NORTHERN TERRITORY GOVERNMENT

DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS

2017

standard specification for small building works

Based on NATSPEC the National Building Specification

general requirements ■ site preparation ■
concrete construction ■ steel construction ■
timber construction ■ block construction ■
insulation, sarking & pliable membranes ■ roofing ■
doors & windows ■ cladding & lining ■
suspended ceiling ■ rendering & plastering ■
joinery & fixtures ■ tiling ■ painting ■ floor coverings ■
plumbing & drainage ■ electrical installations ■
mechanical installations ■ fences ■ paving ■
landscape ■ referenced australian standards ■
other referenced standards ■ acts, regulations, authorities & codes ■
fixtures schedule ■ northern territory climate zones ■

This document specifies the general standards of materials and workmanship required by the Department of Infrastructure Planning and Logistics for small building works

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DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS

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ABOUT THIS SPECIFICATION

This document was prepared by the Department of Infrastructure, Planning and Logistics and specifies the general standards of materials and workmanship required by the Department for small building works including services and landscape.

It applies to new work, restoration work and maintenance and may be used as a blanket reference document or combined with the Project Specific Requirements to identify particular items where a selection is offered in the reference text.

The text is based on NATSPEC, the national building specification, produced by Construction Information Systems Ltd of which the Department of Infrastructure, Planning and Logistics is a stakeholder.

The referenced Australian Standards are current as of 1 September 2016 and this document is compatible with the National Construction Code of Australia 2016.

The text has been edited to specify only the type of construction common in the Northern Territory for small building works. For example, brick construction is not specified and the Roofing Section is confined to sheet metal roofing. However, the text contains specific regional and policy requirements developed by Department of Infrastructure, Planning and Logistics Officers with extensive experience in the construction industry in the Northern Territory.

This Standard Specification, will remain unchanged until an updated version is published.

John Harrison
A/General Manager, Infrastructure Investments and Contracts Division
12 December 2016

INFORMATION

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Thanks to Wicking for providing the caricatures which help to enliven a rather mundane subject.

NORTHERN TERRITORY GOVERNMENT

DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS

STANDARD SPECIFICATION
FOR SMALL BUILDING WORKS 2017

REFERENCE TEXT

REFERENCE: Read this Standard Specification in conjunction with the RFT, Project Specific Requirements and Drawings if any. Only those parts of the Standard Specification which refer to the works being carried out apply. This document may be used as a blanket reference specification referring generally to the standards of materials and workmanship required by the Department for small building works including services and landscape.

PROJECT SPECIFIC REQUIREMENTS:
The selection of specific items or materials for the works being carried out are specified in the Project Specific Requirements (PSRs) or shown as notes on the drawings.

OR

There are no separate project specific requirements in this specification. For specific items or materials for the works being carried out, refer to the drawings or scope of work if any.

PRECEDENCE: Any provision in the project specification or on the project drawings shall override any conflicting provision in the Standard Specification.

HOLD & WITNESS POINTS: These apply whether Project Control or Quality Assurance is included in the project or not. Refer to the definitions of Hold Points and Witness Points in the general requirements section of this reference specification. Tables of Hold and Witness Points are available via https://infrastructure.nt.gov.au/specification-services/technical-specifications/buildings

SITE COPY: Retain a current copy of this document on site for the duration of the works.

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STANDARD SPECIFICATION
FOR SMALL BUILDING WORKS 2017

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1. GENERAL REQUIREMENTS

1.1 GENERAL

Comply with the National Construction Code, Acts, Regulations, Australian Standards and Other Standards referenced in this specification.

Compatibility of Materials

Ensure materials which are used are compatible with all other materials which may be affected.

For example: floor covering adhesives must be compatible with the substrate sealing system used.

Making Good

Repair any damages caused during the execution of the works. Leave the works and the site of the works in a neat and clean state on completion of the works.

Manufacturers' or suppliers' recommendations

Select, if no selection is given, and provide, transport, deliver, store, handle, protect, install, finish, adjust and prepare for use the manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier. If materials or products are supplied by the manufacturer in closed or sealed containers or packages, bring the material or products to the place of use or installation in the original containers or packages.

Proprietary Items

Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item. If alternatives are proposed, submit sufficient information to the Superintendent to enable evaluation of the proposed alternatives.

Standards

Use Standards, and their amendments, current 3 months before the date for the close of tenders except where different editions and/or amendments are required by statutory authorities, including, but not limited to, NATA and the National Construction Code including the Building Code of Australia.

1.2 DEFINITIONS

Hold Point

Obtain the written approval of the Superintendent for that particular stage of the works. Where work is to be covered or concealed do not proceed past that point until approval has been received.

ITP(s)

Inspection Test Plans – detail of inspections and tests required on site or off-site for the project.

Minimum notice

Minimum notice required so that inspections may be made: 24 hours in town areas, 3 days in other areas or 5 days in remote areas.

Proprietary Items

Identifiable by naming the 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.

PSR(s)

Project Specific Requirement(s)

- appear in RFT and refer to this document which is the Technical Specification for the project which is the subject of the RFT,
- detail what selections have been made where selections need to be made,
- are amendments to specified requirements published in this Standard Specification to tailor the specification to suit the project which is the subject of the RFT.

Refer to the PSR clause in this section.

Required

Required by the contract documents or by the local council or statutory authorities.

RFT, RFQ

Request For Tender, Request For Quotation. Provisions applicable to RFTs are equally applicable to RFQs.

Supply

'Supply', 'furnish' and similar expressions mean 'supply only'.

Witness Point

Give the Superintendent sufficient written notice so that an inspection can be made.

1.3 THE CONDITIONS OF TENDER AND CONDITIONS OF CONTRACT

The Conditions of Tender and the Conditions of Contract contain additional requirements which apply to works carried out under any contract awarded by NT Government, including any works carried out using this specification.

1.4 ENVIRONMENTAL MANAGEMENT

The Standard Specification for Environmental Management applies for all construction and demolition work for building and civil works carried out by or on behalf of the Northern Territory Government. An electronic copy of that document is available at:

https://infrastructure.nt.gov.au/specification-services/technical-specifications/environmental-management

The Standard Specification for Environmental Management takes precedence over this specification.

1.5 PROJECT SPECIFIC REQUIREMENTS

Comply with all provisions in the PROJECT SPECIFIC REQUIREMENTS (PSRs) in the Request For Tender (RFT) or on the project drawings. Any conflicts must be advised in writing to the Superintendent for clarification.

1.6 TERMITE MANAGEMENT

Cross reference

Refer to CONCRETE CONSTRUCTION for Witness Points.

Standards

For new buildings: To AS 3660.1.
For in and around existing buildings and structures: To AS 3660.2.

1.6.1 Chemical soil barriers - reticulation systems - Witness Point

Submit evidence that the system complies with AS 3660.1, Section 7 (of 2014 edition) and the Building Code of Australia.

Use Fipronil based termiticide for projects at Educational institutions.
Do not use graded stone particles systems.
All slab penetrations to be fitted with termite protection collars.

1.6.2 Tests– Soil barrier – Witness Point

Submit a Registered Testing Authority laboratory analysis certificate of chemical soil barriers tested to Appendix E of AS 3660.1 if directed by the Superintendent.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

1.6.3 Termite barriers - Witness Point

Provide the Superintendent with a certificate of installation in accordance with AS 3660.1.

Notice: Provide a durable termite barrier notice permanently fixed in a prominent location to BCA Volume 1 Part B1.4 (i) and AS 3660.1 Appendix A. Generally fix to the inside of the door to the electricity meter box.

1.7 TIMBER GENERALLY

Use AFC or FSC certified timber products. Provide Documentary proof that only certified timbers are used.

1.7.1 Moisture content

Make milled products from timbers seasoned:

- To within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use.
- With no more than 3% difference between any two pieces in any one group.

1.7.2 Unseasoned timber

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

1.7.3 Durability

Provide timbers with natural durability appropriate to the conditions of use as listed below, or preservative treated timbers of equivalent durability.
Natural durability class: To AS 5604.
Minimum requirements:
Class 1 for: Timbers in contact with the ground.
Class 2 for: Timbers above ground, not in continuous contact with moisture, well ventilated, protected from moisture but exposed to the weather.
Class 3 for: Timbers above ground, not in continuous contact with moisture, well ventilated, protected with a finish, and well maintained.
Class 4 for: Timbers fully protected from moisture, indoors, above ground, and well ventilated.

1.7.4 Preservative treatment

Standard: To AS 1604.
Hazard classification: To AS 1604.1 Table D1.

1.8 RECYCLED PLASTIC GENERALLY

Definition: Products from recycled and processed plastic wastes which have undergone processes in order to create new plastic products. Proprietary products are included.
Durability: Provide recycled plastic materials appropriate to the conditions list below. Installation process must not compromise the manufacturers warrantee.
Durability demonstrated by outdoor exposure testing in accordance with AS 1745.1.
Provide evidence from the manufacturer for compliance with AS1745.1 in regard to following characteristics (as a minimum):

- Burning characteristics.
- Temperature and ultraviolet light protection.
- Resistance to vandalism.
- Shatter resistance.
- Scratch resistance.
- Impact resistance.

1.9 TESTS

1.9.1 Registered Testing Authority

As defined in the BCA.
Carry out any testing required using an authority registered by the National Association of Testing Authorities (NATA) to test in the relevant field, except for tests to installed services.

1.10 COMPLETION

1.10.1 Warranties

Name the Principal as warrantee and give the Superintendent copies of manufacturers' warranties. Electronic versions in PDF are preferred.

1.10.2 Instruction manuals

Give the Superintendent manufacturers' instruction manuals. Electronic versions in PDF are preferred.

1.10.3 Cleaning

Remove rubbish and surplus material from the site and dispose legally. Clean and tidy the work area upon completion of works.

1.10.4 Operation

Ensure moving parts operate safely and smoothly.

1.10.5 Surveyor's certificate

If requested by the Superintendent, provide a certificate which confirms that the works, including boundary fences, have been correctly located.

1.10.6 Services layout

Give the Superintendent a plan which shows the location of underground services as installed. Use the same format as the contract drawings.

1.11 AUTHORITIES' APPROVALS - WITNESS POINT

Give the Superintendent evidence of approval of the statutory authorities whose requirements apply to the works.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

1.12 AS CONSTRUCTED INFORMATION – WITNESS POINT

Standard: To AS 1100(set) Technical drawing
Document all changes and variations to the design as the work proceeds.
Provide amended versions of the information and drawings which reflect the as built conditions.
Witness Point - Provide copies of drawings in PDF and in CAD format (in AutoCAD, REVIT or MicroStation).
Provide electronic copies of the text information in A4 portrait format in Microsoft Word document electronic format and in PDF format.
Where the drawings are to be reduced, the annotation character heights shall be selected so that the annotation character heights printed are not less than 1.8 mm. The minimum resolution to be 600dpi.
Provide the amended information and drawings to the Superintendent progressively as the work proceed, with or before the claim for the variation which led to the need to amend the information and drawings to accurately reflect the as built conditions.

1.12.1 Amended drawings - Witness Point

Before the work commences provide a proposed procedure for recording and submitting the amended drawings.

Use an independent surveyor who is eligible for membership of the Institution of Surveyors Australia or the Institution of Engineering and Mining Surveyors Australia to record the changes and variations.

1.13 WORK HEALTH AND SAFETY (WHS)

Comply with Work Health and Safety (N.U.L) Act and Regulations and applicable Codes of Practice.

1.14 ASBESTOS

Refer to the asbestos clause in the Conditions of Contract.
Comply with the requirements of NT WorkSafe and the Work Health and Safety (N.U.L) Act and Regulations. Refer to the Code of Practice – How to safely remove asbestos and the Code of Practice - How to manage and control asbestos in the work place.

1.15 CONTRACTOR'S RESPONSIBILITY AND SUBMISSIONS

Required documents to be provided in electronic format, Microsoft Word or PDF.
Warranties
Provide the standard manufacturer's warranty. Name the Principal as the warrantee.
Contractors to submit details of warranties outlining the responsibilities of the manufacturers and contractors for the period of warranty.
Contractor's Environmental Management Plan (CEMP)
Submit details of procedures to protect the environment. Refer to the Standard Specification for Environmental Management. Submission of a Contractor's Environmental Management Plan (CEMP) may be required.
Inspection Test Plans (ITPs)
Submit ITPs detailing all procedures and test plans to be undertaken.
Project Control Plan (PCP)
Submit a project control plan for the project which sets out in detail all control procedures for the project. A framework Project Control Plan document is available at NTG Specification Services webpage: https://infrastructure.nt.gov.au/specification-services/tenderers-contractors-consultants-assistance
This document is to be prepared by the Contractor and not a third party.

Handover

On or before practical completion provide:

- An electronic copy of the as constructed drawings.
- A list of plant and equipment installed as part of the project. Include the following details:
  - Make
  - Model
  - Year of manufacture
  - Capacity
  - Location
- Details of the maintenance and servicing regime that will be undertaken during the defects liability period. Provide a servicing schedule for each item of plant and equipment which will be serviced and maintained during the defects liability period.

Provision of these docs will be required before the final payment can be processed, and, if required, final certificate issued.

At handover all services and utilities included in the project are to have been transferred in to the name of the client or occupant(s) of the building and/or site as directed by the Superintendent. These services and utilities include, but are not limited to;

- Phone service
- Data service including internet
- Electric power service
- Water supply service
- Sewerage service
- Gas service

1.16 TIME ALLOWED FOR ASSESSMENT OF SUBMITTED DOCUMENTS

This clause is related to documents which are to be submitted by the Contractor to the Superintendent for assessment and/or acceptance and/or approval and/or appraisal.

The documents subject to this clause include, but are not limited to:

- Traffic Management Plan
- Inspection and Test Plans
- Project Control Plan
- Quality Assurance Plan
- Work Health and Safety Plan
- Indigenous Development Plan
- Contractor's Environmental Management Plan which incorporates
  - Erosion and Sediment Control Plan
  - Acid Sulphate Soils Management Plan
  - Weed Management Plan
  - Asbestos Management Plan

The Superintendent will provide a response in respect to the submitted documents to the Contractor within a reasonable time. The length of time considered reasonable will depend on the complexity of the documents, the amount of information in the documents and the workload of the Department's personnel who will assess the documents. The length of time considered reasonable can be negotiated between the Contractor and the Superintendent. Any such negotiated time must be fair to both parties.

If the documents are rejected, not accepted, not approved or returned for modification, the Superintendent will have an additional reasonable time period to assess the amended documents.

The time taken by the Superintendent to assess submitted documents or to assess re-submitted documents and to respond to the Contractor will not be accepted as a reason for the Contractor to claim an extension of time nor to claim a variation for costs related to the preparation of, or modification to, documents to be submitted or re-submitted.

These time frames do not apply in emergency situations where faster responses are appropriate.

Resubmitted documents must be sent with the changes made clearly marked. Changes should only be made to the plans to the extent required by the Superintendent. Any changes not explicitly requested by the Superintendent but made in the resubmitted plans must be clearly visible in the document and the reasons for making the changes must be explained in a separate document or the covering email. Changes not made obvious and not explained or made obvious but not explained will not be accepted under the contract whether this is advised to the Contractor or not. Changes which were not requested but are made obvious and which are explained will be assessed during the re-assessment process.

Plans required in respect to works in specialised facilities such as health care facilities and secure facilities will be subject to responses in time frames to be negotiated.

1.17 PROJECT NOTICE BOARDS - SUPPLY, ERECT AND MAINTAIN PROJECT NOTICE BOARDS

Confirm if project notice board is required, if required allow to supply and install a notice board/project sign in accordance with the NTG standard drawings, wording and image to be supplied.

1.18 CONSTRUCTION INDUSTRY WHITE CARD

All workers on site are to undertake and complete "General Safety Induction Training for the Construction Industry" (CPCCOHS1001A) and hold a valid current NT White Card issued in their name by NT WorkSafe.

Site specific and Task specific induction training is still required for all work sites and is to be provided by the employer.

1.19 SEALING OF REVEALS AT OPENINGS

Seal reveals at openings in external walls, and in walls which are between conditioned and non-conditioned spaces, with material which is impervious to water before installing windows, doors or other items in those openings.

1.20 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2. SITE PREPARATION

2.1 GENERAL

Standards

Groundworks for slabs and footings: To AS 2870.
Earthworks: To AS 3798.
Site classification: To AS 2870 and BCA 3.2.4.

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and RFT.

2.1.1 Interpretation

Bad ground: Ground unsuitable for the purposes of the works, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground which is or becomes soft, wet or unstable.

Rock: Monolithic material with a volume greater than 0.5 m^3 which cannot be removed until broken up. The Contractor shall be deemed to have allowed for the cost of performing the required excavations in whatever material may be encountered, and no extra payment shall be paid for excavation in rock.

Subgrade: The trimmed or prepared portion of the formation on which the pavement or slab is constructed. Generally taken to relate to the upper line of the formation.

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.

2.1.2 Rock or Bad Ground - Hold Point

Hold point - If rock or bad ground is encountered, advise the Superintendent immediately. Do not carry out any further work in the affected area until and unless instructed to do so by the Superintendent.

2.1.3 Explosives

Do not use explosives.

2.2 DEMOLITION

Standard

Demolition: To AS 2601.

2.2.1 Commencement Inspection - Witness Point

Give sufficient notice so that inspection may be made of adjoining structures and services before commencement of demolition.

2.2.2 Completion Inspection - Witness Point

Give sufficient notice so that inspection may be made of adjoining structures and services immediately following completion of demolition works.

2.2.3 Photographs

If required, photograph the areas adjoining the demolition work for future reference. Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.2.4 Demolished and salvaged materials

Except for materials to be recovered and retained by the Superintendent or re-used, take possession of demolished materials and remove them from the site. Do not burn or bury demolished materials on the site. Prevent spillage of demolished materials in transit.
Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.2.5 Recycling and salvaging

Where possible, dismantle building components for off site recycling.
Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.2.6 Hazardous materials – Hold Point

Give notice immediately if any hazardous materials or conditions are found.
Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.2.7 Asbestos

Refer to GENERAL REQUIREMENTS and the asbestos clause in the Conditions of Contract. Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.2.8 Dust protection

Provide dust-proof screens, bulkheads and covers to protect existing finishes and the immediate environment from dust and debris.

Adjacent property: Protect property either adjacent or on site from interference or damage by appropriate means.

2.2.9 Reinstatement

Make good any damage caused during demolition to match the existing.

2.2.10 Support

Provide temporary support for sections of existing buildings which are to be altered and which rely for support on work to be demolished.

2.2.11 Encroachment

Prevent the encroachment of demolished materials on to adjoining property, including public places.

2.2.12 Weather protection

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 or weather damage.

2.2.13 Security

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

2.3 TREE PROTECTION

2.3.1 Trees to be retained

Retain all trees NOT marked for removal.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

2.3.2 Marking

Mark trees which are to be removed using suitable easily visible means of identification.

2.3.3 Protection

Tree protection zone: To AS 4970, Section 3.
Tree protection measures: To AS 4970 Section 4.
Protect from damage all trees which are required to remain.
Do not remove topsoil from the area within the dripline of the trees and keep this area free of construction material and debris.

2.3.4 Excavation

If excavating nearby trees required to remain, use hand methods to locate, expose and cleanly remove the roots on the line of excavation. If it is necessary to excavate within the dripline, use hand methods such that root systems are preserved intact and undamaged.

2.3.5 Damage

If a tree, which is to remain, is damaged and repair work is considered impractical, or is attempted and fails, remove the tree and the root system, if so directed. Replace the tree with a tree of the same species and a similar condition and size or pay compensation.

Compensation for damage to existing vegetation shall be borne by the Contractor as a negative variation to the Contract and determined as follows:
Maximum valuation: $2500 per tree.
Minimum valuation: $250 per tree.

2.4 CONTROL AND PROTECTION

2.4.1 Erosion control

Avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.

2.4.2 Water quality

Make sure that washout does not enter waterways or stormwater drains. Make sure that there are no cross connections between stormwater systems and sewerage systems.

2.4.3 Dewatering

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

2.5 SITE CLEARING

2.5.1 Extent

Limit clearing to areas of cut and fill and areas to be occupied by works, such as structures paving, excavation, regrading, and landscape work or to other designated areas to be cleared.

2.5.2 Clearing operations

Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble. Remove grassed soil to a depth just sufficient to include the root zone.

2.5.3 Mulching

Mulch all demolished above ground vegetation and reduce to pieces not larger than 75 x 50 x 15 mm and stockpile for reuse or remove from site. Refer to PROJECT SPECIFIC REQUIREMENTS section of the Request for Tender.

2.5.4 Grubbing

Grub out or grind stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under construction, buildings, embankments and paving, and 300 mm below the finished surface in unpaved areas. Backfill holes remaining after grubbing out or grinding with sand material to prevent ponding of water. Compact the fill material to the relative density of the existing adjacent ground material.

2.5.5 Removal of topsoil

Extent: Areas of cut or fill and areas occupied by structures, pavement and embankments.
Maximum depth: 200 mm.

2.5.6 Topsoil stockpiles

Stockpile site topsoil required for re-use and imported topsoil where necessary. Establish stockpiles to a maximum height of 1.5 m. Protect stockpiles from contamination by other excavated material, weeds and building debris.

2.5.7 Disposal of surplus material

Take possession of surplus material and remove it from the site. Remove cleared, grubbed and ground material from the site. Dispose of this material legally.

2.6 EXCAVATION

2.6.1 Extent

Site surface: Excavate the site to give correct levels and profiles required for construction, site services, paving, and landscaping. Allow for compaction or settlement or heaving.
Footings: Excavate for footings to the required sizes and depths.

2.6.2 Crawl space

Provide a clear space under timber or steel bearers. Minimum clearance 400 mm.

2.6.3 Marking

Before commencing excavation, locate and mark existing underground services in the areas which will be affected by the ground works operations including clearing, excavating and trenching.

2.6.4 Existing services

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

2.6.5 Foundations

After excavation, confirm that the foundation conditions meet the design bearing capacity.

2.6.6 Bearing surfaces

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

2.6.7 Reinstatement of excavation

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

2.6.8 Grading

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

2.6.9 Sub floor areas

Grade the ground surface under suspended floors and externally to drain ground or surface water away from buildings without ponding.

2.6.10 Rock

Do not use explosives.

2.6.11 Existing footings

Requirement: If excavation is required within the zone of influence of an existing footing, use methods including (temporary) shoring and underpinning which maintain the support of the footing and ensure that the structure and finishes supported by the footing are not damaged.

2.7 SURFACE PREPARATION

2.7.1 General

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 loose material, debris, organic matter and materials which will inhibit or prevent satisfactory placement of fill layers and compact the ground to achieve the required density.

2.7.2 Source of fill

Provide fill free from organic matter, imported on to the site from an approved source unless the fill type can be provided from spoil recovered from the excavations or designated borrow pits.

2.7.3 Fill types

Suitable material: To AS 3798 clause 4.4 including inorganic, non-perishable material suitably graded and capable of compaction to the documented density.
Unsuitable material: Do not use unsuitable material for fill in conformance with AS 3798 clause 4.3.
General fill: Inorganic material, maximum particle size 75 mm, plasticity index not exceeding 15%.
Select fill: Naturally occurring material, crushed or quarried stone, crushed gravel, or a mixture of crushed or quarried material free of lumps of clay and free from organic or other deleterious material complying with the following requirements:

Table – Select fill properties	
Property	**Value**
A.S. METRIC SIEVE	**PERCENTAGE PASSING BY WEIGHT**
75.0 mm	100
9.50 mm	30 - 100
2.36 mm	15 - 65
0.075 mm	5 - 25
Liquid Limit	Maximum 35%
Plasticity Index	2 - 15%
Linear Shrinkage	2 – 6 %.
(Passing 04.25 mm)	6% Maximum
C.B.R. - 4 day soaked at 95% MMDD at 5 mm penetration	20%

2.7.4 Locations

Use select fill under concrete building slabs and paving and general fill in other areas.

2.7.5 Placing fill

Placement: To BCA 3.2.2.
Layers: Place fill in near horizontal layers of uniform thickness no greater than 200 mm after compaction, deposited systematically across the fill area. Maximum depth of sand fill: 400 mm.

2.7.6 Placing at structures

Place and compact fill in layers simultaneously on both sides of structures, culverts and pipelines to avoid differential loading.

2.7.7 Moisture content

Moisture content: Adjust the moisture content of fill during compaction within the range of 85 – 115% of the optimum moisture content determined by AS 1289.5.1.1 in order to achieve the required density.

2.7.8 Required density

Density: Compact the subgrade and each layer of fill to the required depth and density, as a systematic construction operation and to conform to the TABLE. – FILL DENSITY. Shape surfaces to provide drainage and to prevent ponding.

2.7.9 FILL DENSITY TABLE

Table – Fill density	
Location	**Density ***
Residential: Lot fill	90
Footings and non-spanning slabs on ground areas of buildings	98
Embankments and paved areas: >0.15 m below subgrade surface <0.15 m below subgrade surface	 90 95
All other areas: >0.3 m below finished surface <0.3 m below finished surface	 90 95
* Minimum dry density ratio (standard compaction) to AS 1289.5.1.1	

2.7.10 Tests - Witness Point

Provide proof that required compaction has been achieved.

2.8 SANDLAYER

2.8.1 Material

Clean sharp sand free from deleterious material, well graded with at least 90% by weight passing the 4.75 mm sieve, and not more than 10% passing the 0.075 mm sieve.
Extent: Place a layer of sand to the area of the building under concrete slabs.
Nominal thickness: 50 mm.
Wet down before laying vapour barrier.

2.9 PILING

2.9.1 Bored piers

After excavating bored piers, remove loose material and water from the base and confirm the bearing capacity. Do not allow loose material to fall down the hole before or during concreting; provide a liner if necessary.

2.9.2 Screw-in foundations

Provide a proprietary system designed to AS 2159.

2.10 SERVICE TRENCHES

2.10.1 Excavation

If practicable, make trenches straight between access chambers, inspection points and junctions, with stable sides as near to vertical as possible and uniform grades.

2.10.2 Trench widths

Keep trench widths to the minimum consistent with the laying and bedding of the relevant service and construction of access chambers and pits.

2.10.3 Backfilling

Backfill service trenches as soon as possible after laying and bedding the service, if possible on the same working day.
Compact all materials in layers not exceeding 200 mm compacted thicknesses. Compact each

layer to the relative compaction specified before the next layer is commenced.
Backfill material: Excavated spoil or well graded inorganic material with maximum particle size of 75 mm.
- 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 sites classified M, M-D, H, H1-D, H2, H2-D, E or E-D to AS 2870: re-use excavated site material at moisture content within ± 1% of that of the adjoining insitu clay.

2.11 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

3. CONCRETE CONSTRUCTION

3.1 GENERAL

Cross reference

Refer to the following sections:
- GENERAL REQUIREMENTS section for termite management.
- FLOOR COVERINGS section and drawings for locations of vinyl floor finishes. Ensure concrete floor and sealers are compatible with adhesives.
- TILING section: Ensure concrete floor and sealer are compatible with adhesives.
- PAVING for footpaths and cycle paths. See In-situ Concrete Paving clause.

Standards

Structural Design: To withstand actions detailed in AS/NZS 1170.1.
Concrete materials, construction and structural design: To AS 3600.
Formwork design and construction: To AS 3610.
Specification and supply of concrete: To AS 1379.
Cement: To AS 3972.
Aggregates: To AS 2758.1.
Water: To AS 1379.
Chemical admixtures: To AS 1478.1 Free of chlorides, fluorides and nitrates.
Profiled steel sheeting composite formwork: Hot-dipped zinc coated sheet steel: To AS 1397.
Minimum steel grade G550.
Coloured concrete: To AS 3610.1.
Plywood Formwork: To AS 6669. Use appropriate grade for the documented design dimensions, loading and surface quality.
Ground slabs footings and damp proof membranes: To AS 2870 where appropriate.
Reinforcement: To AS/NZS 4671.
Deformed Ribbed Bar: Normal ductility class, strength grade 500 MPa, unless otherwise noted.
Round Bars: Normal ductility class, strength grade 250 MPa.
Slip resistance classification of new pedestrian surface materials: To AS 4586.
Reinforcing Mesh: Deformed ribbed, low ductility class, strength grade 500 MPa.

3.2 INSPECTION NOTICE – WITNESS POINT

Give sufficient notice so that inspection may be made at the following stages:
- Termite barrier and film underlay installed.
- Completed formwork, and reinforcement, tendons, cores and embedment fixed in place.
- Commencement of concrete placing.
- Before core filling masonry.
- Evaluation of surface finish.

3.3 TESTS

3.3.1 General

Test authority: concrete supplier or NATA registered laboratory. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Reports and records of test results: To the relevant parts of the AS 1012 series. Keep results on site.

3.3.2 Assessment process of test results

Standard: To AS 1379.
Method of assessment: Project assessment.

3.3.3 Compressive Strength - Hold Point

Sample, test, and assess: To AS 3600 and AS 1379.
Hold Point - Agree to the method of strength assessment prior to ordering concrete. Production assessment may be used if applicable and if the project is registered with the concrete producer for dissemination of production assessment statistics.

3.3.4 Other quality parameters

Sample, test and assess: To AS 1379 Section 5 using a NATA registered testing authority.
Slump: Test at least one sample from each batch before placing concrete from that batch in the work.
Rejection: Remove rejected concrete from the site.

