings and slabs - Site classification
BCA 3.4.1	2019	Acceptable construction - Framing - Subfloor ventilation
BCA Table 3.4.1.1	2019	Acceptable construction - Framing - Subfloor ventilation - Subfloor openings
BCA Table 3.5.1.1	2019	Acceptable construction - Roof and wall cladding - Sheet roofing - Acceptable corrosion protection for metal sheet roofing
BCA 3.5.3.4	2019	Acceptable construction - Roof and wall cladding - Gutters and downpipes - Installation of gutters
BCA 3.7.2.8	2019	Acceptable construction - Fire safety - Fire separation of external walls - Roof lights
BCA 3.7.5	2019	Acceptable construction - Fire safety - Smoke alarms and evacuation lighting
BCA 3.8.1.2	2019	Acceptable construction - Health and amenity - Wet areas and external weatherproofing - Wet areas
BCA 3.8.7.4	2019	Acceptable construction - Health and amenity - Condensation management - Ventilation of roof spaces
BCA 3.9.1	2019	Acceptable construction - Safe movement and access - Stairway and ramp construction
BCA 3.9.2	2019	Acceptable construction - Safe movement and access - Barriers and handrails
BCA 3.9.2.6	2019	Acceptable construction - Safe movement and access - Barriers and handrails - Protection of openable windows - bedrooms
BCA 3.9.2.7	2019	Acceptable construction - Safe movement and access - Barriers and handrails - Protection of openable windows - rooms other than bedrooms
BCA 3.10.5	2019	Acceptable construction - Ancillary provisions and additional construction requirements - Construction in bushfire prone areas
BCA 3.10.6	2019	Acceptable construction - Ancillary provisions and additional construction requirements - Attachment of decks and balconies to external walls of buildings
BCA 3.12	2019	Acceptable construction - Energy efficiency
BCA 3.12.1.1	2019	Acceptable construction - Energy efficiency - Building fabric - Building fabric thermal insulation
BCA 3.12.1.3	2019	Acceptable construction - Energy efficiency - Building fabric - Roof lights
BCA 3.12.1.4	2019	Acceptable construction - Energy efficiency - Building fabric - External walls
BCA 3.12.2	2019	Acceptable construction - Energy efficiency - External glazing
BCA 3.12.3	2019	Acceptable construction - Energy efficiency - Building sealing
FWPA PN06.1039	2008	Interim industry standard – Recycled timber – Visually graded recycled decorative products
NASH NASH-1	2005	NASH Standard Residential and Low-rise Steel Framing Design criteria

NASH-2	2014	Design solutions
Safe Work Aus.	2020	Code of Practice: How to safely remove asbestos
ISO 10580	2010	Resilient, textile and laminate floor coverings - Test method for volatile organic compound (VOC) emissions