3.3.5 Sampling

Method of sampling: AS 1012.1.
Sampling locations: To AS 1012.1 and the following:
- Slump tests: On site, at the point of discharge from the agitator.
- Compressive strength tests: Spread the site sampling evenly throughout the pour.

Table – Project assessment strength grade sampling		
Number of batches for each type and grade of concrete per day	**Minimum number of samples**	
	Columns, load bearing walls elements per batch	**Other elements per day**
1	1	1
2-5	1	2
6-10	1	3
11-20	1	4
Each additional 10	1	1 Additional

Frequency of sampling: To AS 1379 section 5 and 6 and the following:
- Slump tests: Take at least one sample from each batch.
- Compressive strength test: To Table - Project assessment strength grade sampling.

3.3.6 Making and curing of specimen

To AS 1012.8.1 and AS 1012.8.2.
Specimens for compressive strength tests: Make and cure at least two specimens from the sample of each grade. Specimen size:
- Aggregate size ≤ 20 mm: Nominally 200 x 100 mm diameter.
- Aggregate size > 20 mm: Nominally 300 x 150 mm diameter.

3.3.7 Test methods

To the relevant parts of the AS 1012 series.
Acceptance criteria:
- As documented in the **Control properties schedule - performance** (Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document).
- Early age compressive strength: As documented in the **Control tests schedule** (Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document).

Slump test: Assess slump for every batch. Perform slump test on each strength sample.
Drying shrinkage at 56 days: To AS 1012.13.

3.3.8 Embedded pressure pipes

Complete leak tests before embedding pipes.

3.3.9 Liquid retaining structures

Testing for liquid tightness: To AS 3735.

3.4 SURFACE PREPARATION

Any foreign materials such as oils, grease, waxes, form release agents, curing compounds, efflorescence, sealers, salts, laitance, or other contaminants must be effectively removed.

Abrasive blasting should be used to prepare the surfaces. All debris shall be removed following the cleaning and disposed of in an appropriate waste facility. Acid etching may only be used for horizontal surfaces only.

3.5 GROUND SLAB VAPOUR BARRIER

3.5.1 General

Provide a vapour barrier under slabs on ground including integral ground beams and footings.

3.5.2 Standard

Vapour barriers and damp proof membranes: To AS 2870 clause 5.3.3.

3.5.3 Installation

Lay underlay over the bases as follows:
- Lap joints at least 200mm and seal the laps and penetrations with waterproof adhesive tape.
- Face the laps away from the direction of concrete pour.
- Continue up vertical faces past the damp-proof course where applicable, and tape fix at the top
- Patch or seal punctures or tears before placing concrete.
- Cut back as required after concrete has gained strength and formwork has been removed.
- Do not pierce the ground slab vapour barrier.

3.6 REINFORCEMENT

3.6.1 General

Provide reinforcement, including tie wires, plastic support chairs, spacers and accessories. Identification: Supply reinforcement which is readily identifiable as to grade and origin.

3.6.2 Dowels

Round Bars, each dowel in one piece, straight, with square cut ends free from burrs. Apply two coats of bitumen emulsion to half the length of the dowel at one end. Embed the unpainted half of the dowels in the concrete placed first.

3.6.3 Minimum lap

Splice as follows:
- Mesh generally: 225 mm.
- Trench mesh: 500 mm.
- Bars: Greater of either 500 mm or 25 x bar diameter.
- Strip footing intersections and corners: For full width of intersecting reinforcement.

3.6.4 Minimum cover

External surface: 40mm
Internal surface: 20mm
Protected by membrane on ground: 30mm
Cast against ground: 50mm
Aggressive soil: 65mm

3.7 EMBEDDED ITEMS

3.7.1 Placing and fixing - Hold Point

Hold Point - Fix cores and embedded items to prevent movement during concrete placing. Obtain approval before cutting reinforcement or displacing reinforcement from its required location.

3.7.2 Tolerances on placement

Maximum deviation from correct positions:
- Embedded items generally: + 10 mm.
- Fasteners including, anchor bolts: + 3 mm.
- Anchor bolt groups for structural steel: To AS 4100 clause 15.3.1.

3.7.3 Corrosion protection

Galvanized ferrous fixings (other than stainless steel): To AS/NZS 4680 or AS 1214. Passivate galvanized surfaces to be embedded in concrete by dipping in 0.2% sodium dichromate solution. Refer to the PROTECTIVE COATINGS clause in the PAINTING section.

3.8 CONCRETE

3.8.1 Pre mixed supply

Standard: To AS 1379, by the batch production process.
Typical maximum/minimum slump: 95-80 mm. Other concrete slump may be required as shown on the drawings or in the PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document. **Concrete Grade**
Footings - N25.
Exposed slabs on ground - N32.
Internal slabs on ground - N25.
Columns & suspended slabs - N40.
Other concrete grades may be required as shown on the drawings or in the PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

3.8.2 Grout for blockwork cores

Standard: AS 3700 Materials section, grout clause.
Grout: Class S15 (to AS 1379) 15 MPa with a pourable slump, a minimum cement content of 300 kg/m3 and maximum 6 mm aggregate.

3.8.3 Tolerances

Formwork
Plumb of element > 8m high: 1:1000.
Plumb of element ≤ 8m high: To AS 3610.1.
Position: construct formwork so that finished concrete conforms to AS 3600 clause 17.5.
Reinforcement
Fabrication and fixing: To AS 3600 clause 17.5.3.
Finishes
Formed surfaces quality of surface finish: To AS 3610.1 Table 3.3.2.
Confirm conformance with the surface finish requirements of AS 3610.1 and the following;
- Visible: Class 3.
- Not visible: Class 5.

Unformed surfaces: Confirm conformance with the Flatness Tolerance Class Table for the class of finish nominated using a straight edge placed anywhere on the surface in any direction.

Table – Flatness tolerance class

Class	Measurement	Max deviation (mm)
A	2 m straight edge	4
B	3 m straight edge	6
C	600 mm straight edge	6

3.8.4 Concrete placing

Layers: Place concrete in layers not more than 300 mm thick, compact the following layer into previous layer before previous layer has taken initial set.
Slabs and pavements: Place concrete uniformly over the width of the slab so that the face is generally vertical and normal to the direction of placing.

3.8.5 Hot weather placing - Hold Point

The provisions of this clause apply to concreting where the surrounding shade outdoor temperature is greater than 32°C.
Hold Point - Mixing: Do not mix concrete when the outdoor shade temperature on the site exceeds 38°C, unless otherwise approved and then only subject to such conditions as may be imposed. Handling: Take precautions to prevent premature stiffening of the fresh mix and to reduce water absorption and evaporation losses. Mix, transport, place and compact the concrete as rapidly as possible.

3.8.6 Placing

Before and during placing maintain the formwork and reinforcement at a temperature not greater than 32°C by protection, cold water spraying, or other effective means. When placed in the forms, the temperature of the concrete must not exceed 35°C.
Temperature control methods: Submit for approval the proposed method or methods of maintaining the specified temperature of the placed concrete, which may include using chilled mixing water, spraying the coarse aggregate with cold water or covering the container(s) when transporting the concrete.
Evaporation Control: Erect barriers to protect freshly laid concrete from drying winds.

3.8.7 Compaction

Vibrate concrete to remove entrapped air.
Vibrators: Do not allow vibrators to contact set concrete, reinforcement or items including pipes and conduits embedded in concrete. Do not use vibrators to move concrete along the formwork. Avoid causing segregation by over-vibration.

3.8.8 Curing

Protection: Protect concrete from premature drying and from excessive hot, cold and/or windy conditions by a suitable approved method.
Minimum Curing Time:
- In-ground footings: 3 days.
- Fully enclosed internal surfaces: 3 days.
- Exposed footings, beams and slabs: 7 days.
- Other surfaces: 7 days.

3.8.9 Stripping times

Leave formwork for suspended structures in place after pouring concrete for the following periods:
- Vertical surfaces: 2 days.
- Bottom surfaces: 7 days with shoring and backprops left in position for 21 days.

3.9 JOINTS

3.9.1 Construction joints

Joint preparation: Roughen and clean the hardened concrete joint surface, remove loose or soft material, free water, foreign matter and laitance. Dampen the surface before placing the fresh concrete and coat with a neat cement slurry.

3.9.2 Slip joints

If concrete slabs are supported on masonry, provide proprietary pre-lubricated slip joints.

3.9.3 Movement Joints

Insert 12 mm thick Abelflex closed cell compressible filler strip in the joint.
Detach the removable top strip and fill with: Fosroc Thioflex 600.

3.10 SURFACE MODIFIERS – HOLD POINT

Hold Point - Do not use surface modifiers without obtaining prior written approval from the Superintendent.
Application: Apply to clean surfaces to the manufacturer's recommendations.
Seal the concrete with an applied sealing system which is compatible with the concrete and the adhesive to be used for the floor coverings.
The sealing system must prevent moisture from passing through the slab.

3.11 FINISHES TO UNFORMED SURFACES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Screeding

Finish slab surfaces by approved means to finished levels. Produce surfaces to tolerance Class B - maximum deviation from a 3 m straight edge of 6 mm.

Scored finish

After screeding, give the surface a course scored texture in the required direction by drawing a stiff brush or rake across the surface.

Machine floated finish

Finish the screeded surface with approved power driven equipment to a uniform smooth texture. Hand float in locations inaccessible to the machine float.
Finish: To a surface tolerance Class A.

Steel trowelled finish

Use steel hand trowels to produce the final finish free of trowel marks and uniform in texture and appearance.
Finish: To a surface tolerance class A.

Wood float finish

Produce the final finish with a wood float.

Sponge finish

After screeding and finishing with a steel trowel obtain an even textured sand finish by wiping the surface with a damp sponge.

Broom finish

After floating use a broom to produce an even textured slip-resistant surface.

3.12 MISCELLANEOUS ITEMS

Concrete strength: 25 MPa.
Clothes hoist footing: 400 deep x 250 mm diameter with a 300 x 300 x 75 mm thick concrete surround above the finished ground line weathered away from the post.
Splash Pads: Provide 600 x 600 x 50 mm thick concrete splash pads at each downpipe to direct the water away from the building.
Mowing strips: Provide 300 wide x 75 mm thick concrete mowing strips where shown on the drawings. Fall away from building and construct tooled joints at 3 m maximum centres.
Gas cylinder pad: Provide 1000 x 500 x 100 mm thick concrete base slab where shown on the drawings or as directed.
Footpath Crossings: To local authority requirements.

3.13 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

4. STEEL CONSTRUCTION

4.1 GENERAL

Cross references

Refer to the following sections:
- CONCRETE: For installation of foundation bolts.
- TILING: For waterproofing wet areas.
- CLADDING AND LINING
- ROOFING
- NT CLIMATE ZONES TABLE
- PAINTING

Standards

Anti-ponding boards: To AS/NZS 4200.2.
Structural steelwork; materials, construction, fabrication and erection: To AS 4100.
Steel framing: designed to AS 3623.
Preparation of metal surfaces: To AS 1627 series.
Cold-formed steel members: To AS /NZS 4600.
Site testing of protective coatings: To AS 3894.10 and AS 3894.11 and AS 3894.12.
Structural design actions: AS/NZS 1170.1, AS/NZS 1170.2.

4.2 MATERIALS AND COMPONENTS

4.2.1 Steel construction: cold-formed steel

Cold-formed sections from zinc-coated steel or aluminium/zinc alloy coated steel to AS 1397/Z275 or AZ150. Girts and purlins Z450 coating.

4.2.2 Self-drilling screws

Standard: To AS 3566.1.
Generally: Corrosion resistance class 2, AS 3566.2.
Exterior applications: Corrosion resistance class 4, AS 3566.2.

4.2.3 Flashings and damp-proof courses

Standard: To AS/NZS 2904.

4.2.4 Galvanizing

Galvanize mild steel components (including fasteners) to AS 1214 or AS/NZS 4680, as appropriate, if exposed to weather; embedded in masonry; or in contact with chemically treated timber.

4.2.5 Electrogalvanizing

Ferrous hollow and open sections: To AS 4750.

4.2.6 Thermal break

Roof: where metal sheet roofing is fixed to metal purlins, metal rafters or metal battens, provide a thermal break, consisting of a material with an R-value of not less than R0.2 installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.
Walls: where lightweight external cladding such as weatherboards, fibre cement or metal sheeting is fixed to a metal frame provide a thermal break, consisting of a material with an R-value of not less than R0.2, installed between the external cladding and the metal frame.

4.3 STRUCTURAL STEEL

4.3.1 Weld Procedure Specification - Hold Point

Obtain Superintendent's approval of Weld Procedure Specification (WPS) prior to commencement of any welding.

4.3.2 Certification of welders and welding supervisors

Standard: To AS 1796.
The Superintendent may at any time request to see the Welder Qualifications Records (WQR) of any welder and welding supervisor involved in the works. Use only personnel who are pre-qualified for the operations they are to perform.

4.3.3 Steelwork Inspection - Witness Point

Give sufficient notice so that inspection may be made at the following stages:
- Commencement of shop fabrication.
- Surface preparation prior to painting.
- Steelwork and column bases erected on site, prior to grouting, encasing, site painting or cladding.

Pay for the costs of weld examinations and tests, including the costs of re-examination and re-testing of repair welds.

4.3.4 Shop Drawings - Hold Point

Hold Point - Submit 2 complete sets of shop drawings showing the relevant details of each assembly, component, connection and details of transport and erection, including temporary lifting lugs etc. before commencing fabrication.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

4.3.5 Materials – Witness Point

Steel Section	Grade
Structural bars and sections to AS/NZS 3679.1	250 (Bars) 300(Sections)
Steel plate to AS/NZS 3678	250
Hollow steel sections to AS 1163	C350
Cold formed purlin and girt sections to AS 1397	G450 Z450

Witness Point - Compliance: Provide evidence that the steel used in the works complies with the required material standards.

4.4 CONSTRUCTION

4.4.1 Beam Camber

If beam members have a natural camber within the straightness tolerance, fabricate and erect them with the camber up.

4.4.2 Foundation bolts

Hexagonal bolts: To AS 1111.1.
Hot-dip galvanized: To AS 1214.
Supply each foundation bolt with 2 nuts and 2 oversize washers and provide sufficient thread to permit the levelling nut to be set below the base plate.

4.4.3 Temporary connections - Hold Point

Do not attach cleats without approval. Remove temporary cleats on completion and restore the surface.

4.4.4 Enlargement of bolt holes - Hold Point

Do not hand flame cut or otherwise enlarge any bolt holes without approval.

4.4.5 Bolts

Use Grade 4.6/S bolts unless otherwise noted.

4.4.6 Welding

Standard: To AS/NZS 1554.1 use SP category welds unless noted otherwise.
All welds to be 6 mm continuous fillet welds for full perimeter of contact unless noted otherwise (UNO).
Visually examine the total length of all SP welds, in accordance with AS/NZS 1554.1 sections 6 and 7.

4.5 PROTECTIVE COATING

Cross references

Refer to the following sections:
- GENERAL REQUIREMENTS: inspections, Submissions and approvals.
- PAINTING

4.5.1 Protective coatings - Zinc based coatings - Witness Point

Applicators to be PCCP accredited in the category applicable to the works.
Elements: All members except hot dipped galvanised or cold formed sections of purlins and girts.
Do not use DuraGal.
Surface Preparation: To AS 1627.
Remove loose millscale, rust, oil, grease, dirt, globules of weld metal, weld slag and other foreign matter.
Witness Point - Give sufficient notice so that inspection may be made at surface preparation prior to painting.
Priming: Apply the primer coat to the structural steel before delivery to the site and protect from damage during handling and transport.
Witness Point - Submit reports of site testing of protective coatings: To AS 3894.10 and AS 3894.11 and AS 3894.12 within 2 days of receiving them.
Engage an independent NATA accredited paint inspector. Pay all inspection and reporting fees and costs.
Witness Point - Provide details of inspectors name and qualifications
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Single pack zinc phosphate

Thoroughly wire brush steelwork to AS 1627.2 and prime with one coat of single pack zinc phosphate to APAS specification 0162/1 with a dry film thickness of 40 microns.

Epoxy zinc phosphate

Blast clean to the recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of epoxy zinc phosphate to APAS specification 2971 with a dry film thickness of 45 microns.

Inorganic zinc silicate

Blast clean to recommendations of AS 1627.4 to grade Sa of AS 1627.9 and prime with one coat of inorganic zinc silicate to APAS specification 2908 with a dry film thickness of 75 microns.
Site work: After erection, repair any damage to the shop coating and apply the coating, if any, omitted at site connections.
Time delay: Prime the steel surface as soon as possible after surface preparation and prior to any deterioration of the surface. If the surface is contaminated or rust bloomed, repeat the surface preparation before applying the primer.

4.6 LIGHT STEEL FRAMING SYSTEM

4.6.1 Steel stud framing system

Framing: Generally 75 x 1.6 mm G450 studs for cyclonic areas and 75 x 1.2 mm G500 studs for non-cyclonic areas externally at 450 mm max crs and 75 x 1.2 mm G500 studs internally with top and bottom plates, heads, mullions and bracing designed for the specific application.

4.6.2 Steel Framing Inspection - Witness Point

Give sufficient notice so that inspection may be made of steel framing erected on site prior to lining or cladding.

4.6.3 Fabrication

Cut members accurately to length so that they fit firmly against abutting members. Form holes by drilling or punching. Flare the holes for services or provide plastic grommets.
Weld the framing using the metal inert gas (MIG) technique or carbon arc welding. Clean the weld and coated areas affected by welding and touch up with zinc rich organic binder to APAS 2916.
Cleaning: On completion of framing remove any debris from the cavities of members.
Temporary earthing: Provide temporary earthing during erection until the permanently earthing is installed. Permanently earth completed steel frames in accordance with PowerWater regulations.
Damp course: Provide a continuous damp proof course of Super Alcor between the concrete slab and wall bottom plate.

4.6.4 Metal Roof Trusses – Hold Point

Approved manufacturer: Use metal roof trusses prefabricated by an approved manufacturer using Lysaght light steel framing sections.
Hold Point - Shop Drawings – Submit shop drawings showing the truss arrangement, location, loading, member sizes, joint details, lifting points and method of fixing and bracing.
Hold Point - Certification: Provide certification of the structural sufficiency of the truss and roof design supplied on a completed NT Building Act Section 40 structural design form.

4.6.5 Steel battens

Roof Batten: For Region C: 40 mm 0.75 BMT fixed cyclonic steel roof batten fixed to current relevant NT Deemed To Comply.
Ceiling Battens: 23.5 mm 0.42 BMT fixed to manufacturers' recommendations.
Refer to NT CLIMATE ZONES TABLE for requirements for other regions.

4.7 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

5. TIMBER CONSTRUCTION

5.1 GENERAL

Cross references

Refer to the following sections:
- GENERAL REQUIREMENTS: For termite management and timber durability.
- CLADDING AND LINING: For timber trims.
- ROOFING.
- TILING: For waterproofing wet areas.

Standards

Timber framing and flooring: To AS 1684 series.
Design: To AS 1720.1.
Anti-ponding boards: To AS/NZS 4200.2.
Flashings and damp proof courses: To AS/NZS 2904.
Self drilling screws: To AS 3566.1.

5.2 TIMBER FRAMING

5.2.1 General

Handling and protection: Do not distort or damage timber or timber products.
Moisture content: Maintain the equilibrium moisture content of seasoned timber.

5.2.2 Protection from weather

Provide temporary protection for members until permanent covering is in place.

5.2.3 Identification

Branding: Brand all structural timber, floor boards and structural plywood, under the authority of a recognised quality assurance program applicable to the product. Locate the brand mark on faces or edges to be concealed in the works. Provide a suppliers certificate showing compliance.

5.2.4 Structural Woodwork Inspection - Witness Point

Give sufficient notice so that erected structural woodwork may be inspected before it is covered, for example by cladding, lining and roofing.

5.2.5 Preservative pressure treatment

Pressure treat all structural timbers with ACQ Preservative Formulation in accordance with AS 1604.1 or alternatively with BFCA salts by the CSIRO approved dip-diffusion process. The minimum dry salt retention in permeable species is 5.6 kg/m3 to all timber with susceptible sapwood.

5.2.6 Timber grades

Hardwood: To AS 2796.1.
Grading: To AS 2796.2.
Structural Timbers: Generally F14 minimum.
Timber Trusses: To the truss manufacturer's design.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

5.2.7 Fasteners

Metal washers: Provide washers to the heads and nuts of all bolts and coach screws.
Steel straps: Zinc-coated steel to AS 1397/Z275, minimum size 25 x 1 mm or 30 x 0.8 mm.
Timber fasteners: Use fasteners capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly. Do not split or otherwise damage the timber.

5.2.8 Self-drilling screws

Standard: To AS 3566.1 and AS 3566.2.
Generally: Corrosion resistance class 3.
Exterior applications: Corrosion resistance class 4.

5.2.9 Adhesives

Use adhesives capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly and that do not cause discolouration of finished surfaces.
Structural Adhesives: To AS/NZS 1328.1.

5.2.10 Finished sizes

Use milled timbers with actual dimensions which are not less than stated dimensions, except for dimensions qualified by a term such as "nominal" or "out of" to which industry standards for finished sizes will apply. If unseasoned timber is used, or variations in moisture are likely, make allowance for shrinkage, swelling and differential movement.
Coating: Before placing bolts in contact with ACQ treated timber, coat the shank of the bolt in a grease or bituminous coating.

5.2.11 Plywood

Standard: To AS/NZS 2269.0.
Plywood formaldehyde emission class to AS/NZS 2269.0: Class E1.

Grading: Surface grade: CD.
Bond: Type A to AS/NZS 2754.1 (Int.).

5.2.12 Structural sheet flooring

Installation: Fix 17 mm thick F14 Grade structural plywood flooring with elastomeric adhesive to AS 2329 in addition to nailing or screwing. Sand junctions lightly to a smooth, level surface.

5.2.13 Timber decking

Refer to PROJECT SPECIFIC REQUIREMENTS section for manufactured composite or recycled materials.
Standard:
- Treated softwood to AS 4785.1 Section 4.
- Hardwood to AS 2796.1 Section 4.

Definition: Timber flooring with plain, bevel or pencil round edge suitable for pedestrian or light vehicle loadings in balconies, decks and access ways.
Timber (Minimum requirements): Hardwood species of durability Class 2, size 70 x 19 mm finished.
Installation: Lay in long lengths (minimum 3 spans) Stagger joints and make them over joists. Leave 4 mm between edges of boards.
Adhesive: Use a urethane elastomer adhesive in addition to screws or nails as follows;
- Continuously supported flooring: 4 mm beads at 300 mm spacing at right angles to run of flooring.
- Intermittently supported flooring: 6 mm bead along each joist or batten.

Fixing: No 10 Countersunk head tek screws to AS 3566.2 Corrosion resistance class 3. Two screws to each joist. Stainless steel round head nails may be used for timber joists, if timber joists approved.
Surface finish: Apply the first coat of decking oil all around before fixing. Apply a second coat after the deck is completed.

5.2.14 Fibre cement flooring

Compressed sheets: To AS/NZS 2908.2, Type A, Category 4.
Thickness: Generally 15 mm.
Proprietary item: Hardies or CSR compressed sheet.
Installation: Lay the length of the sheets at right angles to the joists and continuous over at least 2 spans. Stagger the end joints and locate them centrally over joists. Provide expansion joints as recommended by the sheet manufacturer.
Fixing: Fix sheeting to the supports with adhesive and non-corrosive countersunk screws. Fill the screw holes with sealant before fixing. After fixing, stop the screw heads with the same sealant, finished slightly below the sheet surface.

5.2.15 Wall framing

Gauging: Use gauged timbers in studs, noggings and plates for double faced walls.
Generally 100 x 50 mm studs at 450 mm crs max.
Timber species or group: Hardwood. Minimum stress grade F14.
Provide additional support in the form of noggings, trimmers and studs for fixing lining, cladding, hardware, accessories, fixtures and fittings as required.

5.2.16 Flashings

Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

5.2.17 Damp-proof courses

Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as follows to AS/NZS 4200.1:
- External walls: Turn up at least 75 mm on the inside and tack to studs. 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.
- All other walls: Turn up 25 mm each side of bottom plate.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.
Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarking and waterproof membranes.
Material: Super Alcor damp-proof courses (DPC).
Sealing: Apply mastic type sealant around penetrations through bottom plate and DPC.

5.2.18 Floor framing

Bearers and joists

Levelling: Level bearers and joists by checking or by packing for the full width of the member with dense corrosion resistant material which is secured in place:
- Maximum thickness of packing: 3 mm.

Spring: Lay bearers and joists to allow for straightening under loading.
Joints: Locate joints only over supports:
- Minimum bearing of bearers: 50 mm.
- Minimum bearing of joists: 30 mm.

Fixing: Secure bearers and joists to supports to provide restraint against lateral movement.
Joist restraint:
- Unseasoned timber: If joist timber is unseasoned, the span is greater than or equal to 3000 mm, and there is no ceiling lining, provide solid blocking between each joist in rows at 1800 mm centres.
- Deep joists: If the joist depth: width ratio is greater than or equal to 4, restrain joists at the ends of the joists over supports and at 1800 mm centres using either of the following as appropriate:

  - Continuous trimming joists.
  - Solid blocking or herringbone strutting.
- Trimmers or blocking dimensions:
  - Depth: Joist depth less 25 mm.
  - Width: greater than 25 mm.
- Herringbone strutting dimensions: greater than or equal to 38 x 38mm.

5.2.19 Timber fasteners

Metal washers: Provide washers to the heads and nuts of all bolts and coach screws.
Steel straps: Zinc-coated steel to AS 1397/Z275, minimum size 25 x 1 mm or 30 x 0.8 mm.

5.3 TIMBER ROOF TRUSSES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

5.3.1 Fabrication

Camber: Camber bottom chord upward.
Overhangs: Free from spring or splits.

5.3.2 Approved Timber Truss manufacturer - Hold Point

Hold Point - Use timber roof trusses prefabricated by an approved manufacturer.
Provide the name of the timber truss manufacturer prior to ordering the trusses.

5.3.3 Shop drawings - Hold Point

Hold Point - Submit shop drawings showing the truss arrangement, location, loading, timber species, grade and sizes, joint details, lifting points and method of fixing and bracing, prior to the manufacture of the trusses. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Marking: Permanently mark each truss to show the manufacturer, timber species, location, support points, project identification, tag or number and other relevant data.
Hold Point - Certification: Provide certification of the structural sufficiency of the roof truss design supplied on a completed NT Building Act Section 40 structural design form.

5.3.4 Installation

Nail plated prefabricated roof trusses: To AS 4440.
Support trusses on bottom chord at two points only, unless designed for additional support. Plumb to within the lesser of H/50 or 50 mm when H is the height of the truss at the point where plumb is being measured. No part of the truss is to be out of plumb by more than these tolerances. Provide the required ties and wind bracing. Over internal walls provide not less than 10 mm vertical clearance and use bracing methods which allow for vertical movements.
Fixing: Fix to the top plate with 50 x 6 mm mild steel over brackets with 1-M12 bolt to the truss top chord centre line and 1-M16 bolt to the structure.

5.3.5 MISCELLANEOUS ITEMS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Roof Battens: Generally 75 x 50 mm Hardwood.
Ceiling Battens: Generally 75 x 38 mm Hardwood.
Fixing: Fix in long lengths with joints at truss crossings and staggered. Double nail ceiling battens and fix roof battens to Deemed to Comply manual details.
Valley Boards: Fabricate from 19 mm exterior grade plywood and nail to each rafter.

Supports for water containers

If a water container or heater is located in the roof space provide a support platform to AS/NZS 3500.4 clause 5.5.

5.4 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

6. BLOCK CONSTRUCTION

6.1 GENERAL

Cross references

Refer to the following sections:

- GENERAL REQUIREMENTS, for termite management.
- STEEL CONSTRUCTION, for structural steelwork.

Standards

Design: To resist actions listed in AS 1170.
Masonry generally: To AS 3700
Masonry units: To AS/NZS 4455.1 and AS/NZS 4455.3.
Strengthened Areas: to BCA/NCC.

6.2 MATERIALS AND COMPONENTS

6.2.1 Steel components

Galvanizing: Galvanize mild steel components (including fasteners) to AS 1214 or AS/NZS 4680 as appropriate.

6.2.2 Masonry units

Strength: generally minimum 15 MPa for structural units, To AS/NZS 4456.4.
Colour: Generally grey.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

6.2.3 Flashings and damp-proof courses

Standard: To AS/NZS 2904.

6.2.4 Mortar materials

Cement: To AS 3972, Type GP.
Sand: Fine aggregate with low clay content and free from efflorescing salts, selected for colour and grading.
Additives: Do not provide additives unless required and approved.

6.2.5 Mortar mix

Provide mortar mixes as follows: 1:1:6 cement, lime, sand for all general block work. Other mix proportions may be required for special purposes. Measure volumes accurately to achieve the specified proportions. Machine mix for six minutes minimum.

6.3 CONSTRUCTION GENERALLY

6.3.1 Joints and cutting

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

6.3.2 Joints

Externally: Tool to give a dense water-shedding finish. Use a 12 mm diameter ironing rod.
Internally: Rake to give a key if wall is to be plastered or strike flush if concealed.
To existing: Provide a straight joint. Do not tooth new masonry into existing work.

6.3.3 Rod

90 mm high blocks: 6 courses to 600 mm.
190 mm high blocks: 3 courses to 600 mm.

6.3.4 Bond

Stretcher bond unless otherwise noted.

6.3.5 Bedding

Shell bed hollow blocks and completely fill bed joints and perpends.

6.3.6 Perpends

Keep perpends in alternate courses vertically aligned.

6.3.7 Building in

Build in wall ties and accessories as the construction proceeds. If it is not practicable to obtain the required embedment wholly in the mortar joint in hollow core brickwork or blockwork, fill appropriate cores with grout or mortar.

6.3.8 Steel door frames

Fill the backs of jambs and heads solid with mortar as the work proceeds.

6.3.9 Double face walls

Select the masonry units for uniform width and double-face qualities in single leaf masonry with facework both sides. Before commencement, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

6.3.10 Colour mixing

In unpainted facework, distribute the colour range of units evenly to prevent colour concentrations.

6.3.11 Sills

Use proprietary concrete sill units solidly bedded.

6.3.12 Appearance

Leave unpainted facework clear of mortar smears, stains and discolouration. Do not clean using an acid solution and do not erode joints if using pressure spraying.

6.3.13 Wall Chasing

Chase concrete block walls to a maximum depth of 35 mm for 190 mm blockwork or 20 mm for 90 mm blockwork. Do not chase walls nominated as fire rated or acoustic.

6.3.14 Rate of construction

Regulate the rate of construction to eliminate joint deformation, slumping or instability.

6.3.15 Protection

Contamination: Protect masonry materials and components from ground moisture and contamination.
Elements: Protect masonry from rain and hot drying winds for at least 24 hours after laying.

6.4 DAMP-PROOF COURSES

6.4.1 Location

Provide damp-proof courses to the first 3 courses and perpends, including the first mortar bed, of all walls on raft slabs or as shown on the drawings.
Damp proof course: Use mortar with a damp course admixture to manufacturer's instructions. Add a black pigment if the mortar admixture is not coloured differently to mortar without the damp course admixture.

6.5 CONTROL OF MOVEMENT

6.5.1 General

Provide joints to AS 4773.1 Section 13.

6.5.2 Control joints for concrete Blockwork

Maximum length of continuous wall: 6 m.
Minimum width of control joint: 10 mm.

6.5.3 Flexible ties and anchors

If ties or anchors extend across control joints, provide ties or anchors which maintain the stability of the masonry without impairing the effectiveness of the joint.
Proprietary Item: Masonry flexible anchors MFA3/3 installed at 400 mm centres max.

6.5.4 Joint material

Installation: Clean the joints thoroughly and insert a 19 mm diameter closed cell expanded polyethylene compressible backing rod before sealing.
Sealant depth: Fill the joints with Sikaflex - PRO flexible sealant for a depth of at least two-thirds the joint width.
Sealant Type: Polyurethane based, external, UV stable.

6.6 STEEL LINTELS

6.6.1 Cold-formed lintels

Proprietary cold-formed flat-based type designed to AS/NZS 4600.

6.6.2 Steel flats and angles

Sizes: To AS 4773.1 Table 12.1 unless detailed otherwise.

6.6.3 Material

Mild steel galvanized to AS/NZS 4680. Do not cut after galvanizing.

Corrosion protection: To AS/NZS 2699.3.

6.6.4 Installation

Install with the longer leg vertical. Keep lintels 10 mm clear of heads and frames. Pack mortar between the angle upstand and supported masonry units.
Propping: To prevent deflection or excessive rotation, temporarily prop proprietary cold-formed lintels until the masonry reaches its required strength.
Minimum propping period: 3 days.

6.7 REINFORCED MASONRY

6.7.1 Designation

Masonry required to be strengthened with embedded steel reinforcement (other than bed joint reinforcement) is designated reinforced masonry.

6.7.2 Clean out blocks – Witness Point

Location: At the base of each core to be grout filled including above bond beams and stage filled walls.
Hole size: Machine cut 100 x 100 mm.
Witness Point - Notify the Superintendent when all clean out blocks have been laid.
In blockwork use purpose-made cleanout blocks or machine cut a cleaning hole at the base of each reinforced core, located on the side of the wall which is to be rendered or otherwise concealed.

6.7.3 Cleaning core holes - Hold Point

Hold Point - Notify the Superintendent when cleaning out is completed. Reinforcement may be placed in the cores prior to the inspection. Do not grout fill the cores until cleaning out and reinforcement have been inspected and approved.

6.7.4 Sealing - Witness Point

Sealing: Following inspection of the core and reinforcement form over holes to contain core filling grout.

6.7.5 Bond beams

Use bond beams made from purpose-made hollow concrete blocks with reinforcement grouted in place. Install 6 mm fibre cement or proprietary metal closers at non reinforced cores of the wall below.
Reinforcement: As shown on the drawings.
Starter bars: Wire tie core reinforcement to starter bars.

6.7.6 Lintel blocks

6.7.7 Use purpose made U shaped blocks with reinforcement grouted in place. Core filling grout

Reference: Refer to CONCRETE CONSTRUCTION.
Structural blockwork: Fill core holes, bond beams and lintels etc. of structural blockwork with pre mixed grout.

Placing: Wait at least 3 days after construction of blockwork before placing grout. Limit the height of pours to 3 m. Grout fill all cores below ground level.

6.8 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

7. INSULATION, SARKING AND PLIABLE MEMBRANES

7.1 GENERAL

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Cross references

Refer to GENERAL REQUIREMENTS for sealing of reveals at openings.

Standards

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

Comply with Work Health and Safety (N.U.L) Act and Regulations.
Comply with the ICANZ Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.

7.2 DEFINITIONS

Condensation
The process used to describe moisture formation on a surface as a result of moist air coming into contact with a surface which is at a lower temperature. As cool air is unable to retain the same amount of water vapour as warm air, excess moisture is released as condensation.

Insulation
Typically a material or assembly of materials intended to provide resistance to heat flow. For Minimum Total R value refer to the PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Pliable building membrane
Includes damp proof membrane, sarking, insulation, vapour barrier or a combination when installed in a building structure**.**

Sarking
A material intended to collect and discharge any water that may penetrate a building (commonly described as RFL, or reflective foil laminate). Where Sarking also forms a vapour barrier, the vapour barrier properties must conform to this specification.

Sisalation
Bonded layers of aluminium foil which may be used as a flame or water retardant. Where Sisalation also forms a vapour barrier, the vapour barrier properties must conform to this specification.

Vapour barrier
A material specifically intended to restrict the transmission of vapour. Typically used for moisture proofing.

7.3 MATERIALS AND COMPONENTS

7.3.1 Insulation

Cellulosic fibre (loose fill): To AS/NZS 4859.1 Section 5.
Mineral wool blankets and cut pieces to AS/NZS 4859.1 Section 8. Only use biosoluble products rated FBS-1.
Polyester to AS/NZS 4859.1 section 7.
Polystyrene (moulded rigid cellular sheets RC/PS-M): To AS 1366.3.
Polystyrene (extruded rigid cellular sheets RC/PS-E): To AS 1366.4.
Polyurethane (rigid cellular sheets RC/PUR): To AS 1366.1.
Reflective thermal insulation: To AS/NZS 4859.1 Section 9.
Wool: To AS/NZS 4859.1 Section 6.
Composite foam and foil blankets or boards: To AS 4859.1.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

7.3.2 Pliable material

Use heavy weight materials.
Standard: To AS/NZS 4200.1.

7.3.3 Wire support to roof insulation

Use support mesh of 1.25 mm diameter galvanized wire welded in a grid of 100 x 115 mm.
Safety mesh to statutory requirements may also be used to support sarking.
Standard: To AS/NZS 4389.
Size: 300 x 150 mm grid of 2 mm diameter galvanized wire.

7.4 INSPECTION NOTICE - WITNESS POINT

Give sufficient notice so that inspection may be made of the pliable membranes, sarking, vapour barriers and insulation before they are covered up or concealed.

7.5 INSTALLATION

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document for minimum R values.

7.5.1 General installation requirements

Insulation must comply with AS/NZS 4859.1 and be installed so that it—

- abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
- forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
- does not affect the safe or effective operation of a service or fitting.

Reflective insulation

Reflective insulation must be installed with—

- the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
- the reflective insulation closely fitted against any penetration, door or window opening; and
- the reflective insulation adequately supported by framing members; and
- each adjoining sheet of roll membrane being—
    - overlapped not less than 150 mm; or
    - taped together.

Bulk insulation

Bulk insulation must be installed so that—

- it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
- in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 150 mm.

7.5.2 Bulk insulation

Standard: To AS 3999. Make sure fibre batts or blankets are firmly butted and fitted tightly between framing members with no gaps except as follows:

- Do not obstruct access holes or vents.
- At light fittings to AS/NZS 3000 clause 4.5.
- At electrical cables: To AS 3999 clause 2.6.

If cables will be in contact with expanded polystyrene (EPS) insulation, ensure the cable is sheathed in low plasticiser migration PVC or wrap cable in polyester tape.

If support is not otherwise provided, secure nylon twine to the framing and stretch tight.

Insulation material: fibreglass blankets or batts; refer to the PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document. for minimum R-value requirements.

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

Marking: Deliver mineral wool products to the site in the original manufacturers' packaging.

7.5.3 Pliable Material

Installation: To AS/NZS 4200.2 and to the BCA.

7.5.4 Wall sarking

Provide sarking where shown on the drawings, behind external facing material which does not provide permanent weatherproofing, or behind cladding which may be subject to condensation forming on the internal face, including:

- Boards fixed vertically or diagonally.
- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.
- Unpainted or unsealed cladding.
- Behind external cladding in bushfire prone areas to AS 3959.
- Masonry veneer.

Installation: Apply to run horizontally to the outer face of external wall framing from the bottom plate, over the flashing, up to the top plate. Pull taut over the framing and fix to framing members. Provide horizontal laps at least 150 mm wide with the direction of the laps ensuring that water is shed to the outer face of the membrane.

At windows, run over the head flashing.

Where the wall sarking also acts as a vapour barrier, lap and seal as for roof sarking to form a continuous air tight seal. Refer to the VAPOUR BARRIER clause.

7.5.5 Roof sarking

Provide sarking to metal roofs as detailed on the drawings.

Installation: Lay the sarking to the whole of the roof area running parallel to the purlins or battens and lapped 150 mm over the purlins or battens.

Use support mesh to sarking on exposed roofs. Ridge ventilation: Finish sarking at least 50 mm clear of ridges.

Note: Where the sarking also forms a vapour barrier refer to the Vapour Barrier clause.

7.5.6 Combined Insulation and Sarking

Standard: To AS/NZS 4859.1. Use a medium/heavy weight reflective foil factory bonded to an insulation blanket with a minimum R-value of 2.0 Lap the insulation material a minimum of 150 mm at joints. Tape joins at edges of the blanket, both top and bottom. Refer to Vapour Barrier clause if to be used in combination with vapour barrier.

7.6 VAPOUR BARRIER

Standard To: AS/NZS 4200.1 and AS/NZS 4200.2

Single layer of heavy weight sisalation, Bradford Thermofoil 753 High Impermeability, or equivalent, over a single layer of insulation or a bonded layer of insulation fixed to a perforated reflective foil material. Bonded perforated foil to the underside.

The vapour barrier for the roof must be impermeable to vapour and provide moisture proofing including at laps, at edges and at penetrations through the vapour barrier membrane. In masonry construction the vapour barrier to the walls is generally provided by an external painted membrane finish.

Requirement: Achieve to the maximum extent of air tight separation between air conditioned and non-air conditioned spaces to prevent moisture transmission. This includes between internal non air conditioned spaces and air conditioned spaces.

7.6.1 Vapour Barrier Installation

Vapour barriers in the roof must be laid on the high vapour pressure side (hot side) of the whole of the roof area, running parallel to the purlins and lapped 150 mm over the purlins, limit the tension and contact with roof metal sheet to reduce thermal transmission; this applies to Climate Zone 1 (BCA). For Climate Zone 3 (BCA) design and specify for the specific requirements for that Region.

Seal the laps and smaller penetrations with approved heat resistant pressure sensitive tape 75 mm wide and elastomeric (polyurethane) sealant to form a continuous air tight seal. The elastomeric sealant used must be compatible with the membrane material.

Masonry walls – Seal vapour barrier membrane to walls with elastomeric sealant and mechanically clamp with metal angle brackets to the wall. If vapour barrier extends from the underside of the roof to the top of the wall, fix metal angles between roof beams to support vapour barrier at roof level. The elastomeric sealant used must be compatible with the materials with which it is in contact.

Frame construction – Ensure the roof vapour barrier is lapped and sealed over the wall vapour barrier. The vapour barrier must be installed on the high vapour pressure side (hot side) of the wall.

Where roof beams pass through the vapour barrier - Weld or mechanically fix metal flanges to the beam, seal with elastomeric sealant and mechanically clamp to the vapour barrier to all surfaces of the beam and to the faces of the flanges. Ensure there are no gaps between beams and flange which could allow air to pass from one side of the vapour barrier to the other. Refer to drawings if available. **Large penetrations such as for ducts or flues -** Fix angle flanges or purpose made straps to the duct

or flue and mechanically clamp and seal the vapour barrier to all sides with elastomeric sealant. No fixings are to penetrate through the duct. Ensure the vapour barrier material is supported to prevent stressing the seal. Refer to drawings if available.

Where box gutters are incorporated into the roof design - Ensure the continuity of the vapour barrier under and around the gutters. Support the vapour barrier at the sides of gutters with plywood or sheet metal infills from the underside of the roof down to the gutter board. Ensure vapour barrier is not damaged during installation.

Any penetrations including service penetrations to the vapour barrier must be fully sealed with approved pressure sensitive tape and elastomeric (polyurethane) sealant compatible with materials with which it will be in contact.

7.6.2 Continuous Air Conditioning - Hold Point

Where the air conditioning systems are to be run continuously, additional design features need to be incorporated to ensure long term effectiveness of the vapour barrier. Instances include fully supporting the foil vapour barrier across the roof by sheeting the whole roof area with plywood. Extend this plywood backing from the roof to the top of the wall.

Hold Point - Design features and alternative methods must be approved by the Superintendent and, if an approved product is used, confirm manufacturer's instructions and recommendations with Superintendent. Refer to detail drawings if any.

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

7.6.3 Laps

Where the sarking also forms a vapour barrier: seal the laps and penetrations with elastomeric (polyurethane) sealant and heat resistant pressure sensitive tape 75 mm wide to form a continuous air tight seal. Turn vapour barrier down into the walls and ensure that the laps are mechanically fixed and fully sealed at all junctions, caps and penetrations.

7.6.4 Blanket for sound insulation

Install reflective thermal insulation (if any), and mesh support, over the roof framing, so that the blanket is in continuous contact with the underside of the metal roofing sheets. Ensure minimum required thermal and sound insulation levels are achieved.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Refer to Vapour Barriers Typical Details: https://infrastructure.nt.gov.au/specification-services/technical-specifications/buildings

7.7 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

8. ROOFING

8.1 GENERAL

Cross reference

Refer to the following sections:
- INSULATION, SARKING AND PLIABLE MEMBRANES - For roof sarking and safety mesh requirements.
- STEEL CONSTRUCTION - For material and component requirements and for steel battens.
- TIMBER CONSTRUCTION
- PAINTING

8.1.1 Protection

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

8.1.2 Thermal movement

Requirement: provide for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

8.1.3 Metal separation

Requirement: Prevent direct contact between incompatible metals, and between green hardwood

or chemically treated timber and aluminium or coated steel, by either:

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

8.2 MATERIALS AND COMPONENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

8.2.1 Roof material

Formed from G550 steel (or G300 for curving) with an AM 125 Finish conforming to AS 1397. Minimum 0.48 mm BMT. Protection: Protect the roof sheets from damage during handling and storage and prevent damage by moisture in stacked sheets.

8.2.2 Safety mesh

Provide Safety mesh, as a fall protection barrier (fall-arrest). Comply with the requirements of the Work Health and Safety (N.U.L) Act, Regulations, and AS 4389.

8.2.3 Prepainted Steel

Prepainted steel sheet, factory finished with a polyester finish to AS/NZS 2728.

8.2.4 Thermal break

Where metal sheet roofing is fixed to metal purlins, metal rafters or metal battens, provide a thermal break, consisting of a material with an R-value of not less than R0.2 installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

8.2.5 Flashing material

Use material with the same finish and from the same manufacturer as the roofing sheets.
Thickness: 0.55 mm BMT steel sheet.

8.2.6 Fasteners

Self-drilling screws: To AS 3566.1 and AS 3566.2, complete with washers and EDPM black, non-conductive seals. Use fasteners which have a 10 year warranty for ISO 9223 Category 5 atmospheric conditions and a 25 year warranty for ISO 9223 Category 4 atmospheric conditions (Climaseal® 5 or equal equivalent) approved for use on roof sheeting by manufacturer.

For Atmospheric Corrosivity Classification	Use Corrosion Resistance Class
AS 3715, ISO 9223	**AS 3566.2**
5 & 4	4
3	3
Refer to NT CLIMATE ZONES TABLE	

Exposed fasteners: Provide fasteners which are prefinished with an oven baked polymer coating to match the roofing material.
Fixings: Use only approved metal fixings.

When replacing sheet roofing use new fasteners – do not re-use old fasteners.

8.2.7 Roof lights

Type: As scheduled or shown on the drawings and fitted in accordance with the Northern Territory Deemed to Comply Manual.

8.3 INSPECTION OF SUBSTRUCTURE – WITNESS POINT

Give sufficient notice so that inspection may be made of the substructure before fixing the roof sheeting.

8.4 ROOF STRUCTURE ALIGNMENT

Check and adjust the alignment of the roof structure before fixing any sheets.
Battens: 2 mm maximum mismatch at abutting ends.
Roof Plane: 5 mm per metre maximum deviation across the battens from a plane parallel to the specified roof slope.

8.5 METAL FASCIA & BARGE

Stratco 0.55 mm BMT prepainted steel 210 mm or 185 mm deep to suit the particular application. Fixing: Fix to rafter ends with proprietary fixing clips in accordance with manufacturer's instructions. Provide corner trims, end trims and cappings as required.

8.6 METAL ROOFING

8.6.1 Design and installation

Standard: To AS 1562.1.
Corrosion protection: To BCA Table 3.5.1.1a.
Prepainted and organic film/metal laminate products: To AS/NZS 2728.
Fixing: Fix the sheeting in accordance with the Northern Territory Deemed to Comply Manual standards.
Pitch: NTCZ03 and NTCZ04; CustomOrb 12½° minimum, other profiles 5° minimum.

8.6.2 Visible accessories

Finish: To match roofing sheets or as documented in design drawings.

8.6.3 Eaves

Treat ends of sheets as follows:

- Close off ribs at tops and bottoms of sheets by mechanical means or with purpose-made end caps.
- Turn ends of pans up at tops and down into gutters at bottoms by mechanical means.
- Project sheets 50 mm into gutters.
- Fit purpose-made ridge and eaves fillers of closed cell polyethylene similar to Unisil.

8.6.4 Swarf

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

8.7 ROOF PLUMBING

8.7.1 Selection and installation of rainwater goods

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Standard: To AS/NZS 3500.3.
Metal rainwater goods: To AS/NZS 2179.1.
Sealing: Seal fasteners, mechanically fastened joints and the holes of blind rivets with silicone sealant.
Fixings: Use only approved metal fixings.

8.7.2 Flashings and cappings

Standard: To AS/NZS 2904.
Flash projections above or through the roof with two part flashings consisting of an apron flashing and an overflashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection. Continue overflashing to the roof ridge.
Large penetrations to low pitched roofs: Extend the base flashing over the roofing ribs to the ridge to prevent ponding behind the penetrating element.
Wall abutments: Where a roof abuts a wall, provide overflashings, stepped to the roof slope in masonry and planked cladding, otherwise raking, and as follows:

- Masonry or concrete: Built into a 25 mm deep raking saw cut.
- Planked cladding: Stepped.

Pipe Penetrations: Seal with a neoprene coupling clamped to the pipe and fixed to the profile of the roof sheeting.
Proprietary Item: Dektite flashings by Deks-Thyer Pty Ltd.
Colour: To match the roof sheeting.
In Concrete or Masonry: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

8.7.3 Gutters

Standard: To AS/NZS 2179.1.
Generally: Prefabricate gutters to the required shape where possible. Form stop ends, bends and returns. Turn down into outlets. Provide overflows to prevent back-flooding.
Minimum slope of eaves gutters: 1:200.
Eaves Gutters: High fronted square profile with overflow slots. Size 125 x 100 mm.
Material: Prepainted Steel 0.55 mm BMT.
Fixing: Fix to fascia with 40 mm x 1.0 mm galvanized brackets at 900 mm max. centres with overstraps.
Expansion Joints: Form expansion joints at max.
12 m centres by stop ending the gutter sections and saddle flashing over the two stop ends.
Valley Gutters: Profile to suit the valley boards. Turn back both edges 180^{o} x 12 mm high. Screw to valley boards at the top to prevent creep.
Minimum overall width: 400 mm.
Material: 0.55 BMT steel sheets.
Finished to match the roof sheeting.
Box Gutters: Form to required falls with top edges level and returned 20 mm at 90^{o}. T.I.G. welds stop ends and outlets for downpipes and overflows. Fabricate rainwater sumps as detailed.
Material: 0.9 mm Grade 304 stainless steel, 2b finish.

8.7.4 Downpipes

Material: 0.55 mm BMT Prepainted steel. Prefabricate downpipes to the required section and shape with lock seams. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains. Fabricate joints, bends, offsets and provide accessories including supports and fittings as required.
Access Cover: Provide a removable watertight access cover at the foot of each downpipe stack.
PVC Downpipes: Use a proprietary system of bends, connections and fittings.
Downpipe support: Provide supports and fixings for downpipes.

8.8 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9. DOORS AND WINDOWS

9.1 GENERAL

Cross references

Refer to the following sections:

- LINING, for architraves.
- PAINTING, for priming of frames and doors before installation.
- MECHANICAL INSTASLLATIONS, for requirements for door grilles.
- GENERAL REQUIREMENTS for sealing of reveals at openings.

Standards

Structural design actions To: AS/NZS 1170, AS/NZS 1170.1 and AS/NZS 1170.2.

Minimum clear opening

Generally 850 mm minimum clear opening. To AS 1428.1.

9.1.1 Door furniture mounting height

Standard: To AS 1428.1.

9.2 MATERIALS AND COMPONENTS

9.2.1 Marking

Identification:
Deliver materials to the site in the manufacturer's original sealed containers or packaging, legibly marked to show the following:

- Manufacturer's identification
- Product brand name
- Product type
- Quantity
- Product reference code and batch number
- Date of Manufacture
- Material composition and characteristics such as volatility, flash point, light fastness, colour and pattern. Provide technical data sheets if not shown on labels
- Handling and installation instructions
- Material safety data sheets

9.2.2 Flashings

Standard: To AS/NZS 2904.

9.2.3 Metal finishes

Zinc plating: To AS 1789, at least service condition number 2.

Aluminium extrusions: To AS/NZS 1866.

Anodising: To AS 1231, thickness, minimum 15 microns to max 20 microns.

Thermoset powder coating: To AS 3715 – Grade: Architectural coating.

9.2.4 Glass

Selection and installation: To AS 1288.
Types and quality: To AS/NZS 4667.
Safety Glazing: To AS/NZS 2208.

9.2.5 Doors

In general: To AS 2688 AS 2689 & AS 1909.
Timber doors: As per 9.5 Timber Doors clause.
Security screen doors and window grilles: To AS 5039 and to AS 1170.2 – confirm the impact resistance and strength required with the Superintendent.
Refer to Security Screen Doors and Window Grilles clause.
Fire Doors: To AS 1905.1 and BCA Spec C3.4.
Garage Doors: To AS/NZS 4505.

9.2.6 Windows

Selection: To AS 2047.

9.2.7 Preglazing

Supply inclusive of glazing, shop preglazed.
Bushfire Screens: To BCA table SA 3.7.4.1 and to AS 3959.

9.2.8 Locksets and hardware

Standards: To AS 4145 series.
Refer to NT CLIMATE ZONES TABLE for corrosion resistance category.

For areas subject to highly corrosive conditions not due to proximity to natural bodies of salt water or rainfall or A/C induced condensation, use corrosive resistance category C8, C9 or C10 to suit the conditions in that area.
Bright or satin chrome finish on brass for all locksets and hardware for doors and windows. Coating to severe ratings.

Locksets and hardware: To AS 4145					
NT Climate zones	1	2	3	4	5
SL, S, D, C, K, Sc	6	6	7	7	6
Refer to PROJECT SPECIFIC REQUIREMENTS					

9.3 CONSTRUCTION GENERALLY

Standards

Window installation: To AS 2047.
Security screen doors and window grilles installation: To AS 5040.

9.3.1 Flashings and weatherings

Install flashings, weather bars, drips, storm moulds, caulking and pointing so that water is prevented from penetrating the building between frames and the building structure.
Refer to GENERAL REQUIREMENTS for sealing of reveals at openings.

9.3.2 Installation

Install doorsets and windows so they are plumb, level, straight and true; are adequately fixed or anchored to the building structure; allow for thermal movement, and will not carry building loads, including loads caused by structural deflection or shortening.

9.4 STEEL DOOR FRAMES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.4.1 Description

Use frames assembled from zinc coated steel sections, including necessary accessories such as grommet type buffers, strike plates to suit the specified hardware, spreaders, mortar guards, switch boxes, fixing ties or brackets, and cavity flashing with suitable provision for fixing hardware; prefinished with protective coatings, built in or fixed to prepared openings.

9.4.2 Sections

Incorporate rebates or double rebates where required for side hung doors or glazed transoms.
Coated steel sheet: To AS 1397.

- coating class interior: Z100.
- coating class exterior: Z275 or Z450.

Frame material: 1.2 mm thick zincanneal (Bluescope G2S).

9.4.3 Assembly method

Welded: Shop assemble frames by continuous welding across mitred flanges. Grind welds smooth and cold galvanize the welded joints before shop priming with primer to APAS 2916.

9.4.4 Shop priming

Shop prime the sections for the painting system.

9.4.5 Fixing

Generally build in metal window and door frames in masonry as the work proceeds using proprietary galvanized fixing clips at 400 mm centres.

9.4.6 Packing

Pack behind fixing points with durable full width packing.

9.4.7 Linings

Provide reveal and jamb linings as necessary.

9.5 TIMBER DOORS

General

Proprietary doors manufactured for interior or exterior applications and for the finish required.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Door construction

NT Designated doors
NT1 External Honeycomb-cored flush door.
NT2 External solid core flush door.
NT3 Internal Honeycomb-cored flush door.
NT4 Internal Honeycomb-cored flush door. (wet areas)
NT5 Timber louvre door.

Special door types – NT designation

TYPE (NT1) - EXTERNAL HONEYCOMB - CORED FLUSH DOOR
Thickness: 38 mm.
Face Panels: 6 mm exterior grade (B Bond) with face veneers equal to Quality A to AS /NZS 2271.
Framing: 90 mm stiles, top and bottom rails.
Lock Block: 600 mm x 75 mm installed at mid height of stile.
Core: Heavy duty kraft paper with an expanded cell size not exceeding 35 mm.
Edge Strips: 12 mm minimum top and sides.
(kiln dried) 20 mm minimum bottom.
Adhesives: Core infills and face panels (machine pressed) - urea formaldehyde resin, edge strips - melamine fortified urea formaldehyde resin, securely pinned.

9.5.1 TYPE (NT2) - EXTERNAL SOLID CORE - FLUSH DOOR

Thickness: 38 mm.
Cross Band Veneer: 1.5 mm minimum with the grain of the veneer adjacent to the core at right angles to the grain of the core and of the same species on both sides of the door.
Face Veneer: Exterior grade (B Bond) with face veneer equal to Quality A to AS/NZS 2271.
Core: Radiata Pine to AS 4785.1 bonded with PVA adhesive, maximum width of core strips 50 mm.
Edge Strips: 12 mm minimum top and sides.
(Kiln dried) 20 mm minimum bottom.
Adhesives: Face panels (machine pressed) - urea formaldehyde resin, edge strips - melamine fortified urea formaldehyde resin, securely pinned.

9.5.2 TYPE (NT3) - INTERNAL HONEYCOMB - CORED FLUSH DOOR

Thickness: 38 mm.
Face Panels: 4.8 mm prime coated hardboard.
Framing: 32 mm minimum stiles and top rail, 90 mm minimum bottom rail.
Lock Block: 600 mm x 75 mm installed at mid height of stile.
Core: Heavy duty kraft paper with an expanded cell size not exceeding 35 mm.
Adhesives: Core infills and face panels (machine pressed) - urea formaldehyde resin.

9.5.3 TYPE (NT4) - INTERNAL HONEYCOMB - CORED FLUSH DOOR (Wet areas)

Thickness: 38 mm.
Face Panels: 4.8 mm resin tempered hardboard.
Framing: 32 mm minimum stiles and top rail, 90 mm minimum bottom rail.
Lock Block: 600 mm x 75 mm installed at mid height of stile.
Core: Heavy duty kraft paper with an expanded cell size not exceeding 35 mm.
Adhesives: Core infills and face panels (machine pressed) - urea formaldehyde resin.

9.5.4 TYPE (NT5) - LOUVRED DOOR

Thickness: 38 mm.
Material: Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Construction: To AS 2688 Section 10.
Finish: Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.5.5 Adhesives

Internal doors: To AS/NZS 2270.
External doors: To AS/NZS 2271.

9.5.6 Edge Strips

Fix hard wood edge strips to all edges to finish a minimum of 10 mm thick.

9.5.7 Tolerance

Squareness: Not more than 3 mm between lengths of diagonals.
Twist: Not more than 3 mm between the perpendicular measurements from the diagonal corners.
Nominal size:
- Height: +0, -2 mm

- Width: +0, -2 mm

9.5.8 Painting

Priming: Prime all areas subjected to paint removal during the course of fitting hinge housings, locks and the like, prior to hanging.
Painting: Within forty-eight hours of hanging and prior to the installation of door handles, weather excluders and the like (latches and locks excepted), undercoat all surfaces, followed by a minimum 1 finishing coat to all surfaces including top and bottom edges. The final coat may be applied at a later stage.

9.6 HINGES

9.6.1 Number of Hinges

Provide 4 hinges for all leaves between 2040mm – 3050 mm high.
Small door leaves: Door leaves not exceeding any of the following: 3 hinges each:
- 2040 mm high
- 850 mm wide
- 30 kg mass

Other door leaves:
Provide at least 4 hinges for all door leaves controlled by door closers.
Provide 4 hinges for door leaves with widths over 850 mm.

9.6.2 Hinge material

Aluminium hinges: provide high tensile aluminium hinge, with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.
Doors fitted with closers: Use low friction bearing hinges.

9.7 DOOR FURNITURE

9.7.1 Supply

Delivery: Deliver door hardware items, 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, fixings and fixing instructions.

9.7.2 Fasteners

Materials: Provide materials compatible with the item being fixed, and of sufficient strength, size and quality to perform their function.
- Concealed fixings: Provide a corrosion resistant finish to concealed fixings.
- Exposed fixings: Match exposed fixings to the material being fixed.

Security: Locate exposed fixings to lock furniture on the inside faces of external doors.
Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fixings.

9.7.3 Hinges

Metal frames: Fix hinges using metal thread screws.
Timber doorsets: Install butt hinges in housings equal in depth to the thickness of the hinge leaf (except for hinges designed for mounting without housing), and fix with countersunk screws.

9.7.4 Door Stops

Install door stops to prevent door furniture striking the wall or other surface.

9.7.5 Door Seals

Provide door seals to the bottom of all external doors. Proprietary Item: Raven RP4. Thresholds to be AS 1428.1 compliant.

9.8 SLIDING INTERNAL DOORS

9.8.1 General

Suspend sliding doors from overhead tracks and wheel carriages appropriate to the size and mass of the doors.

9.8.2 Accessories

General: Provide overhead track supports and head and jamb linings appropriate to the arrangement of the door, and removable prefinished metal 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.

9.9 SECURITY SCREEN DOORS AND WINDOW GRILLES

9.9.1 Standards

Security screen doors and security window grilles: To AS 5039.
Installation of security screen doors and window grilles: To AS 5040.
AS 5041: methods of test – security screen doors and window grilles.

9.9.2 General

Security screen includes impact resistant framing and functions as a complete security system.
Use a proprietary system of extruded aluminium frames and infill of woven wire security mesh (galvanised or stainless steel).
In areas with Atmospheric Corrosivity Classification 5 use stainless steel mesh or perforated stainless steel sheet. Refer to NT CLIMATE ZONES TABLE. Powder coat colour as specified or as noted on drawings. Materials to AS 5039. Fix in accordance with AS 5040.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.10 ROLLER SHUTTERS – WITNESS POINT

Standard To AS 1170.2 for wind action resistance
Refer to NT CLIMATE ZONES TABLE.
Witness Point - Certificate: Provide an N.T Building ACT Section 40 structural design certificate.

9.10.1 Manual operation

Use a proprietary system comprising a flexible curtain sliding between vertical guides incorporating windlocks and operating mechanism of a hand pulled chain or for smaller units a spring balanced inertia movement.

9.10.2 Motorised operation

Provide a proprietary operator with a limit switch, manual safety stop and reversing mechanism, and overload cutout operated by a battery-powered radio remote controller and by a direct push-button or key switch. Locate operating switch 1.5 m above floor level.

9.11 LOCKSETS

9.11.1 External doors

Standard To: AS 4145 series.
Refer to NT CLIMATE ZONES TABLE for corrosion resistance category.
Provide a push-button key and knob deadlock set to each door.
Security screen doors: Whitco double cylinder deadlock with internal snib.

9.11.2 Internal doors

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

9.11.3 Door lockset mounting heights

To centreline of spindle: 1 m above finished floor.

9.11.4 Keying

Number of keys: Provide 2 keys for each lock.
Key external doors on domestic premises (excluding garage doors) alike and key windows alike.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.12 WINDOWS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.12.1 Design

Assemblies: Design the windows and external door assemblies, including glazing, framing and fixings in accordance with AS/NZS 1170.1, AS/NZS 1170.2, AS 4055, AS 1288, and AS 2047.
Pressures: Design the assemblies to be capable of resisting the most adverse combination of pressures as set out in AS/NZS 1170.2.
Suction: Design the assemblies to take into account the high local suction factors as given in AS/NZS 1170 .2.
Human Impact: Design the assemblies to take into account the human impact requirements as given in AS 1288.

9.12.2 Frame Sections

Sections: The window and door frame sections shown on the drawings are indicative only to show the required relationships between openings and adjoining surfaces.
Provide sub seals to all windows.
Refer to GENERAL REQUIREMENTS for sealing of reveals at openings.

9.12.3 Shop Drawings - Hold Point

Submit shop drawings showing the layout and construction and fixing details a minimum of 14 days prior to ordering materials.

9.12.4 Certification - Witness Point

Provide a completed NT Building Act Section 40 Certificate of Compliance form, indicating that the entire assembly when installed as detailed complies with the requirements of AS/NZS 1170, AS 1288 and AS 2047. State on the certificate the design criteria used, and that the installation is in accordance with the Contract Documents. Supply calculations if requested.

9.13 GLAZING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Glass Thickness: To AS 1288.
Glass Types:
- General Use: Clear Float Glass
- Tinted Glass: Grey Tinted Float Glass
- Safety Glass Toughened or Laminated
- Obscure Glass: Satinlite
- Mirrors: Silvered Float Glass

Safety Mirrors: Vinyl backed Grade A safety mirror complying with AS/NZS 2208.
Glazed Shower Screens: Use a proprietary system comprising extruded aluminium frames with a powder coat finish and fixed so that water sheds to the inside.
Mirrors: Seal the edges against moisture. In wet areas entirely seal the space behind the mirror.

9.14 CONSTRUCTION

9.14.1 Joints

Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

9.14.2 Insect Screens

Black anodised aluminium mesh beaded into an extruded aluminium frame and attached to the window by a clipping device to permit removal and finished to match the window frames.

9.14.3 Security Screens and Grilles

Standard: To AS 5039.
Installation: To AS 5040.

9.14.4 Security Screens

Use a proprietary system of extruded aluminium frames and infill of woven galvanized wire security mesh or perforated stainless steel sheet. Security screen and impact resistant framing functions as a complete security system. In areas with Atmospheric Corrosivity Classification 5 use stainless steel mesh or perforated stainless steel sheet. Refer to NT CLIMATE ZONES TABLE. Powder coat colour as specified or noted on drawings. Fix to the building with tamper resistant fastenings. Finish to match the window frames.

9.14.5 Security Grilles

Proprietary metal security grille or woven galvanised or stainless steel mesh or perforated stainless steel sheet in aluminium frames fixed to the building with tamper resistant fastenings and finished to match the window frames.

9.14.6 Debris Screens

Mesh debris: To AS 1170.2 in aluminium frames and finished to match the window frames. Refer to drawings and to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

9.14.7 Louvre Windows

Aluminium galleries with adjustable black plastic clips and dual operating mechanisms screw fixed to the mullions and jambs.
Louvre Blade width: 150 mm nominal.
Glass Louvre Blades: To AS 1288 with arrised edges.
Metal Louvre Blades: Proprietary pre finished metal blades complying with the design requirements.

9.15 INSTALLATION

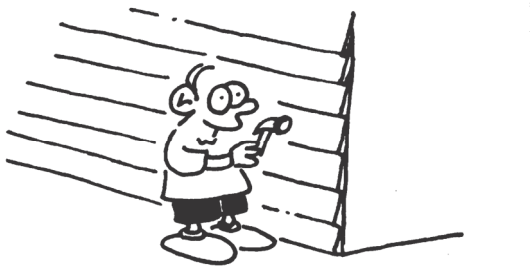
Install flashings and weatherings so that water is prevented from entering the building. Finish the installation with trims etc., to make neat, clean junctions at adjoining building surfaces.

9.16 COMPLETION

Remove temporary protection and ensure smooth and free operation of the assemblies.

9.17 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.



10. CLADDING AND LINING

10.1 GENERAL

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Cross references

Refer to the following sections:

- TILING, for waterproofing of wet areas.
- INSULATION, SARKING AND PLIABLE MEMBRANES, for wall sarking requirements.
- STEEL CONSTRUCTION, material and component requirement.
- TIMBER CONSTRUCTION, for compressed fibre cement flooring.

10.1.1 Substrates or framing

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

10.1.2 Fixing - general

Method: Nail to timber framing, screw to steel framing.

10.1.3 Fixing – proprietary systems or products

Fix the following proprietary systems in conformance with the current written recommendations and instructions of the manufacturer or supplier:

- Fibre cement plank cladding.
- Fibre cement cladding.
- Compressed fibre cement cladding.

10.1.4 Accessories and trim

Provide accessories and trim necessary to complete the installation.

10.1.5 Fixing eaves and soffit lining

Nailing: In accordance with the manufacturers' requirements and the Northern Territory Deemed to Comply Manual. Minimum at 150 mm centres to bearers at maximum 450 mm centres.

10.1.6 Metal separation

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

- Applying an anti-corrosion, low moisture transmission coating to contact surfaces, or
- Inserting a separation layer.

10.2 MATERIALS AND COMPONENTS

10.2.1 Flashing material

Standard: To AS/NZS 2904.

10.2.2 Sarking

Heavyweight reinforced aluminium foil: To AS/NZS 4200.1.

10.2.3 Fasteners

Steel nails: Hot-dip galvanized to AS/NZS 4680.
Self-drilling screws: To AS 3566, corrosion resistance class 4 in tropical areas and class 3 in inland areas.
Finish: Prefinish exposed fasteners with an oven baked polymer coating to match the cladding.

10.2.4 Aluminium composite panel cladding

Certified and tested to AS 1530.1 component parts only.

10.3 PLASTIC CLADDING

Standard

Unplasticised polyvinyl chloride (UPVC) sheet: To AS 4256.4.
Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.
Polycarbonate: To AS 4256.5.
Provide a proprietary system of interlocking planks including all accessories fixed in accordance with the manufacturers' requirements and the Northern Territory Deemed to Comply Manual standards.

Installation

Standard: To AS 1562.3.

10.4 FIBRE CEMENT CLADDING

Standard

General: To AS/NZS 2908.2.
Cladding, eaves and soffit linings: Type A Category 3 (modulus of rupture ≥ 7 MPa).

10.4.1 Fibre cement planks

Standard: To AS/NZS 2908.2.
Plank cladding: Provide a proprietary system of single faced fibre cement building planks:

- Plank thickness: 7.5 mm.
- Joints and edges: Metal joining clips and UPVC extrusion.
- Corners: Preformed metal joining pieces.

10.4.2 Fibre cement sheet cladding

Sheet cladding: Provide 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: UPVC extrusion or V butt joints. Use a Super Alcor backing strip behind vertical V butt joints and a Z section zincalume trim at horizontal joints.

10.4.3 Eaves & soffit lining

Eaves and soffit lining: Provide a proprietary system of single faced fibre cement sheets:

- Sheet thickness: 6 mm.
- Joints: UPVC extrusion or V butt joints.

Installation: Screw fix at 150 mm crs with proprietary self-embedding head screws in accordance with the manufacturers' instructions and the Northern Territory Deemed to Comply Manual.

10.4.4 Screw Types

To metal 1 mm to 1.6 mm thick: Blue Hornet self-embedding head screws.
To metal under 1 mm thick and to timber: Streaker No. 8 x 20 mm self-embedding head screws.

10.5 COMPRESSED FIBRE CEMENT CLADDING

Standard: To AS/NZS 2908.2, Type A, Category 5 (modulus of rupture ≥ 18 MPa).
Cladding: 9 mm thick compressed fibre cement sheets.
Joints: Expressed joints - 10 mm gaps with EDPM gasket backing strips.
Fixing: Recessed countersunk screws in pre-drilled holes, filled with epoxy compound and sanded smooth in accordance with the manufacturers' technical data.

10.6 SHEET METAL CLADDING

10.6.1 Cladding

Provide a proprietary system of prefinished profiled metal cladding complete with accessories, trim and flashings.
Fixing: Fix in accordance with the manufacturer's instructions and the Northern Territory Deemed to Comply Manual standards.

10.6.2 Design and installation

Standard: To AS 1562.1.
Prepainted and organic film/metal laminate products: To AS/NZS 2728.
Penetrations: Flash all pipes and ducts, etc., passing through the cladding and trim with colour matched material to ensure weather-tight joints.

10.6.3 Visible accessories

Provide materials with the same finish as cladding sheets.

10.6.4 Cladding sheet installation

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

10.6.5 Corner flashing

Requirement: Finish off at corners with purpose-made folded flashing strips.

10.7 LINING

10.7.1 Materials and components

For Fire rated and acoustic rated cladding and linings (including ceiling lining) requirements: Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document and to drawings.

10.7.2 Plasterboard

Standard: To AS/NZS 2588.
Do not use plasterboard in wet areas.

10.7.3 Fibre cement

Standard: To AS/NZS 2908.2, Type B, Category 2.

Minimum thickness: 4.5 mm.

10.7.4 Fasteners

Steel nails: Hot dip galvanized.
Self-Drilling Screws: To AS 3566.2, corrosion resistance Class 2.

10.8 PLASTERBOARD

10.8.1 Installation

Plasterboard: To AS/NZS 2589.
Framed construction: Screw or nail or combine with adhesive.
Masonry construction: Adhesive fix direct to masonry.

10.8.2 Joints

Flush joints: Provide recessed edge sheets and finish flush with perforated reinforcing tape.
External corner joints: Make over metallic-coated steel corner beads.
Control joints: Provide purpose-made metallic-coated control joint beads in walls and ceilings at 12 m maximum centres and to coincide with structural control joints.

10.9 FIBRE CEMENT SHEET LINING

10.9.1 Supports

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 fibre cement is not possible due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.

10.9.2 Installation

Fixings: Screw fix with self- embedding head screws and flush over screw heads.
Run sheets across the framing members. In flush jointed applications, stagger end joints in a stretcher (running) bond brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.
Timber framed construction: Nail only or nail combined with adhesive.
Steel framed construction: Screw only or screw combined with adhesive.
Wall framing:

- Do not fix to top and bottom plates or noggings.
- In tiled areas: Provide an extra row of noggings immediately above wall to floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Ceilings: Fix using screw or screw and adhesive to ceiling furring members. Do not fix sheets to the bottom chords of trusses.
Wet areas: Do not use adhesive fixing alone.

10.9.3 Joints (general)

Flush joints: Provide recessed edge sheets and flush finish using perforated paper reinforcing tape.
External corner joints: Make joints over metallic-coated steel corner beads.
Dry Joints: Provide square edged sheet and finish with a UPVC joining section.
Control joints: Provide purpose-made metallic-coated control joint beads at ≤ 7.2 m centres in walls and ceilings and to coincide with structural control joints.
Wet areas: Provide additional supports, flashings, trims and sealants as required.
Joints in tiled areas: Bed perforated paper tape in bedding compound. Do not apply a topping coat.
Control joints: Space to suit joints required in tiling.
Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

10.9.4 Joint materials

Flush jointing: Use 6 mm thick Villaboard with recessed edges. Provide a flush finish using perforated reinforcing tape. In tiled areas do not apply a topping coat after bedding the perforated paper tape in bedding compound.
UPVC Joining Strips: Use 6 mm Versilux with proprietary UPVC mouldings at joints of sheets and edges.
V Joints: Use 6 mm Versilux with bevelled edges tightly butted to form neat V joints.

10.10 TONGUE AND GROOVE LINING

10.10.1 Installation

Stained or clear finished boards: Select boards to give a random pattern. At corners, return the same board to give a continuous grain pattern.
Fixing: Nail twice to each crossing except for secret nailed profiles.
Nailheads: Treat visible nail heads as follows:

- In stained or clear finishes: Drive flush.
- In opaque finishes: Punch below surface and fill flush with putty after the surface has been primed.

10.10.2 Joints

End grain joints: Install boards so that butt joints are in compression.
Corners: Mitre external corners and scribe internal corners.

10.11 PLASTIC LAMINATE

3 mm thick plastic laminate sheet for use in wet areas. Adhesive fix the sheets and join with proprietary UPVC Joiners. Seal all joints.

10.12 TRIM

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Provide timber or moisture resistant medium density fibreboard trim, such as beads, skirtings, architraves, mouldings and stops, where necessary to make neat junctions between components, finishes and adjacent surfaces.

10.13 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

11. SUSPENDED CEILINGS

11.1 GENERAL

Cross references

Refer to CLADDING AND LINING for normal ceiling lining

Standards

Standard to AS/NZS 2785.

11.1.1 Performance Criteria Technical Data – Witness Point

Provide technical data to substantiate compliance with the loading requirements including upward wind load.

11.1.2 Fixing:

Approved Fixers: Install the complete system and accessories using specialist fixers approved by the suspended ceiling manufacturer.

11.2 INSPECTION NOTICE - WITNESS POINT

Give sufficient notice so that inspection may be made of the suspension system prior to installation of the ceiling units or lining.

11.3 MATERIALS AND COMPONENTS

Zinc coated steel: To AS 1397/Z200.
Aluminium extrusions: To AS/NZS 1866.
Anodising: To AS 1231, not less than class AA10.
Thermoset powder coating: To AS 3715.
Plasterboard panels: To AS/NZS 2588.
Fibrous plaster tiles: Proprietary tiles with hard cast plaster faces.
Fasteners: Self-drilling screws: To AS 3566 series.
Powder activated fasteners: To AS/NZS 1873.4.
For Fire rated and acoustic rated ceiling requirements: Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document and to Drawings.

11.4 CONSTRUCTION GENERALLY

11.4.1 Ceiling grid – Hold Point

Set out the ceiling grid so that ceiling unit joints and centrelines of visible suspension members coincide with documented grid lines. If not documented, set out with equal margins.
Hold Point - Obtain approval of the set out before commencing the installation.
Support members: Galvanized metal rods with a length adjustment of 50 mm.
Installation: Install the ceilings level and fix so that there is no looseness or rattling of components or any of the faults described in the Appendices to AS/NZS 2785.

11.4.2 Bracing

Provide bracing where necessary to prevent lateral movement.

11.4.3 Fasteners

Provide concealed fasteners.

11.4.4 Bulkheads

Integrate bulkheads and other similar ceiling fixtures with the ceiling structure and brace for lateral movement.
Ensure these bulkheads and fixtures have the same performance characteristic as the rest of the ceiling.

11.4.5 Installation

Painting: Paint ceiling tiles before erection.
Panel lock clips: if ceiling units are exposed to wind loads or if required for security, insert lock clips at the junction of carrier rails and units.

11.5 ACCESSORIES AND TRIM

11.5.1 General

Provide accessories and trim necessary to complete the installation.

11.5.2 Control Joints

Provide control joints in sheet finishes where required.

11.5.3 Service penetrations

Provide openings for, all service elements, including light fittings, ventilation outlets, detectors, sprinklers and loudspeakers.

11.5.4 Access Panels

Provide flush fitting access panels in non-demountable ceilings supported and anchored to permit ready removal and refixing. Number: One per 100 m^2 or as shown on the drawings.

11.6 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

12. RENDERING AND PLASTERING

12.1 GENERAL

Cross references

Refer to the following sections:

- TILING, for waterproofing of wet areas.
- STEEL CONSTRUCTION and PAINTING, for priming of embedded steel.

Standard

General standard: to SA HB 161.

Interpretation

Rendering means exterior plastering.

12.2 MATERIALS AND COMPONENTS

12.2.1 Plaster materials

Sand: Fine aggregate with low clay content and free from efflorescent salts, selected for grading and complying with SA HB 161.

Cement: To AS 3972, type GP.

Lime: To AS 1672.1.

Gypsum plaster: To comply with the recommendations SA HB 161.

Plasticizers/workability agents: Do not use in cement plasters.

12.2.2 Accessories

Metal lath: Expanded metal to AS 1397/Z350 (internal) or stainless steel or PVC (external).

Beads: Proprietary sections fixed to substrates and/or embedded in the plaster to form and protect edges and junctions.

12.2.3 Lime putty mixes

Make a coarse mix of lime putty and sand 16 hours before use and do not allow to dry out.

12.2.4 Gauged mixes

To improve workability, mixes required to contain only cement and sand may be gauged by the addition of lime up to 25% of the cement content, but not as a substitute for the cement.

12.2.5 Terminations

Re-entrant corners: Finish square.

Salient angles for plasterboard: Finish to manufacturers specifications.

Render corner beads: 4.5mm radius Stainless Steel.

12.3 SUBSTRATE

12.3.1 Correction of substrate

Before plastering, make good defects in the substrate. Hack off excessive projections. Fill voids and hollows with a mix not stronger than the substrate or weaker than the first coat.

12.3.2 Absorbent Surfaces

If suction is excessive control by dampening but avoid over wetting.

12.3.3 Painted Surfaces:

Remove paint and hack the surface at close intervals.

12.3.4 Untrue substrate

If one coat application is required, but the substrate is not sufficiently true to comply with the thickness limits for one coat, or has excessively uneven suction resulting from variations in the composition of the substrate, apply 2 coats.

12.3.5 Cleaning

Remove loose material and leave the surface clean and dust free.

12.3.6 Embedded items

Sheath water pipes and other embedded items to permit thermal movement. If ungalvanized steel items are to be embedded in plaster, prime before fixing.

12.3.7 Chases

If chases or recesses are more than 50 mm wide, cover with metal lath extending at least 75 mm beyond each side of the recess.

12.3.8 Metal backgrounds

Fix metal lath to provide a key for plaster. Press the plaster through the apertures of the metal lathe.

12.3.9 Dense concrete backgrounds

Provide a mechanical key by hacking, bush hammering or abrasive blasting to expose the aggregate then dash coat.

12.4 PLASTERING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

12.4.1 Thickness limits

One coat work: 12 - 15 mm.
Multi-coat work:
- First coat: 9 - 15 mm.
- Setting coat: 2 - 3 mm.

12.4.2 Cement rendering

Proportions by volume (cement: lime: sand) for concrete and dense concrete block: 4:1:16.

12.4.3 White-set plaster

Use 3:1 gypsum plaster: lime putty, applied as a skim coat direct to the substrate.

12.4.4 Waterproof render

Use cement based render with proprietary waterproofing admixture.

12.4.5 Tolerances

To SA HB-161.
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.

12.4.6 Temperature

Ensure the temperatures of mixes; substrates and reinforcement are within the range $5^{O}C \leq 35^{O}C$ at the time of application.

12.4.7 Curing

Do not allow rapid or uneven drying out.
Keep continuously moist for 2 days and allow to dry for 5 days before applying further plaster coats.

12.4.8 V-joints

Provide V-joints cut straight through the plaster to the substrate at the following locations:
- Junctions between different substrate materials.
- Abutments with other finishes.
- Abutments with metal door frames.

12.4.9 Trim and Beads

Provide purpose-made zinc-coated steel sections as corner beads, stop beads, and at movement control joints.
- 1.6 mm radius for plasterboard angles
- Only use Stainless Steel corner beads for Rendering.

12.4.10 Finishes

Terminations and salient angles: To Manufacturer's Recommendation
Sand finish generally for cement render.
Steel trowel finish for white set and cement render to be vinyl sheeted.
Wood float finish for cement render to be tiled.

12.4.11 Control joints

Provide control joints 3 to 6 mm wide in the finish to coincide with control joints in the substrate. Finish with Rondo stopping beads and fill with a resilient sealant.

12.5 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13. JOINERY AND FIXTURES

13.1 GENERAL

This section covers:
- Joinery & Associated Hardware.
- Fire Extinguishers & Blankets.
- Pin Boards & White Boards etc.
- Clothes Hoists, Letter Boxes etc.

Cross references

Refer to the following sections:
- PAINTING*:* For paint finishes.
- CONCRETE: For compatibility between concrete sealer and adhesives.

13.2 JOINERY LAMINATE

Joinery to be fully laminated at all faces and edges unless stated otherwise.

13.3 TOLERANCES

Requirement: Fabricate and install joinery items to substrate undamaged, plumb, level, straight and free of distortion and to the Tolerances Table.

13.3.1 Tolerances Table

Property	Tolerance
Plumb and level	1:800
Offsets in flush adjoining surfaces	0.5 mm
Offsets in revealed adjoining surfaces	2 mm
Alignment of adjoining doors	0.5 mm
Difference in scribe thickness for joinery items centred between walls	2 mm
Doors centred in openings	Zero
Joints in finished surfaces	Zero

13.4 MATERIALS AND COMPONENTS

13.4.1 Plywood

Interior use generally: To AS/NZS 2270.
Interior use, exposed to moisture: To AS/NZS 2271.

13.4.2 Particleboard

Standard: To AS/NZS 1859.1.

13.4.3 Moisture Resistant Medium density fibreboard (MR MDF)

Use fine grained uniform density resin-bonded board.
Standard: To AS/NZS 1859.2.
Moisture resistant medium density fibreboard: Designated by the manufacturer as having improved moisture resistance and marked as such.
Melamine overlaid medium density fibreboard: Medium density fibreboard overlaid on both sides with low pressure melamine.
Do not use MDF in Joinery for Department of Housing and Community Development projects. Use Moisture Resistant (MR) particle board. Seal underside of bench tops.

13.4.4 Wet Processed Fibreboard

Standard: To AS/NZS 1859.4.

13.4.5 Moisture content

Make milled products from timbers seasoned to within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use; and with no more than 3% difference between any 2 pieces in any one group.

13.4.6 Finished sizes

Finished sizes of milled timbers: Not less than the documented dimensions unless qualified by a term such as nominal, out of or ex to which industry standards for furnished sizes apply.

13.4.7 Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

13.4.8 High pressure decorative laminated sheet

Standard: To AS/NZS 2924.1.

13.4.9 Decorative laminated sheet application table

Provide classes as follows in either Standard Type or Type P for post forming as applicable:

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

13.4.10 Thickness

When fixed to a continuous substrate
- Horizontal surfaces: 1.2 mm
- Vertical surfaces: 0.8 mm
- Post formed laminate: 0.8 mm
- Edge strips: 0.4 mm
- Vertical fixing to studs etc.: 3.0 mm

13.5 CONSTRUCTION GENERALLY

13.5.1 General

Construction: Build components square and install plumb.
Framing: Frame and trim where necessary for openings, including those required by other trades.
Accessories and trim: Provide as necessary to complete the installation.
Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

13.5.2 Fasteners and adhesives

Provide fasteners, adhesives or both to transmit the loads imposed and ensure the rigidity of the assembly. Do not split, discolour or otherwise damage timber or sheets.
Visibility: Do not provide visible fixings except in the following locations:
- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Installation: Secure plinths and carcasses to floors, walls, or both, at not more than 600 mm centres. Fix floor mounted units to backgrounds at maximum 600 mm centres. Fix wall mounted units to each nogging or stud stiffener or both.
Fixings: Screws with washers into timber or steel framing, or masonry anchors into masonry or concrete.

13.5.3 Finishing

Junctions with structure: Scribe plinths, bench tops, splashbacks, ends of cupboards, kickboards and returns to follow the line of floors or walls.
Edge Strips: Finish all exposed edges of sheets with edge strips that match the sheet faces.

13.6 CUPBOARD AND DRAWER UNITS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.6.1 Plinths

Generally: 18 mm melamine overlaid high moisture resistant medium density fibreboard.
Wet Areas: Nominal 25 mm Thick Hardwood.
Height: 90 mm.
Fabrication: Form up with front and back members and full height cross members at 900 mm max. centres. Finish: Plastic laminates or painted.

13.6.2 Carcasses, drawer fronts, shelves and doors

Material: Melamine overlaid high moisture resistant medium density fibreboard.
Minimum thickness: 18 mm.
Fasteners: Conceal with finish.

Installation: Secure plinths and carcasses to floors, walls, or both at not more than 600 mm centres.
Drawer fronts: Rout for drawer bottoms.
Adjustable shelves: Support on proprietary pins in holes bored at 32 mm centres vertically. Maximum span for 18 mm thick shelves is 600mm. For 900 mm spans use 32 mm thick board.

13.6.3 Drawer and door hardware

Hinges: Provide concealed all-metal hinges with the following features:

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

Proprietary item: Blum 170^{o} opening hinges. If required use machined brass butts.
Door leaves up to 760 mm high - 2 no. 64 mm hinge.
Door leaves over 760 mm high - 3 no. 75 mm hinge.
Drawer Slides: Provide metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Closure retention.
- White thermoset powder coating or nickel plated.

Proprietary Item: Blum BS220 m with length to suit the drawer size.
Cupboard Locks: pin tumbler cupboard locks.
Cupboard Handles: 100 mm x 10 mm diameter stainless steel 'D' pulls - Satin Finish.

13.6.4 Benchtops

Laminated benchtops
Material: Moisture Resistant Medium Density Fibreboard (MR MDF)
Minimum thickness: 32 mm.
Finish: Decorative laminated sheet adhesive fixed.
Sealing underside: Laminate undersides of benchtops if likely to be subject to excessive moisture from equipment such as dishwashers; or the benchtop is not restrained against warping by cupboard carcass or support framing.
Installation: Fix to carcass at least twice per 600 mm length of benchtop.
Joint sealing: Fill joints with a 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.

13.7 CEILING ACCESS

13.7.1 Ceiling

Trim openings and provide lockable access panels of minimum size 600 x 600 mm, Rondo or similar.

13.8 FIRE FIGHTING EQUIPMENT

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.8.1 Portable extinguishers

Provide portable fire extinguishers and location signs in accordance with the general requirements of AS/NZS 1841.1.

13.8.2 Fire blankets

Provide fire blankets and location signs to AS/NZS 3504 – blanket size: 1800 x 1800 mm.

13.9 DISPLAY BOARDS

13.9.1 White boards

White Vitreous enamel steel sheet on backing board fixed in a clear anodised aluminium frame with a black neoprene strip to conceal fixings and with an integral pen rail. Conceal screw fix to wall at 900 mm maximum crs. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.9.2 Pin boards

Homogenous, resilient material on a backing board, fixed in a clear anodised aluminium frame with a black neoprene strip to conceal fixings. Screw fix to wall at 900 mm maximum crs. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.10 CLOTHES HOISTS

Supply clothes hoists as required in the positions indicated or as directed.
Rotary Hoists - Hills Supa 4 rotary clothes hoist.
Folding Hoist - Hills Paraline Duo FD40362.
Install as per the manufacturers' written instructions.
Concrete Footings: refer to the miscellaneous items clause in the CONCRETE CONSTRUCTION.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.11 GRAB RAILS

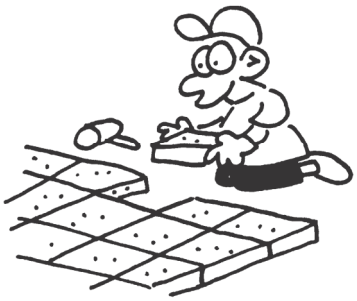
Polished stainless steel, or as specified in the PSRs, 32 mm diameter with concealed fixings.
Design and fixing: To AS 1428.1.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.12 LETTERBOXES

Supply mailboxes complying with AS/NZS 4253.
Provide locks where required.
Install on the fence with galvanized brackets or mount on 40 N.B. galvanized pipe 1000 mm above ground level in a concrete footing 300 dia. x 600 mm deep. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

13.13 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.



14. TILING

14.1 GENERAL

Cross reference

Ensure concrete floor and sealer are compatible with adhesive. Refer to the CONCRETE section.

Standards

Ceramic tiles To: AS 3958.1 and AS 3958.2.
Slip resistance classification of new pedestrian surface materials To: AS 4586.

Tolerances

Completed tiling: To AS 3958.1 Clause 5.4.6.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

14.2 MATERIALS AND COMPONENTS

14.2.1 Tiles

Standard: To AS/ISO 13006.

14.2.2 Exposed edges

If available, provide purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face.

14.2.3 Accessories

If available, provide tile accessories such as round edge ceramic tiles, cove tiles, step treads and nosings to stairs, landings, and thresholds, skirtings, sills, copings and bath vents, which match the surrounding tiles, composition, colour and finish.

14.2.4 Adhesives

Standard: To AS 2358 and AS ISO 13007.1.
PVA based adhesives: Do not use in wet areas or externally.

14.2.5 Mortar materials

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.
Cement: To AS 3972, type GP.

14.2.6 Bedding mortar

Proportioning: Select proportions from the range 1:3 to 1:4 cement: sand by volume to obtain satisfactory adhesion. Use minimum water.

14.2.7 Grout

Cement based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.
Portland cement based grout: Mix with fine sand. Use minimum water consistent with workability.
Proportioning:

- For joints up to 3 mm: 1:2 cement: sand.
- For joints over 3 mm: 1:3 cement: sand.

Epoxy Grout: Use a proprietary epoxy grout in commercial kitchens and other heavy duty applications.
Terracotta Tiles: Use proprietary polymer modified grout.

14.2.8 Substrates curing – Witness Point

Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on brick or blockwork: A further 21 days.

Witness Point - Moisture content: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS/NZS 2455.1 Appendix B.
Provide results of tests to Superintendent.
For textile floor corning (use the hygrometer test method) or test to AS1884 Appendix A for resilient sheet or tiles. Provide results of tests to Superintendent.
Test type: Hygrometer test; Seal a hygrometer to the substrate for more than 16 hours and measure the relative humidity of the air between the instrument and the slab.
Falls: If the membrane is directly under the floor finish ensure the fall in the substrate conforms to the fall nominated for the finish.

14.2.9 Water stops

Requirement: Provide water stop angles at door thresholds and shower enclosures to support the waterproof membrane at junctions between waterproofed and non-waterproofed areas.

14.2.10 Substrate Preparation

Ensure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- If walls are plastered, remove loose sand.
- Compatible with all components of the floor system.
- If framed or discontinuous, support members are in full lengths, without splicing.
- If solid or continuous;
  - Excessive projections are removed.
  - Voids and hollows more than 10 mm are filled with a cement/sand mix not stronger than the substrate nor weaker than the bedding.

- Depressions less than 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
- Fill cracks in substrates wider than 1.5 mm with a filler compatible with the membrane system.

External corners: Round or arris edges.
Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not apply mortar bedding to substrates showing surface moisture.
Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then apply a bonding treatment.

14.3 INSPECTION NOTICE - WITNESS POINT:

Give sufficient notice so that an inspection may be made at the following stages:
- Completion of waterproof membrane.
- Initial or trial set out.

14.4 SAMPLES

If required submit labelled samples of tiles, including fittings, accessories, grout and sealants, illustrating the range of variation in colour and finish.

14.5 WATERPROOFING WET AREAS

Standard

General: To AS 3740.
Membranes: To AS/NZS 4858.
Extent: To BCA 3.8.1.2.

14.5.1 Membrane

Provide a proprietary (non acrylic) liquid applied or sheet membrane system for use in wet areas, shower recess bases and associated floors and wall to floor junctions which are to be tiled.

14.5.2 Bond breakers materials

Requirement: Compatible with the flexibility class of the membrane to be used.
Material: Purpose made bond breakers tapes and closed cell foam backing rods or fillets of sealant.

14.5.3 Bond breakers installation

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.
Sealant fillet bond breakers:
- Application: Form a triangular fillet or cove of sealant to internal corners within the period recommended by the membrane manufacturer after the application of the primer.
- Widths: 8 mm minimum to vertical corners. 10 – 12 mm to horizontal corners.

Backing rod bond breakers: Retain in position with continuous length of tape pressed firmly in place against the surfaces on each side of the rod.

14.5.4 Sealants

Requirement: Waterproof, flexible, mould-resistant and compatible with host materials.

14.5.5 Preparation

See Substrate Preparation.

14.5.6 Installation

Floor wastes: Turn membrane down into the floor waste drainage flanges, and adhere to form a waterproof connection.
Hobs: Extend membrane over the hob and into the room at least 50 mm. For unenclosed showers extend membrane at least 1500 mm into the room measured from a point directly below the shower rose outlet on the wall.
External tiling: Provide a waterproof membrane under external floor tiling, to balconies and over habitable rooms, which forms a drained tank suitable for continuous immersion. Do not run under bounding walls.
Curing: Allow membrane to cure fully before tiling.

14.6 TILING

14.6.1 Sequence

Fix wall tiles before floor tiles.

14.6.2 Cutting

Cut tiles neatly to fit around fixtures and fittings and at margins where necessary. Drill holes without damaging tile faces. Cut recesses for fittings such as soap holders. Rub edges smooth without chipping.

14.6.3 Laying

Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes.

14.6.4 Variations

Distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

14.6.5 Protection

Keep traffic off floors until the bedding has set and attained its working strength.

14.6.6 Setting out

Set out tiles to give uniform joint widths within the following limits:
Floors:
- Quarry tiles: 6 to 12 mm.
- Vitrified floor tiles: 3 to 5 mm.
- Dry pressed tiles: 3 mm.
- Extruded tiles: 6 mm.

Mounted mosaic tiling: To match mounting pattern.
Stone tiles: 1.5 to 3 mm.
Internal ceramic tiling: 1.5 to 3 mm.

Walls:
- Dry pressed tile: 1.5 mm.
- Extruded tile: 6 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.
Joint position: Set out tiles from the centre of the floor or wall to be tiled and if possible, ensure cut tiles are a half tile or larger.
Fixtures: If possible, position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or in the centre of tiles.

14.6.7 Falls and levels

Grade floor tiling to even and correct falls generally, and to floor wastes and elsewhere asrequired. Make level junctions with walls. If falls are not required, lay level.
Minimum fall generally: 1:100.
Minimum fall in shower areas: 1:60.
Change of finish: Maintain finished floor level across changes of floor finish including carpet.

14.6.8 Preparation of tiles for bedding

Adhesive bedding: Fix tiles dry, do not soak.
Mortar bedding: Soak porous tiles in water for half an hour, then drain until the surface water has disappeared.
Terracotta Tiles: Use pre-sealed tiles or apply a breathable sealer and lay dry. If final sealed finish is selected use compatible laying sealer.

14.6.9 Floor finish dividers

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.

14.6.10 Bedding

Use bedding methods and materials which are appropriate to the tile, the substrate, the conditions of service, and which leave the tile firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

14.6.11 Bath ventilation

Ventilate the space below fully enclosed baths with at least 2 vermin proof ventilating tiles.

14.6.12 Grouted joints

Commence grouting as soon as practicable after bedding has set. Clean out joints as necessary before grouting.
Face grouting: Fill the joints solid and tool flush. Clean off surplus grout. Wash down when the grout has set. When the grout is dry, polish the tiled surface with a clean cloth.

14.6.13 Sealant joints

Provide sealant joints filled with sealant and finished flush with the tile surface as follows:
- Where tiling is cut around sanitary fixtures.
- At corners of walls in showers.
- Around fixtures interrupting the tile surface, for example pipes, brackets, bolts and nibs.
- At junctions with elements such as window and door frames and built-in cupboards.

Material: Anti-fungal modified silicone.
Proprietary Item: ABA Colourflex silicone sealant to match the colour of the grout.

14.6.14 Control joints

Provide control joints carried through the tile and the bedding to AS 3958.1 clause 5.4.5, and as follows:

Floor location:
- Over structural control joints.
- To divide complex room plans into rectangles.
- Around the perimeter of the floor.
- At junctions between different substrates.
- To divide large tiled areas into bays.
- At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.

Wall location:
- Over structural control joints.
- At junctions with different substrate materials when the tiling is continuous.
- At vertical corners in shower compartments.
- Depth of joint: Right through to the substrate.
- Sealant width: 6 – 25 mm.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

14.7 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

15. PAINTING

15.1 GENERAL

Cross reference

Refer to the following sections:

- GENERAL REQUIREMENTS: for compliance with manufacturers' instructions.
- GENERAL REQUIREMENTS for sealing of reveals at openings.
- STEEL CONSTRUCTION.
- ROOFING

Refer to 15.6 Tables – Paint Specifications and Paint Systems Schedule Australian Paint Approval Scheme (APAS) Specification Numbers.

Applicators to be PCCP accredited in the category applicable to the works.

Standards

Follow the guidance given in AS/NZS 2311 and AS/NZS 2312.1.

15.1.1 Inspection test plans – Hold Point

Provide ITPs before commencing painting or substrate preparation.

15.1.2 Powder Coating

Aluminium surfaces: To AS 3715.
Steel or zinc coated surfaces: To AS 4506.

15.1.3 'Wet Paint' warning

Place notices conspicuously and do not remove them until the paint is dry.

15.2 MATERIALS AND COMPONENTS

15.2.1 Low VOC Paints – Witness Point

Use low VOC emitting paints. Provide manufacturer's specifications.

15.2.2 Premium Paints

Use only premium paints from approved manufacturers.

15.2.3 Paint Manufacturer – Hold Point

Prior to placing orders provide a list showing the brand of the paint proposed for use and the trade names of the paint types referred to by generic type and APAS specification number in the painting schedule. Refer to 15.6 Tables – Paint Specifications and Paint Systems Schedule Australian Paint Approval Scheme (APAS) Specification Numbers.

15.2.4 Spray Painting - Hold point

Do not apply by spray without approval.

15.2.5 Combinations

Do not combine paints from different manufacturers in a paint system.

15.2.6 Delivery - Hold Point

Provide copies of invoices receipts or delivery dockets showing brands, quality and quantities of paints and colour(s).
Deliver paints to the site in the manufacturers' labelled containers. Ensure containers are marked with the APAS (Australian Paint Approvals Scheme) specification number.

15.2.7 Verification

- Provide reports.
- Provide manufacturer's paint specification.

15.3 INSPECTION – WITNESS POINT

Engage an independent NATA accredited painting inspector. Pay all inspection and reporting fees and costs.
Give sufficient notice so that each of the following stages may be inspected;

- Substrate immediately prior to the commencement of painting.
- Prior to application of final coat.
- Complete and submit copies of AS 3894.10, AS 3894.11 and AS 3894.12.

Witness Point – Provide copies of reports within 2 days of receiving them

15.4 GENERAL PAINTING

15.4.1 Warranties – Witness Point

Provide paint manufacturers' warranties in respect to the paints in the name of the Principal as the warrantee.

Provide paint applicators' warranties in regards to workmanship in the name of the Principal as warrantee.

Minimum warranty period is to be 10 years.

15.4.2 Substrate Preparation

Unpainted surfaces: To AS/NZS 2311 Section 3.
Previously painted and in good condition: To AS/NZS 2311 Clause 7.4.
Previously painted and in poor condition: To AS/NZS 2311 Clause 7.5.
Steel with protective coatings: To AS/NZS 2312.1 Section 8 and to AS 1627.1.
This includes cleaning down with sugar soap, treatment of mould growth, rubbing back existing painted surfaces with abrasive paper and patching and priming of damaged surface.

15.4.3 Order of work

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

15.4.4 Protection

Before painting, clean the area and protect it from contamination by dust entry. Use drop sheets and masking to protect finished surfaces or other surfaces at risk of damage during painting.
Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position on completion of painting.

15.4.5 Restoration

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

15.4.6 Fillers

Provide filler tinted to match the substrate if the finish is transparent.

15.4.7 Paint application

Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Ensure each coat of paint or clear finish is uniform in colour, gloss, thickness and texture, and free of runs, sags, blisters, or other discontinuities.

15.4.8 Number of coats

Apply additional coats if necessary at no extra cost to achieve the required total film thickness and satisfactory opacity.

15.4.9 Priming before fixing

Timber: Apply a first coat (two coats to end grain) to exposed roof trim, timber doors including tops and bottoms of doors, associated trims and glazing beads before fixing in position.
Steel: Apply a priming coat of zinc-rich organic binder to APAS - 2916.

15.4.10 Repair of galvanizing

If galvanized or zinc-coated surfaces have been cut or welded after galvanizing, prime the affected area with a zinc-rich organic binder to APAS - 2916.

15.4.11 Paint system description

If a system is referred to only by its final coat (for example by the manufacturer's brand name, the APAS specification code or the generic name) provide stains, primers, sealers and undercoats which are suitable for the substrate and are compatible with the finish coat and each other.

15.5 PAINTING / FINISHES SCHEDULES

Refer to the PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document for painting and finishes schedules.

15.6 TABLES - PAINT SPECIFICATIONS AND PAINT SYSTEMS SCHEDULE AUSTRALIAN PAINT APPROVAL SCHEME (APAS) SPECIFICATION NUMBERS

AUSTRALIAN PAINT APPROVAL SCHEME (APAS) SPECIFICATION NUMBERS	
0014/1	One pack organic binder zinc rich pre-construction primer
0015/1	Full gloss alkyd enamel for interior and exterior use (buildings)
0015/3	Semi gloss interior enamel (buildings)
0016/1	Solvent borne undercoat for exterior and interior use (buildings)
0032	Metal primer – lead and chromate free (buildings)
0114	One pack interior varnish (general purpose)
0115	Lightly pigmented alkyd low gloss ranch finish for exterior timber
0117/4	Long life texture coating for exterior concrete and masonry - High build, high profile
0134	Latex primer for galvanised steel and Zincalume ® (buildings)
0162	Zinc phosphate metal primer
0171	Solvent borne sealer for concrete and masonry (buildings)
0172	Interior latex sealer (buildings)
0181	Solvent borne wood primer (buildings)
0200/1	One pack semi gloss pigmented solvent borne paving paint for concrete
0200/2	One pack full gloss pigmented solvent borne paving paint for concrete
0205	One pack clear moisture cured finish for timber
0206	Two pack clear finish for timber
0215	Interior latex paint, low odour, low VOC
0260/1	Interior gloss latex paint (buildings)
0260/2	Semi gloss interior latex paint in MCR (buildings)
0260/3	Low gloss interior latex paint in MCR (buildings)
0260/4	Washable flat finish for interior use (buildings)
0260/5	Ceiling paint – interior flat (buildings)
0280/1	Gloss exterior latex paint in MCR (buildings)
0280/2	Semi gloss latex paint, exterior (buildings)
0280/3	Flat or low gloss exterior latex finish in MCR (buildings)
0280/4	Heavily pigmented gloss latex ranch finish for exterior timber
0280/5	Heavily pigmented low gloss latex ranch finish for exterior timber
2908	Inorganic zinc coating for protection of steel
2916/1	Organic zinc rich coating for protection of steel-Primers
2916/2	Organic zinc rich coating for protection of steel-Durable one coat single pack
2971	Epoxy 2-pack durable primer for protection of steel in atmosphere
2972	Low build epoxy 2-pack coating for the long term protection of steel in atmosphere

Paint Systems Schedule			
Flat latex: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Fibre cement products/Plasterboard/Organic or inorganic zinc primed metal	0172	0260/4	0260/4
Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0172	0260/4	0260/4
Iron and steel	0032	0260/4	0260/4
Aluminium	0035/2	0260/4	0260/4
Zinc-coated and zinc-alloy-coated steel	0134	0260/4	0260/4
Timber/Hardboard, un-primed	0183	0260/4	0260/4
Existing paintwork (solvent-borne)/ Existing paintwork (latex)/ Oil-based air-drying primed metal/ Pre-primed board	0183 if required	0260/4	0260/4

Low gloss latex: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/ Cement render/ Masonry/ Sprayed ceiling/ Fibre cement products/ Plasterboard/ Organic or inorganic zinc primed metal	0172	0260/3	0260/3
Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0172	0260/3	0260/3
Iron and steel	0032	0260/3	0260/3
Aluminium	0035/2	0260/3	0260/3
Zinc-coated and zinc-alloy-coated steel	0134	0260/3	0260/3
Timber/Hardboard, un-primed	0183	0260/3	0260/3
Existing paintwork (solvent-borne)/Existing paintwork (latex)/Oil-based air-drying primed metal/Pre-primed board	0183 if required	0260/3	0260/3

Flat or low gloss latex: Exterior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Fibre cement products/Organic or inorganic zinc primed metal/Oil-based air-drying primed metal/Cat. epoxy zinc phosphate primed metal/Existing paintwork (solvent-borne)/Existing paintwork (latex)	0280/3	0280/3	
UPVC	0016/1	0280/3	0280/3
Iron and steel	0032	0280/3	0280/3
Aluminium	0035/1	0280/3	0280/3
Zinc-coated and zinc-alloy-coated steel	0134	0280/3	0280/3
Timber/Exterior grade hardboard	0183	0280/3	0280/3

Semi-gloss latex: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Sprayed ceiling/Fibre cement products/ Plasterboard/Organic or inorganic zinc primed metal	0172	0260/2	0260/2
Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0172	0260/2	0260/2
Iron and steel	0032	0260/2	0260/2
Aluminium	0035/2	0260/2	0260/2
Zinc-coated and zinc-alloy-coated steel	0134	0260/2	0260/2
Timber/Hardboard, un-primed	0183	0260/2	0260/2
Medium Density Fibreboard	0183	0260/2	0260/2
Existing paintwork (solvent-borne)/Existing paintwork (latex)/Oil-based air-drying primed metal/Pre-primed board	0183 if required	0260/2	0260/2

Semi-gloss latex: Exterior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Fibre cement products/Organic or inorganic zinc primed metal/ Oil-based air-drying primed metal/Cat. epoxy zinc phosphate primed metal/Existing paintwork (solvent-borne)/Existing paintwork (latex)	0280/2	0280/2	
UPVC	0016/1	0280/2	0280/2
Iron and steel	0032	0280/2	0280/2
Aluminium	0035/1	0280/2	0280/2
Zinc-coated and zinc-alloy-coated steel	0134	0280/2	0280/2
Timber/Exterior grade hardboard	0183	0280/2	0280/2

Gloss latex: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Sprayed ceiling/Fibre cement products/ Plasterboard/Organic or inorganic zinc primed metal	0172	0260/1	0260/1
Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0172	0260/1	0260/1
Iron and steel	0032	0260/1	0260/1
Aluminium	0035/2	0260/1	0260/1
Zinc-coated and zinc-alloy-coated steel	0134	0260/1	0260/1
Timber/Hardboard, un-primed	0183	0260/1	0260/1
Medium Density Fibreboard	0183	0260/1	0260/1
Existing paintwork (solvent-borne)/Existing paintwork (latex)/Oil-based air-drying primed metal/Pre-primed board	0183 if required	0260/1	0260/1

Gloss latex: Exterior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Fibre cement products/Organic or inorganic zinc primed metal/ Oil-based air-drying primed metal/Cat. epoxy zinc phosphate primed metal/Existing paintwork (latex)/Existing paintwork (solvent-borne)	0280/1	0280/1	
UPVC	0280/1	0280/1	
Iron and steel	0032	0280/1	0280/1
Aluminium	0035/1	0280/1	0280/1
Zinc-coated and zinc-alloy-coated steel	0134	0280/1	0280/1
Timber/Exterior grade hardboard	0183	0280/1	0280/1

Semi-gloss, solvent-borne: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Sprayed ceiling/Fibre cement products/Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0171	0015/3	0015/3
Plasterboard (paper faced)	0172	0015/3	0015/3
Iron and steel	0032	0015/3	0015/3
Aluminium	0035/2	0015/3	0015/3
Zinc-coated and zinc-alloy-coated steel/Organic or inorganic zinc primed metal	0134	0015/3	0015/3
Timber/Hardboard, un-primed/Pre-primed board/ Oil-based air-drying primed metal	0016/1	0015/3	0015/3
Medium Density Fibreboard	0183	0015/3	0015/3
Existing paintwork	0016/1	0015/3	0015/3

Full gloss, solvent-borne: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Sprayed ceiling/Fibre cement products/Set plaster/Fibrous plaster/Glass reinforced gypsum plaster	0171	0015/1	0015/1
Plasterboard (paper faced)	0172	0015/1	0015/1
Iron and steel	0032	0015/1	0015/1
Aluminium	0035/1	0015/1	0015/1
Zinc-coated and zinc-alloy-coated steel/Organic or inorganic zinc primed metal	0134	0015/1	0015/1
Timber/Hardboard, un-primed/Pre-primed board/ Oil-based air-drying primed metal	0016/1	0015/1	0015/1
Medium Density Fibreboard	0183	0015/1	0015/1
Existing paintwork	0016/1	0015/1	0015/1

Full gloss, solvent-borne: Exterior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Iron and steel	0032	0015/1	0015/1
Aluminium	0035/1	0015/1	0015/1
Zinc-coated and zinc-alloy-coated steel/Organic or inorganic zinc primed metal	0134	0015/1	0015/1
Timber	0181	015/1	0015/1
UPVC/Cat. epoxy zinc phosphate primed metal	0015/1	0015/1	
Oil-based air-drying primed metal/Existing paintwork/Pre-primed exterior grade board	0016/1	0015/1	0015/1

Texture finish, latex: Interior	
Substrate	**System**
Concrete/Cement render/Masonry	0118, 2, 3 or 4 System including primer in accordance with the manufacturer's recommendations.

Texture finish, latex: Exterior	
Substrate	**System**
Concrete/Cement render/Masonry	0117 /2, 3 or 4 System including primer in accordance with the manufacturer's recommendations.

One pack polyurethane clear: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Timber/Cork	0205	0205	0205
Concrete	0116/2	0116/2	0116/2

Latex Clear: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Timber	0114, or Wattyl Estapol Clear water based gloss or Satin or Resene Aquaclear, or Dulux Polyurethane Professional Premium, or Berger Gold Label Satin		

Two pack polyurethane clear: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Timber/Cork	0206	0206	0206

Two pack epoxy, water-borne: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Fibre cement products	0172	0167	0167
Iron and steel/Oil-based air-drying primed metal	0032	0167	0167
Zinc-coated and zinc-alloy-coated steel	0134	0167	0167
Aluminium	0035/1	0167	0167
Timber	0181	0167	0167
Existing paintwork/Cat. epoxy zinc phosphate primed metal	0167	0167	

Opaque timber finish, latex: Exterior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Timber/Hardboard/Fibre cement products/ Pre-primed board	0280/5	0280/5	
Existing latex timber finish	0280/5		
Iron and steel	0032	0032	0280/5**
Zinc-coated and zinc-alloy-coated steel	0134	0280/5	0280/5
** 4th Coat 0280/5			

Semi-transparent oil-based timber finish			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Timber	0115	0115	
Existing semi-transparent timber finish	0115		

Paving paint - semi-gloss			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Clay brick/Fibre cement products	0200/1	0200/1	
Timber/Cork	0200/1	0200/1	
Existing paintwork	0200/1		

Roofing paint - latex			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Exterior of buildings for finishing of roofs, gutters and downpipes.	0012/1	0012/1	
Iron and steel	0032	0032	0012/2**
Zinc-coated and zinc-alloy-coated steel	0134	0012/1	0012/1
Organic or inorganic zinc primed metal/Oil-based air-drying primed metal	0012/1	0012/1	
** 4th Coat 0012/2			

Two pack epoxy, solvent borne: Interior			
Substrate	**1st Coat**	**2nd Coat**	**3rd Coat**
Concrete/Cement render/Masonry/Galvanized and Zincalume/Fibre cement products	2972	2972	
Iron and steel	2971	2972	2972
Aluminium	0035/1	2972	2972
Existing Two Pack Epoxy	2972		

Clear Water Repellent for Masonry - Overcoatable			
Substrate	**1st Coat**	**2nd Coat**	
Masonry	0116/2	0116/2	

16. FLOOR COVERINGS

16.1 GENERAL

Cross references

Refer to the following sections:
- PAINTING for finishing of sanded timber floors.
- CONCRETE Ensure adhesives used for vinyl floor finishes are compatible with sealers, additives or coatings to concrete floor.
- TILING for slip resistance.

Standards

Slip resistance: To AS 4586.
Hardboard underlay: To AS/NZS 1859.4.
Substrate moisture content: To AS/NZS 2455.1 for fabric floor covering.
Substrate moisture content: To AS 1884 for resilient finishes.
Laying carpet: To AS/NZS 2455.1.
Laying resilient finishes: To AS 1884.

16.1.1 Approved Fixers

Have the floor coverings and accessories installed by experienced fixers approved by the floor covering supplier.

16.2 INSPECTION NOTICE - WITNESS POINT

Give sufficient notice so that inspection may be made of the prepared substrate or underlay.

16.3 MATERIALS AND COMPONENTS

Carpets
Resilient finishes: Sheet/vinyl tiles.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

16.3.1 Hardboard underlay

Standard: To AS/NZS 1859.4, standard hardboard Type RD, manufactured as flooring underlay. Thickness: 5.5 mm.

16.3.2 Carpet underlay

Needled underfelt: Provide a felt composed of 60% animal fibre and 40% jute, reinforced with polypropylene scrim with a minimum mass of 50 g/m^2, or hessian fabric with a minimum mass of 150 g/m^2.
Synthetic Foam underlay: Provide high density synthetic latex flat cushion foam sandwiched between reinforced carrier fabric.
Rubber underlay: Provide a heavy-duty natural rubber, waffle pattern, with a backing of reinforcing fabric, either hessian, spun nylon, or polyester.

16.3.3 Hot-melt adhesive tape

Provide a 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.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

16.4 SUBSTRATE

16.4.1 Substrate preparation

Prepare the substrate including the following:
- Stripping and cleaning: Remove deleterious and loose material, including existing floor coverings and any surface treatment which could adversely affect adhesion.
- Repairs: Make good to the surface finish as necessary. Fill depressions with a suitable filler, and remove high spots and projections. If necessary lay a steel-trowelled underlay to concrete substrate.
- Fixtures and fittings: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation.
- Basic sanding: Produce an even plane sanded surface on strip flooring to be covered. Lightly sand the junctions of sheet flooring.

16.4.2 Moisture Content - Hold Point

Do not commence the installation of flooring unless the moisture content of the concrete substrate has been tested to the following:
- Carpet: AS/NZS 2455.1 Appendix B and values in clause 2.4.2 (c) have been obtained.
- Resilient finishes: AS 1884 Appendix A and the values in clause A 3.1.3 have been obtained.

If necessary provide artificial means for drying out the substrate before installation.

16.5 LAYING CARPET

Standard: To AS/NZS 2455.1.

16.5.1 Setting out

Lay the carpet in continuous lengths without cross joins in the body of the area. Make unavoidable cross joins at doorways under the closed door.
Joints in underlay: Ensure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

16.5.2 Seaming methods

Woven carpet: Machine or hand sew.
Tufted carpet: Provide hot-melt adhesive tapes.

16.5.3 Fixing

Gripper strip: To AS/NZS 2455.1 Clause 3.5.
Provide preformed gripper strip and tackless edge strip. Space fixings at 150 mm maximum centres.
Direct stick method: To AS/NZS 2455.1 Clause 3.6.
Use low VOC adhesives.

Immediately after laying, and again one hour later, roll the carpet from the centre diagonally towards each edge using a multi-wheeled roller. Do not roll foam-backed carpet.

16.5.4 Edge strip

Provide a proprietary aluminium edge strip with a PVC insert at exposed edges of the carpet. If edge strips occur at doorways, make the junction underneath the closed door.
Proprietary Item: Roberts multi-purpose aluminium trim section.

16.5.5 Clearance

Doors: Trim doors as required to clear the finished carpet by 3 mm and reseal the underside.

16.6 LAYING RESILIENT FINISHES

Standard: To AS 1884.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

16.6.1 Sheet set out

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.

16.6.2 Tile set out

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

16.6.3 Adhesives

Use low VOC adhesives as recommended by the manufacturer for the particular application.

16.6.4 Joints

Heat welding: After fixing, groove the seams with a grooving tool and weld the joints with matching filler rod and hot air welding gun. When the weld rod has cooled, trim off flush.
Chemical welding: Apply seaming compound 100mm wide to the substrate centrally under the seam. Roll the finish in two directions until the compound is forced up into the joint. Clean off flush with a damp cloth.

16.6.5 Junctions

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

16.6.6 Vinyl Skirting

Moulded PVC feather edge skirting section, 100 mm high. Scribe as necessary, mitre corners and fix to walls with low VOC contact adhesive.

16.6.7 Protection

Keep traffic off floors until bonding has set but not before 24 hours after laying. Do not allow water in contact with the finish for 7 days.

16.6.8 Finishing

Finish in accordance with the manufacturers written instructions.
Slip resistance classification of new pedestrian surface materials: To AS 4586.

16.6.9 Cleaning

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

16.7 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

17. PLUMBING AND DRAINAGE

17.1 GENERAL

Cross references

Refer to the following sections:
- SITE PREPARATION, for service trenches.
- ROOFING, for roof plumbing.
- TILING, for waterproofing of wet areas.
- PAINTING, for priming steel or iron before installation and exposed piping required to be painted.
- REFERENCED DOCUMENTS for Tapware And Sanitary Fixtures Schedules.

Standards

Plumbing and drainage products: To SAA MP52,
The Plumbing Code of Australia.
The AS/NZS 3500 series.
The ATS 5200 series.
Installation: To AS/NZS 3500.5.
Swimming Pool Skimmers to AS 1926.3.

17.1.1 N.T Licenced Plumber

Plumbers and drainers providing services under this contract must be licensed under the NT Building Act or NT Plumbing and Drainage Act and the Regulations applicable to those Acts. A Plumber or Drainer engaged to provide services under this contract must be registered under the Act and be able to issue a certificate of compliance.

17.1.2 Inspection Process

Refer to the Inspection Process for Hydraulic works, documents available at:

https://infrastructure.nt.gov.au/specification-services/technical-specifications/buildings

17.2 NOTICE COMMENCEMENT - HOLD POINT

Do not commence work until copies of the approved plumbing plans have been lodged with the Building Certifier. Supply one copy of the approved Drawings to the Superintendent before commencing work on site.

17.3 INSPECTION - WITNESS POINT

Give sufficient notice so that inspection may be made of work ready for hydrostatic testing and so that the hydrostatic tests may be witnessed. Include inspection of plumbing and drainage installation. Refer to clause: 17.12 for Gas inspection and installation.

17.4 HYDROSTATIC TESTING

17.4.1 Standards

Water pipes: Test to AS/NZS 3500.1, Section 16.
Sanitary pipes test to: AS/NZS 3500.2, Section 13.

17.4.2 Preparation for testing

Seal off items of equipment not designed to withstand the test pressure. Securely anchor pipes and fittings in position to prevent movement during the tests.
Cure solvent cement joins for at least 24 hours before testing.

17.4.3 Testing

Check pipe joints, valve seats, tap washers, strainers and other elements for leaks. Repair or replace if damaged, and retest.

17.5 CONTRACTOR'S SUBMISSIONS

17.5.1 Work-as-executed drawings

Submit drawings showing the 'as installed' locations of pipes, fittings, tanks, water heaters, control valves and accessories. Show the depth of underground pipework.

17.5.2 Connections

Excavate to locate and expose the connection points and connect to the authorities' 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.

17.5.3 Local authorities

If the authority elects to perform or supply part of the works, make arrangements and pay and bear the fees payable for the work.

17.6 MATERIALS AND COMPONENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Refer to the Tapware Schedule in the REFERENCED DOCUMENTS.

17.6.1 Water supply pipes

Copper pipe: To AS 1432, Type B.
Jointing methods: Use capillary fittings, compression fittings, silver brazed slip joints or screwed joints.
Galvanized steel pipe: To AS 1074, with screwed joints.
Wall thickness: Heavy for sizes up to and including DN 80, medium for sizes above DN 80.
Generally: Use copper pipes.
Corrosive water areas: Use Class 16 Polybutylene pipes, or Polyethylene equivalent, to AS/NZS 2642.2 and where exposed, use 316 stainless steel pipes including stainless steel breaching pieces and in wall outlets.

17.6.2 Finishes

Finish exposed piping, including fittings and supports as follows:

- Internal locations such as toilet and kitchen areas: Chrome plate copper piping to AS 1192 Service condition 2, bright.
- Externally: Paint.
- Concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave unpainted except for required identification marking. Prime steel piping and iron fittings.
- Valves: Finish valves to match connected piping.

17.6.3 Tapware and Fixtures

Provide sanitary fixtures and tapware as scheduled or shown on the drawings.

17.6.4 Toilet Cisterns

Provide toilet cisterns complying with a minimum 4A water efficiency rating.
Refer to the Tapware Schedule.

17.7 CONSTRUCTION GENERALLY

17.7.1 General

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

17.7.2 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 pipeline in subfloor spaces at least 150 mm above ground and

ensure access can be provided throughout for inspection. Provide at least 25 mm clearance between adjacent pipelines (measured from the piping insulation where applicable).

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

17.7.3 Building penetrations

If piping passes through building elements provide purpose-made metal or plastic sleeves formed from pipe sections. Prime steel or iron before installation.

17.7.4 Pipe supports

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

17.7.5 Cover plates

Where 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.

17.7.6 Connections to Network Utility Operator Mains

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.

17.8 STORMWATER

Use sewer grade pipes for all storm water systems. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

17.8.1 Standard

General: To AS/NZS 3500.3 or AS/NZS 3500.5.

17.8.2 Cleaning

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

17.8.3 Pipe laying

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

17.8.4 Downpipe connections

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

17.8.5 Subsoil drains

Connection: Connect subsoil drains to the stormwater drainage system.
Trench width: Minimum 450 mm.
Trench floor: Grade the trench floor evenly to the gradient of the pipeline. If the trench floor is rock, correct any irregularities with compacted bedding material.
Subsoil drains: Provide proprietary perforated plastic pipe.
Filter fabric: Provide a non-woven 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 non-woven polyester permeable sock capable of retaining particles of 0.25 mm size. Securely fit or join the sock at each joint.
Backfilling: Backfill with 20 mm nominal size washed screenings, to the following depths:

- To the underside of the bases of overlying structures such as pavements, slabs and channels.
- To within 75 mm of the finished surface of unpaved or landscaped areas.

17.8.6 Stormwater Pits

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

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

17.9 WASTEWATER

17.9.1 General

The entire waste water treatment system is to comply with AS/NZS 1547 On-site domestic waste water management. A comprehensive study of the ground conditions is to be completed, including the following requirements:

Conduct an assessment of the absorption conditions prior to designing absorption trenches as per Department of Health requirements (for on-site wastewater installations outside designated building control areas), or Department of Environment and Natural Resources (for on-site wastewater installations within designated building control areas).

17.9.2 Design - Hold Point

Design sewerage treatment and septic systems to suit building sanitary load. Submit formal calculations stating average and peak sanitary loads. To be submitted prior to ordering of the waste water treatment system.

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

17.9.3 Standards

Generally: To AS/NZS 3500.2 or AS/NZS 3500.5.
Materials: UPVC drainage pipes, type DWV.
Waterless composting toilets: To AS/NZS 1546.2
On-site domestic wastewater treatment units: To AS/NZS 1546.3.

17.9.4 Cleaning

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

17.9.5 Septic tanks

Use only precast concrete or glass fibre reinforced plastic septic tanks: To AS/NZS 1546.1.
Proprietary item: Royal or Everhard.
Effluent disposal: To AS/NZS 1547 and the requirements of the Environmental Health Branch of the Department of Health.

17.9.6 Vent pipes

Staying to roof: Do not penetrate the roof covering, fix the stays at roofing screws.
Terminations: Provide bird-proof vent cowls made of the same material and colour as the vent pipe.

17.10 COLD AND HEATED WATER

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

17.10.1 Standards

Standards to: AS/NZS 3500.1, AS/NZS 3500.4 and AS/NZS 3500.5.

17.10.2 Tap positions

Locate hot tap to the left of, or above, the cold water tap.

17.10.3 Accessories

Provide the accessories and fittings necessary for the proper functioning of the plumbing systems, including taps, valves, outlets, pressure and temperature control devices, strainers, gauges and pumps.

17.10.4 Water Heaters

Electric water heaters: To AS/NZS 4692.1.
Energy performance: To AS/NZS 4692.2.
Gas water heaters: To AS/NZ 5263.1.2
Energy performance: To AS/NZS 4552.2.
Oil fired heaters: To AS 1691.
Solar water heaters: To AS/NZS 2712.
Heat Pump Water Heaters: To AS/NZS 2712.
Solid fuel heaters: To AS/NZS 2918.

17.10.5 Heater installation

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

17.10.6 Solar water heater

Use a proprietary automatic water heater comprising solar collector and storage container, with supplementary heating unit, including the connections, controls and fittings necessary for the proper functioning of the system.
Manufacturer: Solahart 302 litre with 4 m^2 solar collectors for houses and 180 litre with 2 m^2 solar collectors for units. Use D models in corrosive water areas.

17.10.7 Electric Water Heater

Provide an electric water heater wall mounted in the position shown on the drawings or as directed. Proprietary Item: Hardies Dux 50 litre. Model HDE50V.

17.10.8 Temperature

Maximum temperature at ablution outlets: 50^{O}C. Maximum temperature at kitchen sinks and laundry tubs: 60^{O}C.

17.10.9 Isolating valves

Provide isolation valves to water heaters.

17.10.10 Cleaning

On completion, flush the pipelines using water and leave clean.

17.10.11 Rainwater Tanks

Standards
Metal tanks and rainwater goods: To AS/NZS 2179.1.
Design and Installation: To the recommendations of SAA HB 230.
Polyethylene Tanks: To AS/NZS 4766.
General
Provide structurally sound and watertight tanks.
Openings: To be Designed to resist human load bearing forces and to prevent the inappropriate entry of humans, animals, insects surface water, ground water and rubbish.
Accessories: Provide the accessories needed to complete the installation, including inlet and outlet connections, and flywire screened overflow and access opening. Include the following:
- Floating outlet to draw water from the upper part of the tank.
- Tight fitting lids or screens with ≤ 1 mm mesh at all openings.
- Flap valves at every opening to the tank.
- Calmed inlet to the tank to prevent stirring sediment.
- Overflow siphon to skim surface contaminants.

Accessory materials: Select from:
- Ultraviolet light resistant plastic.
- Corrosion resistant metal.
- Do not use copper or copper alloys with metallic coated steel tanks.
- The same material as the tank.

Access opening: Provide a vermin proof, child proof access opening above the high water level and cover with either a strainer or a lid fixed securely to the tank.
Warranty
Requirement: Provide a manufacturer's warranty on the tanks in the name of the Principal.

17.11 FIRE HOSE REELS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Standard: To AS/NZS 1221.

Reel Type: Reel drum mounting bracket, independent of the supply pipe.
Hose: 36 m hose with metal nozzle for jet and spray.
Installation: To AS 2441. Provide swing out arms where necessary.

17.12 GAS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document for Gas Appliance Schedule.

17.12.1 Standards

AS/NZS 5601.1 and AS/NZS 1596.
AS/NZS 4645 Gas distribution networks.
AS 3814 Industrial and commercial gas fired appliances.
Dangerous Goods Regulation.

17.12.2 Notification – Hold Point

Submit a notification of commencement of gas works to NT WorkSafe at least 24 hours before commencement of installation works.

17.12.3 Installation

Install pipework in straight lines and uniform grades. Keep the number of joints to a minimum. Prevent direct contact between incompatible metals. Conceal pipes where possible.
Accessories: Provide the accessories and fittings, necessary for the proper functioning of the gas system.

17.12.4 Buried pipes

Testing:
Pressure test pipes to AS/NZS 5601.1 before any pipes are buried, concealed or built in.
Cover:
Depth of cover to be 450 mm minimum except in rock where depth of cover can be reduced to 300 mm minimum.
Warning tape:
During backfilling lay two layers of detectable plastic warning tape to AS/NZS 2648.1 above and for the full length of buried gas pipes.
The bottom layer of warning tape is to be installed above the pipe and 300 mm below finished surface level. The upper layer of warning tape is to be installed 150 mm below finished surface level.

17.12.5 Certificates of Compliance - Hold Point

Submit certificates from the manufacturer stating that the appliances meet AGA/ALPGA requirements for operation with the type of gas to be used before installing the appliances.

17.12.6 Isolation Solenoid

If a Fire Indicator Panel or other fire alarm system is installed, provide a fire alarm activated isolation solenoid to the gas supply line, close to the supply point. Refer to Fire Contractor's Guide Book Electrical available from Northern Territory Fire Alarm System Transmission (NTFAST).

17.12.7 Gas bottles

Provide 2 x 45 kg gas cylinders with a manual change over valve. Locate where shown on the drawings or as directed on a concrete pad.
Provide a lockable ventilated enclosure if gas bottles are installed in a public location.

17.12.8 Appliances

Gas water heaters: To AS/NZ 5263.1.2
Gas space heating appliances: To AS/NZS 5263.1.3.

17.12.9 Pressure Test – Witness Point

Give notice so that the installation may be inspected and the testing witnessed.
Pressure test pipes to AS/NZS 5601.1 before any appliances are connected and before commissioning any part of the installation.

17.12.10 Commissioning

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

17.12.11 Compliance plate - Hold Point

Install a compliance plate and provide a certificate of approval prior to practical completion.

17.13 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

18. ELECTRICAL INSTALLATIONS

18.1 GENERAL

Cross reference

Refer to SITE PREPARATION for service trenches.

Standards

All switches, isolators and socket outlets in non-domestic installations to have circuit number and phase identification.
Design and access for mobility: To AS 1428.1.
Electrical installations generally: To AS/NZS 3000.
Selection of Cables: To AS/NZS 3008.1.1.
Design: To SAA HB 301.
Minimum Energy Performance Standards: To AS/NZS 4782.2 and AS/NZS 4783.2.

18.1.1 Legislation

Comply with the following:
- PowerWater Regulations.
- NT WorkSafe requirements.
- WHS (NUL) Act and Regulations.
- WHS Codes of Practice applicable to the works.
- The BCA.
- NTG, Safety and Technical Requirements.
- The N.T. Electricity Reform Act.

Persons carrying out electrical work under this contract must be registered in the NT under the NT Acts and Regulations governing electrical works and workers.

18.1.2 Materials & Components

Luminaires: To AS/NZS 60598.1.
Circuit breakers: To AS 60947.2.
Low voltage switchgear and control gear: To AS 60947.1.
Switchboards: To AS/NZS 61439.1 or AS/NZS 61439.3 as appropriate.
Domestic electricity meter enclosures: To AS 6002 and PowerWater requirements.
Cables: To AS/NZS 3008.1.1.

18.2 INSPECTION NOTICE - WITNESS POINT

Give sufficient notice so that inspection may be made of trench excavations and underground or concealed conduits or cables before covering.

18.3 INSTALLATION GENERALLY

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Wiring: Conceal cables and conduits, including underground cable or conduit entering the building, in a manner that will allow wiring replacement without structural work or the removal of cladding or lining. Do not penetrate damp-proof courses.
Electrical accessories: Install flush mounted accessories in wall boxes, if required, in masonry and in mounting brackets in stud walls.
Fixed appliances: Provide connections with socket outlet and flush blank plate for fixed and stationary appliances.
Earth all slab fabric.

18.4 CONSUMER MAINS & METERING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Provide a consumer main and connect to the main service.
Meter Box: Provide a metal meter box with a hinged lid and arrange for the kWh meter to be installed by PowerWater.
Standard: To AS 6002 and PowerWater requirements.

18.5 DISTRIBUTION BOARD

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Provide control switchgear, circuit breakers and residual current devices (RCDs) on a wall mounted distribution board enclosed in a case with a hinged door.
Housing: Install a distribution board with a minimum of 4 spare poles.
Circuit Breakers: DIN rail mounted. 6kA minimum fault current rating. Size circuit breakers to the calculated fault current at the site. Provide combined circuit breakers and residual current devices on each circuit requiring RCD protection.
Leave documents and instructions on how to use the RCDs with the Superintendent or in the building for use by the building occupiers.

18.6 ACCESSORIES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Refer to Fire Contractor's Guide Book Electrical- available from Northern Territory Fire Alarm System Transmission (NTFAST) for Fire Detection Equipment.
Available:
https://infrastructure.nt.gov.au/specification-services/technical-specifications/buildings

18.6.1 Socket outlets and light switches

Proprietary Item: Use Clipsal 2000 series or HPM Excel. For Public Housing or institutional buildings use single piece face plates and positively locked in switches.

18.6.2 Mounting heights

Light Switches and Fan Controllers: Generally 1 m above finished floor level (AFL).
Socket Outlets: Generally 300 mm AFL or 200 mm above bench surface.

18.6.3 Ceiling Fans

Mounting Height: 2300 mm minimum.
Fixing: fix to 75 x 50 mm hardwood trimmers securely fixed between truss bottom chords. On sloping ceilings provide a hardwood mounting block to give a horizontal fixing.
Controls: 5 speed or electronic generally mounted adjacent to light switches and in view of the fan.

18.6.4 Smoke detection

Provide smoke detectors to the requirements of the BCA and refer to Fire Contractor's Guide Book Electrical available from Northern Territory Fire Alarm System Transmission (NTFAST)
Standard: To AS 3786.
Power: Connect to the nearest light circuit or where the number of detectors is 4 or more connect to a dedicated final sub circuit.
Connection: Inter connect detectors so as to raise the alarm in all areas in the event of one detector being activated.
Installation: To AS 1670.6.

18.6.5 Emergency lighting

Provide emergency lighting and exit signs in accordance with the BCA and to AS 2293.1.

18.6.6 Intruder Alarm System

Provide an intruder alarm system.
Standard: To AS/NZS 2201.1.

18.7 APPLIANCES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Wiring: For permanently connected appliances, including appliances the provision of which is specified in other Sections, provide a standard wall box, if required, or a wall bracket in stud framed structures, with either a flush blank plate or isolating switch, angle take off terminator, and approximately 900 mm of flexible PVC conduit terminated at the appliance and supported in accessible locations.

18.8 TELECOMMUNICATIONS CABLING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

18.8.1 Pre Wiring

Install pre-wiring of telephone, data, TV and telecommunications services before the installation of linings, paving and landscaping.

18.8.2 General

Provide a complete operational telecommunications cabling system, tested and commissioned in conformance with;

- AS/NZS 3080.
- AS/CA S009.
- SA/SNZ HB 252 2014 Communications cabling manual Module 3: Residential communications cabling handbook.
- NBN Co. Limited - New developments: deployment of the NBN to conduit and pit network – guidelines for developers. Requirements of NT Government ICT Standard Data and Voice Cabling - Specifications and Guidelines. Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
- Requirements of the Australian Communications and Media Authority (ACMA)

Ensure systems comply with special client needs i.e. Police, Fire, Ambulance and Emergency services.
Ensure telecommunications connections are ordered at a time which takes into account lead times for service supply. Determine client requirements and communicate these requirements to service provider.

18.9 TELECOMMUNICATIONS OUTLETS

18.9.1 Installation

Mounting: Flush mount.
Style, material and colour of plates: To match adjacent power and switch plates.
Horizontal cabling termination: Terminate Category 6 cabling to the rear of the outlet modular jack with insulation displacement connections forming a gas tight joint. Arrange cable pairs at each jack conforming to AS/NZS 3080 Fig 13a.

18.9.2 Outlets:

Provide RJ45 8 way modular jacks except where documented otherwise. Provide for up to three modular voice or data outlets on each faceplate with three spaces for identification inserts.

18.9.3 Pinouts:

T568A to AS/NZS 3080.
The pinouts vary with the application. Determine required pinouts before making cable terminations.

18.9.4 Cables Installation

General: To manufacturers recommendations.
Crossover: Install cables neatly and without crossovers between cables.
Loom size: Loom cables into groups not exceeding 50 cables, and hold looms in place using re-usable cable ties at least 20 mm wide. Do not exert compressive force on the cables when installing cable straps.

18.9.5 External

Standard: Water penetration resistance to IEC 60794-1-2.

18.9.6 Cable Separation

For safety: To AS/CA S009, and by at least 150 mm.

Electromagnetic interference (EMI): Provide clearance to minimise the effect of EMI where communications cables are installed parallel and adjacent to power cables carrying loads in excess of 200 A. Avoid parallel runs where practical.

Fluorescent luminaires: Maintain a clearance of minimum 300 mm.
Low voltage cables: Separate telecommunications cables not enclosed in conduits or ducts from low voltage services by at least 150 mm.
External cables: To AS/CA S009, and by at least 150 mm.

18.9.7 Fly Leads

Quantity: Provide fly leads to 50% of outlets installed.

18.9.8 Patch Cords

Type: Stranded.
Length: 900 mm.
Quantity: 100% of outlets installed.
Termination: Registered Jacks.

18.10 EARTHING SYSTEM

18.10.1 General

Standard: To AS/CA S009.

18.10.2 Communications earth system

Communication Earth System (CES): Provide a Communications Earth Terminal (CET) adjacent to each electrical switchboard. Connect the CET to the local Protective Earth (PE) system at the switchboard.
Distributor: Provide an earth bar within each distributor and connect to local CET.
Interconnections: Verify that there are no interconnections between the lighting protective earthing system and the telecommunications earthing system.

18.11 CABLE MANAGEMENT

Before Practical Completion submit log books for each distribution frame with the details of cable terminations and provisions for recording cable, line and jumper information.
Record book: Provide a record book at each cross connect.
Records in pencil: Complete the records in pencil for each termination and jumper, providing origin and destination and type of service.
Location: Secure log books in each distribution frame records holder.
Identification and labelling, and record documentation: To AS/NZS 3085.1.

18.12 TELEPHONES IN BUILDINGS

Wire and terminate telephone outlet to a Telstra lead in box on external wall and provide a conduit and draw wire to the property boundary. Liaise with the service provider for location of termination box. Arrange with the service provider for the installation of the incoming service line, cabling etc., as supplied by the service provider.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document for requirements for connection to Telstra network.

18.13 TELEVISION

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

18.13.1 Standards

Electromagnetic compatibility: To AS/NZS 1367 Section 3.
Bending radius: Conform to the manufacturer's recommendations minimum bending radius for the size of cable.

18.13.2 General

Provide an analogue and digital television distribution system to AS/NZS 1367 and conforming to the recommendations of Digital Broadcasting Australia.
Capacity: Provide the distribution system with the installed capacity to accommodate 30% additional outlets.
Antennas: Provide and locate antennas to receive all locally available free-to-air television stations suitable for satellite or cable network operators' services. Provide a coaxial cabling system. Conduits for future cabling: great than 25 mm diameter with drawstrings.
For remote areas: provide appropriate antennae or satellite systems to receive free to air programs. Advise in writing to the Superintendent if clarification is required.

18.13.3 Signal sources

Free – to - air (FTA) antennae system: Provide FTA antennae system terminating at the premises cabling interface.
Network operator: Provide for the connection of the network operator's system terminating at the premises cabling interface as documented.
Local signal source: Provide television input sockets at the premises cabling head-end for the distribution of in-house television channels on separate channels network.

18.13.4 Service entry

Provide service entry facility to suit signal sources, head end equipment and distribution systems.
Location: As documented.

18.13.5 Head end equipment

Provide head end equipment to suit signal sources, distribution systems and documented systems.

18.13.6 Surge Protection Devices (SPD)

Provide surge protection devices to protect final equipment in racks and cabinets.

18.13.7 Distribution system

Provide a cabling distribution network form the head end equipment to each network distribution tap.
FTA distribution taps: Provide FTA distribution taps.
Network distribution taps: For systems designed for more than one network operator provide individual distribution taps for each network operator.
Co-locate the taps with FTA taps in groups to facilitate selected connection or changes to outlet feeders.
Location: As documented.

18.13.8 Outlets

Connect the TV antennae to outlet plates where shown on the drawings.

18.13.9 Television system testing - Witness Point

Test the complete television and audio system and provide the Superintendent with a certificate showing test results and certifying compliance.

18.14 COMMISSIONING

18.14.1 Requirement

On completion clean faceplates, luminaire reflectors and diffusers, and the like, replace faulty lamps, reinstate ground surfaces and finishes disturbed by

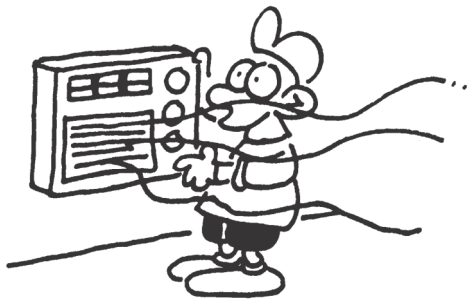
trenching, and hand over the completed installation in working order.
Testing: Carry out mandatory inspection and testing in accordance with AS/NZS 3000, Section 8.

18.14.2 Contractor's Submissions – Hold Point

Prior to practical completion submit a copy of the test results and the Electrical Certificate of Compliance to the Superintendent.

18.15 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.



19. MECHANICAL INSTALLATIONS

19.1 GENERAL

Cross references

Refer to the following sections:

- GENERAL REQUIREMENTS: for compliance with manufacturers' instructions.
- GENERAL REQUIREMENTS for sealing of reveals at openings.
- ELECTRICAL INSTALLATIONS: for electrical requirements.
- INSULATION, SARKING AND PLIABLE MEMBRANES: for large penetrations and Vapour Barriers.
- DOORS AND WINDOWS: If door grilles are required.

Standards

Non ducted air conditioners: To AS/NZS 3823.1.1.
Ducted air conditioners: To AS/NZS 3823.1.2.
Ductwork for air-handling systems in buildings: To AS 4254.2.
Evaporative air coolers: To AS 2913.

19.2 REFRIGERANT HANDLING: TO AIRAH CODE OF PRACTICE, AIR CONDITIONERS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Efficiency Rating: To the requirements of Minimum Energy Performance Standards (MEPS) and AS/NZS 4776.2.

19.2.1 Split Systems - Installation

Split system air conditioners of less than 18 kW capacity.

Refrigerant Lines: Use refrigeration grade copper tube and install with low rated K value closed cell insulation, glued and taped to maintain a vapour barrier and sealed at both ends. Where pipes run through ceiling or wall cavities, insulate with a minimum of 19 mm Bradflex. Support pipe runs to minimize the compression of insulation.
Refrigerant Type: Use R410A or R407C.
Do not use R22 which is being phased out for new equipment.
Leakage Testing: Comply with AS/NZS ISO 817, AS/NZS 5149, (AS/NZS 1677.2 is superseded) and the recommendations of SAA HB 40.1 and SAA HB 40.2.
Dryness testing: Test each refrigerant system for dryness by evacuating the whole system when the ambient temperature is over 16^{O}C to maximum 25 Pa absolute pressure and measuring the pressure rise with the vacuum pump isolated from the system. Maximum allowable absolute pressure rise after minimum 4 hours is 15 Pa.

19.2.2 Room Air Conditioners

Installation: Seal and weatherproof window and wall apertures.

19.3 INSTALLATION GENERALLY

Location: Locate units where shown on the drawings or as directed by the Superintendent. Generally install condensing units on concrete plinths at ground level or mount on concrete block walls. Position condensing units so as not to cause an obstruction or hazard. Do not mount on roofs or bracket off framed walls without prior approval.
Installation: Bolt units down to manufacturer's recommendations using anti vibration mounts.
Mount units in such a way as to prevent vibration and reduce operational noise to an acceptable dB level. Install refrigeration piping and electrical wiring neatly.
Clearance: Provide minimum recommended clearance around units for correct condenser air flow and maintenance requirements.
Insulation: Protect pipework insulation against ultra-violet light and mechanical damage by fitting folded Colorbond metal or proprietary uPVC covers.
Cyclone Fixings: Fix all external plant to resist cyclonic winds in accordance with the N.T. Building Act.
Electrical: Hardwire split systems from isolating switches adjacent to the outdoor units, with control wiring to the indoor units. Connect RACs to adjacent power outlet with a three pin plug and flexible cord.

19.4 CONDENSATE DRAINS

Install condensate drains in accordance with the N.T. Plumbing Code, AS/NZS 1477, AS 2032, AS/NZS 3666.1 and Plumbing Code of Australia.

Minimum size: 20 mm or increase to the size of the unit discharge line. Where more than one unit is connected to a common drain, increase the drain size to meet the capacity. Connect to the nearest floor waste, stormwater drain or to a soaker drain. Lag/insulate the drain within the building envelope to eliminate sweating.
Provide an air break and tundish on condensate lines close to the connection to the soaker drain or stormwater line.
Soakage Pit: 50 mm Dia. uPVC pipe 2 m long with 2 m of slotted uPVC pipe at end graded away from building in 600 mm deep trench. Surround slotted pipe with 100 mm cover of 13 mm aggregate.
Drawing: Refer to Detail 2 on Standard Housing Drawing B08 – 7278.

19.5 FRESH AIR

Provide fresh air supply through the air conditioning unit to air conditioned spaces in accordance with AS 1668.2.DUCTWORK

Standard

Flexible duct: To AS 4254.1.

Rigid ductwork: To AS 4254.2.

Requirement: Provide ductwork for fresh air supply or exhaust air as required. Fan coil units are considered to be part of the ductwork and must comply with AS 4254.2.

No fixings are to penetrate the duct work. Refer to Drawings if available.

Material: Zinc coated steel sheet to AS 1397/G2 Z275.

Provide suitable grilles at intakes and outlets.

Filters: Provide filters for fresh air supply to AS 1324.1 G2, Type 1, Class A.

19.5.1 Circular Flexible Ductwork

Fabrication: To AS 4254.1.

Installation: Fix without restriction to airflow using straps to prevent sagging.

19.5.2 Insulation

Insulate ducts to reduce heat gain and to prevent condensation. Provide continuous vapour barrier around ducts.

19.6 LEAKAGE TESTING

Standard

Leakage testing methods: Select from the following:

- SMACNA 016 HVAC Air Duct Leakage Test Manual.
- The Building and Engineering services Association publication DW/143-A Practical Guide to Good Practice Ductwork Leakage Testing.
- Maximum leakage rate under test: To AS 4254.2.

19.7 FANS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

19.7.1 General

Provide fans which have quiet operation with acceptable dB levels, deliver the required air quantity against the resistance of the system as installed and have maximum static efficiency at the required duty.

Installation: Install fans so as to isolate vibration and to allow access for maintenance.

19.8 COMMISSIONING

Test, commission and maintain the specified mechanical services, including all inferred and obvious work required to complete the works.

19.8.1 Certificates – Hold Point

Provide copies of test certificates for the mechanical installation and equipment used in the installation, test and balancing reports and all control system testing and commissioning results within 2 days of completion of commissioning.

19.9 CORRECTIVE MAINTENANCE

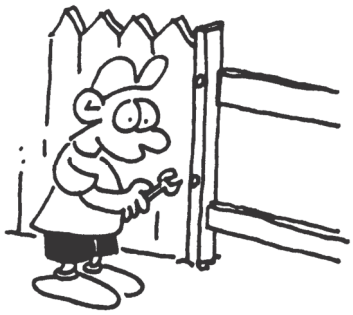
Commence any corrective maintenance within 4 hours of verbal advice from the Superintendent during the defects liability period. Report on the progress and advise the Superintendent if any delays are foreseen.

19.10 SERVICING

During the defects liability period, provide servicing to mechanical units in accordance with the manufacturer's instructions.

19.11 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.



20. FENCES

20.1 GENERAL

Cross reference

Refer to the following sections:
- BLOCK CONSTRUCTION for block fences and walls.
- PAVING for Log Barriers.

20.2 MATERIALS AND COMPONENTS

20.2.1 Galvanizing

Galvanize mild steel components as follows:
- Threaded fasteners: To AS 1214.
- Other components: To AS/NZS 4680.

20.2.2 Steel Tubes

Standard: To AS/NZS 1163 grade C350LO or to AS 1074.

20.2.3 Wire

Chainwire, cablewire, tiewire or barbed wire: To AS 2423.

20.2.4 Concrete

Standard: To AS 1379 Grade N25.

20.2.5 Metal Components

Self-drilling screws: To AS 3566.1.
Steel framing: Zinc-coated or aluminium/zinc alloy coated steel to AS 1397, Z450 or AM125.
Steel sheeting: Prepainted to AS/NZS 2728.
Swimming pool fencing To AS 1926.1 and AS 1926.2.

20.3 CONSTRUCTION GENERALLY

20.3.1 Clearing

Clear vegetation, except for trees and shrubs to be retained, within 1 m of the fence alignment. Grub out the stumps and roots of removed trees or shrubs and trim the grass to ground level, but do not remove the topsoil.

20.3.2 Boundaries

Confirm property boundaries by survey before commencement of works.

20.3.3 Set-out

Set-out the fence lines and mark the positions of gates, posts and bracing panels.

20.3.4 Excavation

Excavate footings so that they have vertical sides and a firm base.

20.3.5 Minimum footing size

Refer to the standard drawing for the required fence.

20.3.6 Line and level

Erect posts vertically. Set heights to follow the contours of the natural ground.

20.3.7 Earth footings

Place 100 mm of gravel in the footing base and backfill with earth around posts, compacting firmly by hand or machine in 150 mm layers.

20.3.8 Concrete footings

Place mass concrete around posts and finish with a weathering top falling 25 mm from the post to ground level.

20.3.9 Steel panel fencing

Ensure bottom rails have drain holes and are at least 50 mm clear of the ground or mowing strip.

20.3.10 Mowing strips

Where required provide a 200 mm wide x 75 mm deep concrete mowing strip under the centreline of the fence to finish 20 mm above finished ground level.
Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

20.4 GATES

General

Construction: Construct gates to match the fencing and in the locations shown on drawings or as directed.
Hardware: Provide the following:
- Drop bolt and ferrule to each leaf of double gates.
- Latch to one leaf of double gates.
- Provision for locking by padlock.
- Hinges; select to ensure smooth operation and to facilitate adjustment to correct future sagging.

Hand access: Provide openings to give access from outside to reach locking provision.

20.5 FENCE TYPES

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

20.5.1 Domestic fences

Street Frontage: Minimum 760 mm high galvanized posts and rails with chainwire in accordance with standard drawing CS 1304-3.
Other Boundaries: 760 mm high galvanized posts and pigwire in accordance with standard drawing CS 1304-3. (See note overleaf).

Note CS 1304-3 under review at time of publication.
Check:
https://infrastructure.nt.gov.au/specification-services/standard-drawings
for current list of standard drawings.

20.5.2 Security fences

1830 mm high chainwire supported on 4 mm galvanized wire cables and posts, complete with offset 3 strand barbed wire at the top constructed and installed in accordance with standard drawing CS 1303-1.
Note CS 1303-1 under review at time of publication.
Check:
https://infrastructure.nt.gov.au/specification-services/standard-drawings
for current list of standard drawings.

20.5.3 Remote Community Fences

1500 mm high chainwire with knuckled selvedges supported on 3 strands of 2 x 4 mm galvanized twisted wire and galvanized steel posts set in concrete footings in accordance with standard drawing B93-1168-D.

20.5.4 Swimming pool fences

Standard panels of 16 dia. tube roll top fencing 2400 mm long x 1250 mm high welded to 32 x 32 x 1.6 mm rails and fixed with proprietary fittings to 65 x 65 x 2.5 mm SHS posts, including caps. Gate posts 76 x 76 x 3.2 mm SHS.
Concrete Footings: 250 mm dia. x 600 mm deep for posts and 300 dia. x 700 mm deep for gateposts.
Finish: Hot dipped galvanized and powder coated. Fit proprietary hinges and safety latches etc. Proprietary Item: Magnalatch.

20.5.5 Horizontal sheet metal fences

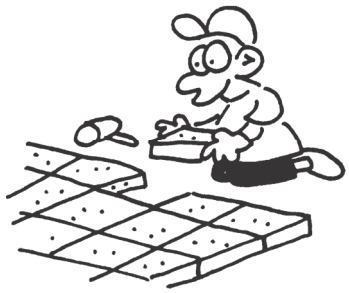
Hot dipped galvanized 65 x 65 x 3 mm SHS posts with caps at 2400 mm centres set in 225 mm dia. x 900 mm deep concrete footings with 0.42 mm BMT Colorbond Trimdek in long lengths, valley fixed horizontally to finish 1600 mm above ground level in accordance with standard drawing B93-1168-D.

20.5.6 Vertical sheet metal fences

Hot dipped galvanized 76 x 76 x 3.2 mm SHS posts, 1500 mm high with caps, at 2400 mm crs set in 250 mm dia. x 600 mm deep concrete footings with 64 x 38 x 3.2 mm RHS horizontal rails clad with 0.42 mm BMT Colorbond Trimdek valley fixed vertically to finish 1650 mm above ground level.
Refer to the Northern Territory Deemed to Comply Manual, Drawing # M/812/01-04.

20.6 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.



21. PAVING

21.1 GENERAL

21.1.1 Cross reference

Refer to SITE PREPARATION for fill types.

21.1.2 Footpath crossing

Provide a footpath and kerb crossing to local council requirements and AUSTROAD design guidelines.

21.2 MATERIALS AND COMPONENTS

21.2.1 Bitumen: To AS 2008.

21.2.2 Mortar materials

Sand: Use a fine aggregate with a low clay content selected for grading.
Cement: To AS 3972, type GP.

21.2.3 Mortar

Mix proportions: 1:3 cement: sand.

21.3 CONSTRUCTION GENERALLY

21.3.1 Grading

Grade paving to even falls to drain away from buildings to drainage outlets without ponding. Minimum fall for drainage: 1:100.

21.4 BASE COURSE

21.4.1 Preparation

Prepare the subgrade to suit the thickness of the base course and paving. If necessary, loosen the ground to a depth of 200 mm and adjust the moisture content before compaction. Compact the ground to a firm even surface using at least 2 passes of a vibrating plate compactor or roller. Remove and replace soft areas with suitable fill.

21.4.2 Base course material

Provide well-graded crushed rock or gravel, free of deleterious material, with a maximum particle size of 26.5 mm, uniformly graded and with a maximum clay content of 6% by mass. Particle size distribution- sieving method: To AS 1141.11.1.

21.4.3 Placing

Spread and compact the base course to a firm, tight, close textured surface using at least 3 passes of a vibrating plate compactor or roller. Adjust the moisture content as needed to facilitate compaction.

21.4.4 Base course minimum thickness table

Comply with the following minimum thicknesses:

	Unit paving		Bituminous paving	
AS 2870 Site Class	**A**	**S & M**	**A**	**S & M**
Foot & bicycle traffic	0	0	50 mm	100 mm
Light domestic traffic occasionally up to 3 tonnes gross	0	75 mm	100 mm	150 mm
For other conditions – to engineer's specifications.				

21.5 ASPHALT PAVING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

21.5.1 Hotmix paving

Standard: Place and compact asphaltic concrete paving over the prepared base course to AS 2150.
Mix designation: AC7.
Bitumen binder: Class 320 bitumen.
Minimum thickness: 25 mm.
Tack coating: Bituminous emulsion sprays to AS 2150.

21.6 SPRAY SEALING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

21.6.1 Preparation

Prepare the surface as per the Gravel Driveways clause.
Priming: Prime the surface with cutback bitumen to AMC 00 at the rate of 1 litre per m^2.

21.6.2 Sealing

Apply the bitumen seal at the rate of 2.5 litres per m^2.
Mix Designation: S10E.
Aggregate: Apply 14 mm aggregate and roll into the surface.

21.6.3 Completion

Broom off the excess aggregate and remove from site.

21.7 UNIT PAVING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.
Masonry segmental pavers:
Provide paving units of clay, natural stone or concrete masonry, purpose-made for use as paving, or units made for bonded masonry construction but suitable for paving.
Standard: To AS/NZS 4455.2.
Minimum thickness:

- Foot and bicycle traffic: 40 mm.
- Light domestic traffic occasionally up to 3 tonne gross: 60 mm.

Cutting units: Cut paving units to maintain sharp edges and accurate joints and margins.
Pattern: As shown on the drawings, otherwise stretcher bond.

21.7.1 Laying unit paving

Over the base course, lay the units on bedding sand screeded to a uniform thickness not exceeding 50 mm, and to the required falls and levels. Do not disturb the screeded sand bedding before the units are laid. Provide a gap of 2 to 5 mm wide between adjoining units. After laying, tamp the units using a vibrating plate compactor.
Cut courses: 50 mm minimum plan dimension. On footpaths and other linear elements, use at least 2 cut courses and maintain symmetry.
Compaction: Compact the sand bedding after laying paving units using a vibrating plate compactor and appropriate hand methods. Continue until lipping between adjoining units is eliminated.
Joint filling: Spread dry sand over the paving units and fill the joints by brooming. Carry out one or more passes with the vibrating plate compactor and refill the joints with sand. Repeat the process until the joints are completely filled

21.7.2 Edge restraint

Provide concrete fillet edge restraint to bedding and units where not provided by other structures.

21.8 IN SITU CONCRETE PAVING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

21.8.1 Concrete

Standard: To AS 1379 grade N25.

21.8.2 Minimum thickness

Foot and bicycle traffic and light domestic traffic occasionally up to 3 tonne gross: 100 mm.
Reinforcing Mesh: SL62 placed centrally, material to AS/NZS 4671, installation to AS 2870

21.8.3 Preparation

Trim the ground to suit the required thickness of concrete and compact to a firm, even surface.

21.8.4 Control joints

Form tooled joints at maximum 2 m spacing for concrete paths.

21.8.5 Expansion joints

Cast-in 10 mm thick closed cell cross-linked polyethylene compressible filler strip (Abelflex or equivalent) at maximum 6 m spacing.
Abutment with building
If concrete paving is more than 1.5 m wide abuts the wall of a building, provide a strip of 10 mm thick closed cell cross-linked polyethylene compressible filler strip (Abelflex or equivalent) between the paving and the wall.

21.8.6 Broom finish

Wood float and broom to an even textured slip-resistant surface with steel tooled margins. On gradients steeper than 10%, roughen the surface by scoring.

21.8.7 Exposed aggregate finish

Steel trowel to a smooth surface. After final set use clean water and brushes to remove the surface film of mortar until the aggregate is uniformly exposed without cutting of the matrix.

21.8.8 Sponge finish

After screeding and finishing with a steel trowel obtain an even textured sand finish by wiping the surface using a damp sponge.

21.8.9 Pattern Paving

After machine floating, apply a proprietary treatment producing an integral coloured and patterned surface.

21.9 GRAVEL DRIVEWAYS

Location: Hardstand, driveways and paths as shown on the drawings.
Material: Approved road gravel - Type 3.
Thickness: Minimum 100 mm after compaction.
Falls: Minimum 1:100.
Compaction: Compact and Proof Roll to achieve a dry density ratio of 95% MMDD when tested to AS 1289 5.4.1.

21.10 LOG BARRIERS

Provide log barrier fencing consisting of close spaced vertical bollards.
Use recycled plastic bollards or Stringybark, Woollybutt or Pine Timber, pressure impregnated with ACQ preservative formulation, copper oxide (CuO) and quaternary ammonium compound (DDAC) to Category H4 of AS 1604.
Do not use preservative treatments that contain arsenic or chromium.
The use of recycled materials such as plastic in this application is acceptable.

Recycled plastic bollards

Supply round pre-moulded recycled plastic bollards, 1.5 m length x 150 mm diameter with built in colours and UV stabilised, resistant to termites, microorganisms and moisture.
Install and ensure security of recycled plastic bollards as per manufacturer's recommendations.
Make allowance for excavation and concreting of anchor/footings.
Make allowance for minor clearing of fence lines.

21.11 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

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22. LANDSCAPE

22.1 GENERAL

Cross reference

Refer to GENERAL REQUIREMENTS for timber durability classes appropriate for various applications.

Specification Reference

Refer to the Northern Territory Government Standard Specification for Environmental Management and to the RFT.

Standards

Comply with the Acts, Regulations, Guidelines and Codes applicable to the works. Comply with the requirements of Authorities with jurisdiction over the works. Conform to the Standards and Publications quoted throughout this document unless specified otherwise. Refer to REFERENCED DOCUMENTS.

22.2 MATERIALS AND COMPONENTS

Concrete

Standard: To AS 1379.

Potting mixes

Standard: To AS 3743.

Site and imported topsoil

Standard: To AS 4419.

Composts, soil conditioners and mulches

Standard: To AS 4454.

22.3 PREPARATION

22.3.1 Weed eradication

Eradicate weeds using a non-residual glyphosate herbicide in any registered formulae, at the recommended maximum rate.

22.3.2 Surplus spoil

Remove surplus spoil from site. Do not burn vegetative material.

22.4 INSPECTION – WITNESS POINT

Give sufficient notice so that inspection may be made of the planting and garden edging set out prior to excavation and advanced tree and palm holes excavated.

22.5 SAMPLES - HOLD POINT

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.5.1 Samples - Requirement - Hold Point

Provide the following samples for approval:

- 5 kg bag of topsoil and test documentation.
- 5 kg bag of mulch.

22.5.2 Irrigation design drawings

Refer to IRRIGATION clause in this section for Hold Point information.

22.6 SUBSOIL

22.6.1 Ripping

If practicable rip parallel to the final contours. Do not rip when the subsoil is wet or plastic. Do not rip within the dripline of trees to be retained.

Ripping depths: Rip the subsoil to the following typical depths:

- Compacted subsoil: 300 mm.
- Heavily compacted clay subsoil: 450 mm.

22.6.2 Cultivation

Cultivate to a minimum depth of 100 mm. Do not disturb services or tree roots; if necessary, cultivate these areas by hand. During cultivation, thoroughly mix in materials required to be incorporated into the subsoil. Remove stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to the required design levels after cultivation.

22.6.3 Additives

Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil.

Gypsum: Incorporate at the rate of 0.25 kg/m^2.

22.7 TOPSOIL

22.7.1 General

Provide sand based topsoil, equal to or better than the approved sample, which is free from unwanted matter and complying with AS 4419. Add 6 kg/m3 of “Terra Firma Organic Life” and thoroughly combine.

22.7.2 Source

Obtain topsoil from an approved source and keep records of soil delivery.

22.7.3 Placing topsoil

Spread the topsoil on the prepared subsoil and grade evenly, making the necessary allowances so that required finished levels and contours are achieved after light compaction; and grassed areas may be finished 20 mm below adjacent hard surfaces such as kerbs, paths and mowing strips.

22.7.4 Consolidation

Compact lightly and uniformly in 150 mm layers.

Avoid differential subsidence and excess compaction and produce a finished topsoil surface which is finished to design levels; smooth and free from stones or lumps of soil; graded to drain freely, without ponding, to catchment points; graded evenly into adjoining ground surfaces; and ready for planting.

22.7.5 Topsoil depths

Spread topsoil to the following typical depths:

- Planting areas: 250 mm.
- Irrigated grassed areas generally: 150 mm.
- Grass areas: 100 mm.

22.8 TURFING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.8.1 Turf

Obtain turf from a specialist grower of cultivated turf. Provide turf of even thickness, free from weeds and other foreign matter.

22.8.2 Supply

Deliver the turf within 24 hours of cutting, and lay it within 36 hours of cutting. Prevent it from drying out between cutting and laying.

22.8.3 Fertilising

Mix fertiliser thoroughly into the topsoil before placing the turf.

22.8.4 Laying

Lay turf as follows:

- In “stretcher” pattern with the joints staggered and close butted;
- Parallel with the long sides of level areas, and with contours on slopes and;
- To finish flush, after tamping, with adjacent finished surfaces of ground, paving edging, or grass seeded areas.

22.8.5 Tamping

Lightly tamp to an even surface immediately after laying. Do not use a roller.

22.8.6 Watering

Water immediately after laying until the topsoil is moistened to its full depth.

22.9 GRASS SEEDING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.9.1 Seed

Use seed mixtures which are thoroughly pre-mixed with a bulking material such as safflower meal. Deliver to the site in bags marked to show weight, seed species and supplier’s name. Use fresh, clean new seed. Do not use wet, mouldy, or otherwise impaired seed.

22.9.2 Preparation

Prepare the areas to be sown. Spread the fertiliser evenly over the cultivated bed not more than 48 hours before sowing, and rake lightly into the surface. If a prepared area becomes compacted from any cause before sowing can begin, rework the ground surface before sowing.

22.9.3 Sowing

Sow the seed only in favourable conditions and using a suitable mechanical spreader. Roll the seed bed immediately after sowing.

22.9.4 Watering

Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Continue watering until germination to keep the surface damp and the topsoil moist but not waterlogged.
After germination: Water to maintain a healthy condition, progressively hardened off to the natural climatic conditions. Remove weeds that occur in sown areas.

22.9.5 Germination

A dense continuous sward of healthy grass over the whole of the seeded area. Reseed areas that do not germinate within 1 month.

22.10 SPRAYGRASS (HYDROSEEDING)

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.10.1 Preparation

Cultivate in situ soil to a minimum of 100 mm and bring existing soil to a fine tilth 50 mm below finished levels. Remove all deleterious material. Add “Tropigro-Clay-Breaker” to manufacturers’ Specifications. Spread 50 mm topsoil and incorporate additional “Terra Firma Organic Life” at 6 kg/m3.

22.10.2 Application

Apply seed at 10g/m2 using:
- 30% Cynodon dactylon.(Couch)
- 35% Paspalum notatum pensicola.
- 35% Paspalum notatum argentina.

Apply to the area to be seeded a thoroughly mixed slurry of seed, fertiliser, vegetative emulsion, mulch and water, free of weed, seed or germination inhibitors, using a purpose made mechanical mixer and high pressure pumping equipment Use local applicators experienced in this work and using approved methods.

22.11 MOWING

Mow to maintain the grass height within the required range of 40 to 80 mm. Carry out the last mowing not more than seven days before the end the planting establishment period. Remove grass clippings from the site after each mowing.

22.12 PLANTING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.12.1 Excavation

Excavate plant holes a minimum of twice the size of the volume of the specified pot size.

22.12.2 Plants

Provide plants with the following characteristics:
- Large healthy root systems, with no evidence of root curl, restriction or damage;
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety and;
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

Trees: Provide trees which, unless required to be multi-stemmed, have a single leading shoot.

22.12.3 Labelling

Label at least one plant of each species or variety in a batch using a durable, readable tag.

22.12.4 Planting conditions

Carry out planting on the same day that plants are delivered to the site.
Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

22.12.5 Backfilling

Backfill planting holes with imported blended topsoil.

22.12.6 Watering

Thoroughly water plants before planting and immediately after planting.

22.12.7 Fertiliser

Provide proprietary materials, delivered to site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

Initial fertilizer at planting or sowing			
Location	**N:P:K ratio**	**Application rate**	**Product**
Grassed areas	15.9 : 7 : 7	7.5kg per 100 m^2	Mastergreen
All planted trees	20 : 4.3 : 4.1	Manufacturer’s recommendation – spaced equally around root ball	Agriform Planting Tablets
All planted trees	12.5 : 3.3 : 6.5	Manufacturer’s recommendation – under mulch	Agriform Planting and Feeding Mix
Ground cover & shrubs	15 : 4 : 9	100 gm per m^2	Osmocote Exact 8-9 months
All planted trees & palms	-	300 gm in base of each hole	Tropigro 10-88

For grassed areas: Fertilizer during establishment period			
Time	**N:P:K ratio**	**Application rate**	**Product (or equiv.)**
November *	10.3:9:7+11(s)	7.5 kg per 100 m^2	Tropigro 10-97
March *	38% N	1 kg per 100 m^2	Osmoform 38N
* Or when directed.			

For planting: Week 10 of the establishment period			
Location	**N:P:K ratio**	**Application rate**	**Product**
All planted trees	12.5:3.3:6.5	Manufacturer's recommendation – under mulch	Agriform Planting and Feeding Mix
All planted trees	-	Manufacturer's recommendation – under mulch	Tropigro 10-88
Ground cover & shrubs	13:5.6:10.8	100 gm per m^2	Agriform Planting and Feeding Mix
Ground cover & shrubs	-	100 gm per m^2	Tropigro 10-88

For planting: Week 40 of the establishment period			
Location	**N:P:K ratio**	**Application rate**	**Product**
All planted trees	15 : 4 : 9	Manufacturer's recommendation – under mulch	Osmocote Exact 8-9 months
All planted trees		Manufacturer's recommendation – under mulch	Tropigro 10-88
Ground cover & shrubs	15 : 4 : 9	200 gm per m^2	Osmocote Exact 8-9 months
Ground cover & shrubs		200 gm per m^2	Tropigro 10-88

22.13 MULCHING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.13.1 Mulch

Provide mulch, equal to or better than the provided approved sample, from an approved source, which is free of deleterious and extraneous matter such as stones (for organic mulches), soil, declared weeds and their seeds and sticks.

Application: Place mulch clear of plant stems, and rake to an even surface flush with the surrounding finished levels.

Depth: 100 mm.

22.13.2 Mulch Types

Hay: Cut from seasonal grasses and free from declared weeds and deleterious materials.

Laterite gravel: Uniform colour and size or graded from 5 to 25 mm.

Brush Chippings: Approved "Forest Blend" vegetative material processed to pieces not larger than 75 x 50 x 15 mm and aged from 6 to 12 weeks.

Washed River Pebble: Uniform size or graded from 10 to 25 mm.

22.14 STAKES AND TIES

22.14.1 Stakes

Material: Hardwood or recycled plastic which satisfies existing dimensions and properties, straight, free from knots or twists, pointed at one end.

Installation: Drive stakes into the ground at least one third of their length, avoiding damage to the root system. Remove those no longer required at the end of the establishment period.

Stake sizes:

- For plants 1 to 2.5 m high: Two 50 x 50 x 1800 mm stakes per plant.
- For plants smaller than 1 m high: One 38 x 38 x 1200 mm stake per plant.

22.14.2 Ties

Provide ties fixed securely to the stakes, one tie at half the height of the main stem, others as necessary to stabilise the plant. Attach ties loosely.

Webbing: Provide 50 mm hessian webbing stapled to the stake.

22.15 GARDEN EDGING

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.15.1 Spade Edging

Location: To edges between garden beds and around tree planting in areas of lawn.

Requirement: Form a spade cut edge to a minimum depth of 150 mm below the adjacent surface levels. Align adjacent spade cuts to achieve smooth curves and/or straight lines as required.

Remove all grass or weeds from the spade cut and maintain the edge free from grass and weed growth.

22.15.2 Concrete Edging

Location: To garden edges against lawns and areas not planted.

Edging Strip: N20 in situ concrete 175 mm wide x 90 mm high. Place in position on a cleared compacted base with a forming machine to the layout shown on the drawings or as directed.

Finish with a profiled steel trowel and tool in control joints at a maximum 2.5 m centres.

Profile: Rounded or splayed top.

22.16 IRRIGATION

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

Standard: To AS/NZS 3500.1.

22.16.1 Cross references

Refer to: SITE PREPARATION for excavating trenches.

22.16.2 Inspection - Witness Point

Give sufficient notice so that inspection may be made of work ready for testing.

22.16.3 Hydrostatic tests - Hold Point

Fill the pipework with water and test at the required pressure and duration.

22.16.4 Contractors design plans - Hold Point

Submit drawings indicating design proposals showing all pipework, sprinklers, tanks, valves and control systems for approval, before commencing landscaping works.

22.16.5 Work-as-executed drawings – Hold Point

Submit drawings showing the “as installed” locations of all pipework, fittings, sprinklers, control valves and accessories before practical completion.
Show the depth of underground pipework. Show location of all controllers and automatic control wiring; indicate colours used for individual valves.

22.16.6 Connection

Connect the cold water supply system to the supply authority’s main through a stop valve and meter. Carry out the excavation necessary to locate and expose the connection point. On completion reinstate surfaces and elements which have been disturbed such as roads, pavements, kerbs, footpaths and nature strips.

22.16.7 Excavation and installation

Requirement: Excavate to the lines, levels and grades as required for irrigation trenches. Trench depths and widths as required by AS/NZS 3500.1.
Obstructions: Cut back roots encountered in trenches to not less than 600 mm clear of the pipework. Remove such other obstructions including stumps, boulders and the like which may, in the opinion of the Superintendent, interfere with the pipework.

22.16.8 Installation

Install pipework in straight lines and uniform grades. Provide unions, flanges and isolating valves for the satisfactory removal of piping and fittings for maintenance or replacement of plant. Arrange and support pipework so that it remains free from vibration whilst permitting necessary movements such as thermal expansion and contraction. Minimize the number of joints.

22.16.9 Accessibility

Location: Locate fittings requiring maintenance or servicing, including control valves, joints designed to enable removal of pipes, and the like, in accessible positions, with adequate clearance. Arrange the pipework so that it does not interfere with the removal or servicing of associated equipment or valves.

22.16.10 Description of irrigation system

Use a fixed location type with automatically or manually operated sprinklers, sprays, microsprays and drippers.

22.16.11 Performance of irrigation system

Coverage (mm of water over area to be watered):
50 to 60 mm per week during the establishment period and then progressively hardening off to local conditions.
Ensure that water usage is such that plant health and vigour is maintained without wastage of water.

22.16.12 Backflow

Fit a backflow prevention device to AS/NZS 3500.1 and as required to meet the approval of PowerWater Corp.

22.16.13 Irrigation controllers

Use electric solenoid valves wired to an irrigation controller.
Irrigation controller: Mount the controller in a weatherproof lockable cabinet. Include the following features:

- Variable timer for each station with a range from 1 minute to not less than 30 minutes.
- Manual cycle and individual station operation.
- Manual on-off operation of irrigation without loss of program.
- 240 V input and 24 V output capable of operating 2 control valves simultaneously.
- 24 hour battery program backup.

22.16.14 Micro-irrigation system

Polyethylene irrigation pipe: To AS 2698.2 with barbed fittings of similar pressure rating fastened with ratchet type clamps. Lay pipe on finished ground surface under planting bed mulch and anchor at minimum 1.5 m intervals with U-shaped stakes. Connect micro-tube laterals with proprietary push in or screw in fittings.
Microsprays: Mount microsprays on stakes 300 mm above ground and connect to the pipework with microtubes.
Drippers: Use drippers which are turbulent flow types, easily dismantled for cleaning. Connect directly into the pipework or with microtubes.
Micro irrigation valve box: Use micro irrigation valve boxes which are of high impact plastic with snap lock covers at finished ground level, each housing a stop cock, filter (200 mm for microsprays, 100 mm for drippers), pressure reducing valve (170 kPa outlet pressure) and automatic control valve. Use vandal resistant controls in public areas.

Irrigation Schedule			
Location	**Item**		**Requirement**
As shown on drawings	External hose cocks	Type	To AS/NZS 3500
		Size	20mm
As on approved design plan	Sprinkler	Type	Gear driven
As on approved design plan	Automatic valve	Type	Solenoid operated
		Size	Maximum pressure loss 20 kPa
As shown on drawings	Quick Coupling valve	Type	Polypropylene
		Size	25mm
As required to achieve uniform coverage	Micro-sprays	Type	No moving parts
At each plant	Drippers	Type	Turbulent flow
At each plant	Bubblers	Type	Adjustable from 0 to 10 litres per minute

22.17 MATERIALS:

Pipework upstream of control valves: Use uPVC class 12.

Pipework downstream of control valves: Use uPVC class 9 or 25 mm diameter polyethylene.

22.17.1 Drip irrigation systems

Integrated drip line systems: Tubing with integral drippers inserted into the tube during manufacture.

Discrete drip emitter systems:

- Tubing: Polyethylene micro- irrigation pipe.
- Drippers: Turbulent flow types, easily dismantled for cleaning. Connect directly into piping or provide appropriately sized micro-tubes.

Piping: Lay polyethylene micro-irrigation pipe on finished ground surface under planting bed mulch and anchor at 1.5 m maximum intervals with U-shaped stakes.

Air release valves: Provide at the highest point in each section to drain the system when flow stops.

22.17.2 Subsurface drip irrigation systems

Tubing: Collector and distributor mains: LDPE or PVC pipe.

Dripline: LDPE pipe.

Piping: Install at least 150 mm below ground.

Automatic line flushing valve: Provide at the furthest point from the valve on the collector main.

22.17.3 Fittings

Type: Barbed fittings rated for the pressure class of the pipe, fastened with ratchet type clamps.

22.17.4 Valve boxes

Requirement: Provide the following in each valve box:

- Automatic control valve.
- Isolating valve.
- Filter: 100 µm (micrometre).
- Pressure reducing valve with 170 kPa outlet pressure.

Construction: UV – resistant high impact plastic with high impact snap lock plastic cover.

22.18 COMPLETION

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

22.18.1 Irrigation

Requirement: on completion of the irrigation system, carry out the following:

- Flush system thoroughly, check heads, spray and drippers and clean if blocked.
- Clean strainers.
- Adjust for even distribution with no dry area.

22.18.2 Maintenance Manual

Provide a maintenance manual which includes notes and specifications of all landscape and irrigation work and recommendations for ongoing maintenance work.

22.18.3 Plant Establishment

Maintain the planted areas for a minimum of 13 weeks from the time of practical completion. Replace damaged, stolen or vandalised stock as required. For all other work including irrigation and hardworks, the contractual defects liability period applies.

22.19 OTHER REQUIREMENTS

Refer to PROJECT SPECIFIC REQUIREMENTS section of Request for Tender document.

23. REFERENCED AUSTRALIAN STANDARDS

Referenced Australian Standards		
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Entries in Times New Roman italics indicate Standards not cited in this document but which may be useful references.		
AS 1012 (set)	-	Methods of testing concrete
AS 1012.1	2014	- Sampling of concrete
AS 1012.8.1	2014	- Method for making and curing concrete - Compression and indirect tensile test specimens
AS 1012.8.2	2014	- Method for making and curing concrete - Flexure test specimens
AS 1012.13	2015	- Determination of the drying shrinkage of concrete for samples prepared in the field or in the laboratory
AS 1074	1989	Steel tubes & tubulars for ordinary services
AS/NZS 1080 (set)	*-*	*Timber- Methods of test*
AS/NZS 1080.1	*2012*	*- Moisture content*
AS 1100 (set)	-	Technical drawing
AS 1100.101	1992 (R2014)	- General principles
AS 1100.201	1992	- Mechanical engineering drawing
AS 1100.301	2008	- Architectural drawing
AS 1100.401	1984 (R2014)	- Engineering survey and engineering survey design drawing
AS 1100.501	2001 (R2014)	- Structural engineering drawing
AS 1111.1	2015	ISO metric hexagon bolts & screws – Product Grade C – Bolts
AS 1141.11.1	2009	- Methods for sampling and testing aggregates - Particle size distribution- Sieving method
AS/NZS 1163	2016	Cold formed structural steel hollow sections
AS/NZS 1170 (set)	-	Structural design actions
AS/NZS 1170.0	2002	- General Principles
AS/NZS 1170.1	2002	- Permanent, imposed and other actions
AS/NZS 1170.2	2011	- Wind 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)
AS/NZS 1221	1997	Fire hose reels
AS 1231	2000	Aluminium and aluminium alloys - Anodic oxidation coatings
AS 1288	2006 (R2016)	Glass in buildings - Selection and installation
AS 1289.5	*2000*	*Methods of testing soils for engineering purposes - Soil compaction & density tests*
AS 1289.5.1.1	2003	- Determination of the dry density/moisture content relation of a soil using standard compaction effort
AS 1289.5.4.1	*2007*	*- Compaction control test – Dry density ratio, moisture variation and moisture ratio*
AS 1324.1	2001	Air filters for use in general ventilation and air conditioning - Application, performance and construction
AS/NZS 1328.1	1998	Glued laminated structural timber - Performance requirements and minimum production requirements
AS 1366 (set)	-	Rigid cellular plastics sheets for thermal insulation
AS 1366.1	1992	- Rigid cellular polyurethane (RC/PUR) (+Amendment 1:1992)
AS 1366.3	1992	- Rigid cellular polystyrene - Moulded (RC/PS-M)

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Entries in Times New Roman italics indicate Standards not cited in this document but which may be useful references.		
AS 1366.4	1989	- Rigid cellular polystyrene - Extruded (RC/PS-E)
AS/NZS 1367	2016	Coaxial cable and optical fibre systems for the RF distribution of analogue and digital television and sound signals in single and multiple dwelling installations
AS 1379	2007	Specification and supply of concrete
AS 1397	2011	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1428.1	2009	Design for access and mobility – General requirements for access – New building work
AS 1530.1	1994 (R2016)	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS 1432	2004	Copper tubes for plumbing, gas fitting & drainage applications
S/NZS 1477	2006	PVC pipes & fittings for pressure applications
AS 1478.1	2000	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete
AS/NZS 1546 (set)	-	On site domestic waste water treatment units
AS/NZS 1546.1	2008	- Septic tanks
AS/NZS 1546.2	2008	- Waterless composting toilets
AS/NZS 1546.3	2008	- Aerated wastewater treatment systems
AS/NZS 1547	2012	Onsite domestic wastewater management
AS/NZS 1554.1	2014	Structural steel welding - Welding of steel structures
AS 1562 (set)	-	Design and installation of sheet roof and wall cladding
AS 1562.1	1992 (R2016)	- Metal
AS 1562.3	2006	- Plastic
AS/NZS 1596	2014	The storage & handling of LP Gas
AS 1604 (set)	-	Specification for preservative treatment
AS 1604.1	2012	- Sawn & round timber
AS 1627 (set)	-	Metal finishing - Preparation and pretreatment of surfaces
AS 1627.0	1997	- Method selection guide
AS 1627.1	2003	- Removal of oil, grease and related contamination
AS 1627.2	2002	- Power tool cleaning
AS 1627.4	2005	- Abrasive blast cleaning of steel
AS 1627.9	2002	- Pictorial surface preparation standards for painting steel surfaces
AS 1668 (set)	-	The use of ventilation and air-conditioning in buildings
AS 1668.2	2012	- Mechanical ventilation in buildings
AS 1668.4	*2012*	*- Natural ventilation of buildings*
AS 1670.6	1997	Fire detection, warning, control and intercom systems - System design, installation and commissioning – Smoke alarms
AS 1672.1	1997 (R2016)	Limes and limestones - Limes for building
AS/NZS 1677.1	1998	Refrigerating systems Part 1: Refrigerant classification (Superseded by AS/NZS ISO 817:2016)
AS/NZS 1677.2	1998	Refrigerating systems - Safety requirements for fixed applications (Superseded by AS/NZS 5149 (set) :2016)
AS 1684 (set)	-	Residential timber-framed construction
AS 1684.2	2010	- Non-cyclonic areas
AS 1684.3	2010	- Cyclonic areas

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Entries in Times New Roman italics indicate Standards not cited in this document but which may be useful references.		
AS 1720.1	2010	Timber structures – Design methods
AS 1745.1	1989	Outdoor weathering of plastics in the Australian environment – commercial products (available withdrawn)
AS 1789	2003	Electroplated zinc (electrogalvanized) coatings on ferrous articles (batch process)
AS 1796	2001 (R2016)	Certification of welders and welding supervisors
AS/NZS 1841.1	2007	Portable fire extinguishers – General requirements
AS/NZS 1859 (set)	-	Reconstituted wood-based panels– Specifications
AS/NZS 1859.1	2004	- Particleboard
AS/NZS 1859.2	2004	- Dry-processed fibreboard
AS/NZS 1859.3	2005	- Decorative overlaid wood panels
AS/NZS 1859.4	2004	- Wet-processed fibreboard
AS/NZS 1866	1997	Aluminium & aluminium alloys – Extruded rod, bar, solid & hollow shapes
AS/NZS 1873.4	2003	Powder-actuated (PA) hand held fastening tools – Fasteners (available withdrawn)
AS 1884	2012	Floor coverings- Resilient sheet and tiles- Installation practices
AS 1905.1	2015	Components for the protection of openings in fire-resistant walls – Fire-resistant doorsets
AS 1909	1984	Installation of timber doorsets (available obsolescent)
AS 1926 (set)	-	Swimming pool safety
AS 1926.1	2012	- Safety barriers for swimming pools
AS 1926.2	2007 (R2016)	- Location of safety barriers for swimming pools
AS 1926.3	2010 (R2016)	- Water recirculation systems
AS 2008	2013	Bitumen for pavements
AS 2032	2006	Installation of PVC pipe systems
AS 2047	2014	Windows and external glazed doors in buildings
AS 2150	2005	Hot mix asphalt – A guide to good practice
AS 2159	2009	Piling – Design and installation
AS/NZS 2179.1	2014	Specifications for rainwater goods, accessories and fasteners – Metal shape or sheet rainwater goods, and metal accessories and fasteners
AS/NZS 2201.1	2007	Intruder alarm systems – Client's premises – Design, installation, commissioning and maintenance
AS/NZS 2208	1996	Safety glazing materials in buildings
AS/NZS 2269.0	2008	Plywood – Structural – Specifications
AS/NZS 2270	2006	Plywood and blockboard for interior use
AS/NZS 2271	2004	Plywood and blockboard for exterior use
AS 2293.1	2005	Emergency escape lighting and exit signs for buildings – System design, installation and operation
AS/NZS 2311	2009	Guide to the painting of buildings
AS/NZS 2312.1	2014	Guide to the protection of structural steel against atmospheric corrosion by use of protective coatings – Paint coatings
AS 2329	1999	Mastic adhesives for fixing wallboards (available withdrawn)
AS 2358	1990	Adhesives – For fixing ceramic tiles (available withdrawn)
AS 2423	2002	Coated steel wire fencing products for terrestrial, aquatic and general use.
AS 2441	2005	Installation of fire hose reels

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AS/NZS 2455.1	2007	Textile floor coverings – Installation practice – General
AS/NZS 2588	1998 (R2016)	Gypsum plasterboard
AS/NZS 2589	2007	Gypsum linings – Application and finishing
AS 2601	2001	The demolition of structures
AS/NZS 2642.2	2008	Polybutylene (PB) plumbing pipe systems – Polybutlene (PB) pipe for hot & cold water applications
AS/NZS 2648.1	1995	Underground marking tape - Non-detectable tape
AS 2688	1984	Timber doors (available obsolescent)
AS 2689	1984	Timber doorsets (available obsolescent)
AS 2698.2	2000	Plastic pipes and fittings for irrigation and rural applications – Polyethylene rural pipe
AS/NZS 2699.3	2002	Built-in components for masonry construction – 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 2754.1	2016	(INT) Adhesives for timber and timber products – Adhesives for manufacture of plywood and laminated veneer lumber (LVL)
AS/NZS 2758.1	2014	Aggregates and rock for engineering purposes – Concrete aggregates
AS/NZS 2785	2000	Suspended ceilings – Design and installation
AS 2796 (set)	-	Timber – Hardwood – Sawn and milled products
AS 2796.1	1999 (R2016)	- Product specification
AS 2796.2	2006	- Grade Description
AS 2870	2011	Residential slabs and footings
AS/NZS 2904	1995	Damp-proof courses and flashings
AS/NZS 2908.2	2000	Cellulose-cement products - Flat sheets
AS 2913	2000 (R2016)	Evaporative air-conditioning equipment
AS/NZS 2918	2001	Domestic solid fuel burning appliances – Installation
AS/NZS 2924.1	1998	High pressure decorative laminates – Sheets made from thermosetting resins - Classification and specifications
AS/NZS 3000	2007	Electrical installations – (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.1	2009	Electrical installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 kV – Typical Australian installation conditions.
AS/NZS 3080	2013	Information technology - Generic cabling for customer premises (ISO/IEC 11801:2011, MOD)
AS/NZS 3085.1	2004 (R2016)	Telecommunications installations - Administration of communications cabling systems - Basic requirements
AS/NZS 3500 (set)	-	Plumbing and Drainage
AS/NZS 3500.1	2015	- Water services
AS/NZS 3500.2	2015	- Sanitary plumbing and drainage
AS/NZS 3500.3	2015	- Stormwater drainage
AS/NZS 3500.4	2015	- Heated water services
AS/NZS 3500.5	2012	- Housing installations
AS/NZS 3504	2006	Fire blankets

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AS 3566 (set)	-	Self-drilling screws for the building and construction industries
AS 3566.1	2002 (R2016)	- General requirements and mechanical properties
AS 3566.2	2002	- Corrosion resistance requirements (available withdrawn)
AS 3600	2009	Concrete structures
AS 3610	1995	Formwork for concrete
AS 3610.1	2010	- Documentation and surface finish
AS 3623	1993	Domestic metal framing
AS 3660 (set)	-	Termite management
AS 3660.1	2014	- New building work
AS 3660.2	2000	- In and around existing buildings and structures - Guidelines
AS/NZS 3666.1	2011	Air-handling and water systems of buildings – Microbial control – Design, installation and commissioning
AS/NZS 3678	2016	Structural steel – Hot-rolled plates, floorplates and slabs
AS/NZS 3679.1	2016	Structural steel – Hot-rolled bars and sections
AS 3700	2011	Masonry in buildings
AS 3715	2002	Metal finishing – Thermoset powder coating for architectural applications of aluminium and aluminium alloys
AS 3735	2001	Concrete structures retaining liquids
AS 3740	2010	Waterproofing of domestic wet areas
AS3743	2003	Potting mixes
AS 3786	2014	Smoke alarms using scattered light, transmitted light or ionization (+Amendment 1:2015)
AS 3798	2007	Guidelines on earthworks for commercial and residential developments.
AS 3814	2015	Industrial and commercial gas fired appliances
AS/NZS 3823 (set)	-	Performance of electrical appliances – Air conditioners and heat pumps
AS/NZS 3823.1.1	2012	- Non-ducted air conditioners and heat pumps – Testing and rating for performance
AS/NZS 3823.1.2	2012	- Ducted air conditioners and air-to-air heat pumps – Testing and rating for performance
AS 3894 (set)	-	Site testing of protective coatings
AS 3894.10	2002	- Inspection report - Daily surface and ambient conditions
AS 3894.11	2002	- Equipment report
AS 3894.12	2002	- Inspection report - Coatings
AS 3958 (set)	-	Ceramic tiles
AS 3958.1	2007	- Guide to the installation of ceramic tiles
AS 3958.2	1992	- Guide to the selection of a ceramic tiling system
AS 3959	2009	Construction of buildings in bushfire prone areas
AS 3972	2010	General purpose and blended cements
AS 3999	2015	Bulk thermal insulation - Installation
AS 4055	2012	Wind loads for housing
AS 4100	1998 (R2016)	Steel structures
AS 4145 (set)	-	Locksets and hardware for doors and windows
AS 4145.1	2008	- Glossary of terms and rating system
AS 4145.2	2008	- Mechanical locksets for doors and windows in buildings
AS 4145.3	2001	Locksets - Mechanical locksets for windows
AS 4145.4	2002	Locksets - Padlocks

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AS 4154.5	2011	- Controlled door closing devices (EN 1154: 1997, MOD)
AS/NZS 4200 (set)	-	Pliable building membranes and underlays
AS/NZS 4200.1	1994	- Materials
AS/NZS 4200.2	1994	- Installation requirements
AS/NZS 4253	1994	Mailboxes
AS 4254.1	2012	Ductwork for air-handling systems in buildings - Flexible duct
AS 4254.2	2012	Ductwork for air-handling systems in buildings - Rigid duct
AS 4256 (set)	-	Plastic roof and wall cladding materials
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/NZS 4389	2015	Roof safety mesh
AS 4419	2003	Soils for landscaping & garden use
AS 4440	2004	Installation of nailplated timber roof trusses
AS 4454	2012	Composts, soil conditioners and mulches
AS/NZS 4455 (set)	-	Masonry units, pavers, flags and segmental retaining wall units
AS/NZS 4455.1	2008	- Masonry units
AS/NZS 4455.2	2010	- Pavers and flags
AS/NZS 4455.3	2008	- Segmental retaining wall units
AS/NZS 4456.4:	2003	Masonry units and segmental pavers and flags - Methods of test - Determining compressive strength of masonry units
AS/NZS 4505	2012	Garage doors and other large access doors
AS 4506	2005	Metal finishing – Thermoset powder coatings
AS 4534	*2006*	*Zinc and zinc/aluminium-alloy coating on steel wire*
AS 4552	2005	Gas fired water heaters for hot water supply and/or central heating - superseded by AS/NZS 5263.1.2:2016 Gas appliances - Gas fired water heaters for hot water supply and/or central heating
AS/NZS 4552.2	2010	Gas fired water heaters for hot water supply and/or central heating - Minimum energy performance standards for gas water heaters
AS 4586	2013	Slip resistance classification of new pedestrian surface materials
AS/NZS 4600	2005	Cold-formed steel structures
AS/NZS 4645 (set)	-	Gas distribution networks (Set)
AS 4667	2000	Quality requirement for cut-to-size and processed glass
AS/NZS 4671	2001	Steel reinforcing materials
AS/NZS 4680	2006	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4692 (set)	-	Electric water heaters
AS/NZS 4692.1	2005 (R2016)	- Energy consumption, performance and general requirements
AS/NZS 4692.2	2005 (R2016)	- Minimum Energy Performance Standard (MEPS) requirements and energy labelling
AS 4750	2003	Electrogalvanized (zinc) coatings on ferrous hollow and open sections
AS/NZS 4766	2006	Polyethylene storage tanks for water and chemicals
AS/NZS 4776.2	2008	Liquid chiller packages using the vapour compression cycle – minimum energy performance Standard (MEPS) and Compliance Requirements
AS 4773 (set)	-	Masonry in small buildings
AS 4773.1	2015	- Design
AS/NZS 4782.2	2004	Double-capped fluorescent lamps - Performance specifications - Minimum energy performance standard (MEPS)

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Entries in Times New Roman italics indicate Standards not cited in this document but which may be useful references.		
AS/NZS 4783.2 (R2013)	2002	Performance of electrical lighting equipment - Ballasts for fluorescent lamps - Energy labelling and minimum energy performance standards requirements
AS 4785.1	2002 (R2016)	Timber – softwood – sawn and milled products – product specification
AS/NZS 4792	*2006*	*Hot-dip galvanized (zinc) coatings on ferrous hollow sections applied by a continuous or specialised process*
AS/NZS 4858	2004	Wet area membranes
AS/NZS 4859.1	2002	Materials for the thermal insulation of buildings - General criteria and technical provisions
AS 4970	2009	Protection of trees on development sites
AS 5039	2008	Security screen doors and security window grilles
AS 5040	2003	Installation of security screen doors and window grilles
AS 5041	2003	Methods of test - Security screen doors and window grilles
AS/NZS 5149 (set)	-	Refrigerating systems and heat pumps—Safety and environmental requirements
AS/NZS 5149.1	2016	- Part 1: Definitions, classification and selection criteria (ISO 5149-1:2014, MOD)
AS/NZS 5149.2	2016	- Part 2: Design, construction, testing, marking and documentation (ISO 5149-2:2014, MOD)
AS/NZS 5149.3	2016	- Part 3: Installation site (ISO 5149-3:2014, MOD)
AS/NZS 5149.4	2016	- Part 4: Operation, maintenance, repair and recovery (ISO 5149-4:2014, MOD)
AS/NZS 5263.1.2	2016	Gas appliances - Gas fired water heaters for hot water supply and/or central heating
AS/NZS 5263.1.3	2016	Gas appliances - Gas space heating appliances
AS 5601.1	2013	Gas installations- General installations
AS 5604	2005 (R2016)	Timber - Natural durability ratings
AS 6669	2016	Plywood - Formwork
AS 6002	1999	Domestic electric meter enclosures (available withdrawn)
AS/NZS 60598.1	2013	Luminaires - General requirements and tests
AS 60947 (set)	-	Low-voltage switchgear and control gear
AS 60947.1	2015	- General rules
AS 60947.2	2015	- Circuit-breakers
AS/NZS 61439.1	2016	Low-voltage switchgear and controlgear assemblies - General rules (IEC 61439-1, Ed. 2.0 (2011), MOD)
AS/NZS 61439.3	2016	Low-voltage switchgear and controlgear assemblies - Distribution boards intended to be operated by ordinary persons (DBO) (IEC 61439-3, Ed. 1.0 (2012), MOD)
AS ISO 13006	2013	Ceramic tiles- definitions, classification, characteristics and marking (ISO 13006:1998)
AS/NZS ISO 817	2016	Refrigerants—Designation and safety classification

24. OTHER REFERENCED STANDARDS

OTHER STANDARDS		
ATS 5200	-	Technical specification plumbing and drainage products. (includes ATS 5200 series)
AS/CA S009	2013	Installation requirements for customer cabling (wiring rules)
ATS 5387	-	Guidelines – Fire safety engineering
ATS 5387.1	2006	- Application of fire performance concepts to design objectives
ATS 5387.2	2006	- Design fire scenarios and design fires
ATS 5387.3	2006	- Assessment and verification of mathematical fire models
ATS 5387.4	2006	- Initiation and development of fire and generation of fire effluents
ATS 5387.5	2006	- Movement of fire effluents
ATS 5387.6	2006	- Structural response and fire spread beyond the enclosure of origin
ATS 5387.7	2006	- Detection, activation and suppression
ATS 5387.8	2006	- Life safety - Occupant behaviour, location and condition
IEC 60794-1-1	2011	Optical fibre cables: Generic specification - General
IEC 60794-1-20	2014	Optical fibre cables: Generic specification - Basic Optical Cable Test Procedures - General and Definitions
IEC 60794-1-21	2015	Optical fibre cables: Generic specification - Basic Optical Cable Test Procedures – Mechanical test methods
ISO 9223	2012	Corrosion of metals and alloys- Corrosivity of atmospheres – Classification, determination and estimation
ISO 13007	-	Ceramic tiles
ISO 13007.1	2013	Grouts and adhesives- Terms, definitions and specifications for adhesives
SAA HB 40.1	2001	The Australian Refrigeration and Air conditioning Code of Good Practice - Reduction of emissions of fluorocarbon refrigerants in commercial and industrial refrigeration and air conditioning applications
SAA HB 40.2	2001	The Australian Refrigeration and Air conditioning Code of Good Practice - Reduction of emissions of fluorocarbons in residential air conditioning applications
SAA HB 161	2005	Guide to plastering
SAA HB 230	2008	Rainwater tank design and installation handbook
SA/SNZ HB 252	2014	Communications cabling manual - Module 3: Residential communications cabling handbook
SAA HB 301	2001	Electrical installations - Designing to the wiring rules
SMACNA 016	2012	HVAC Air Duct Leakage Test Manual
WMCS	-	NCC- Watermark Certification Scheme

25. ACTS, REGULATIONS, AUTHORITIES AND CODES

Acts, regulations and codes applicable to the works and authorities with jurisdiction over the works include, but are not limited to:

Acts and Regulations
Aboriginal Sacred Sites Act
Bushfires Act
Control of Roads Act
Dangerous Goods Act and Regulations
Environment Protection and Biodiversity Conservation Act
Environmental Assessment Act
Environmental Offences and Penalties Act
Fair Work Act 2009
Fire and Emergency Act
Food Act 2004
Heritage Conservation Act
NT Building Act and Regulations
NT Planning Act and Regulations
Poisons and Dangerous Drugs Act and Regulations
Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations
Soil Conservation and Land Utilisation Act
Territory Parks and Wildlife Act
Territory Parks and Wildlife Conservation Act
Traffic Act and Regulations
Waste Management and Pollution Control Act
Water Act
Weeds Management Act
Work Health and Safety Act and Regulations
CODES AND GUIDELINES
AIRAH Australia and New Zealand Refrigerant Handling Code of Practice 2007 (Parts 1 and 2)
NT FAST: Fire Contractor's Guide Book Electrical
NBN Co. Ltd - New developments: Deployment of the NBN Co conduit and pit network – guidelines for developers
Building Code of Australia (BCA) volume 1 and 2
Plumbing Code of Australia (PCA) volume 3
Volume 1 – Appendices variations and additions
OTHER SPECIFICATIONS
Standard Specification for Environmental Management
Standard Specification for Road Maintenance
Standard Specification for Roadworks
Water Supply and Sewerage, PowerWater Corporation

AUTHORITIES
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Development Consent Authority of the NT (DCA)
NT Department of Health and Community Services
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NT Department of Land Resource Management (DLRM)
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NT Environment Protection Authority (ntepa)
NT Fire and Rescue Service (NTFRS)
NT WorkSafe
PowerWater Corporation of the NT (PWC)
Work Health and Safety Act and Regulations (N.U.L)
NT Building Act and Regulations
NT Planning Act and Regulations
Requirements of the engaged Building Certifier

26. FIXTURES SCHEDULES

Tapware Schedule

Refer to PROJECT SPECIFIC REQUIREMENTS section of RFT

LOCATION	FIXTURE	ACCESSORIES
Kitchen	Sink	A-3B Swivel Sink Mixer
Bathroom	Vanity basin	A-1 Swivel Basin Mixer
Bathroom	Bath	C-45 Hot and Cold Bath Set. Spout: Fixed.
Bathroom	Shower (over bath)	C-45 Hot and Cold Shower Set Shower Head; Round Shower Head and Arm Complete.
WC	WC cistern	Cistern cock.
Laundry	Trough	A-1 Swivel Basin Mixer
Laundry	Washing machine outlets	Washing Machine Hose Cocks with Screwed Caps.
External positions shown on drawing (2 per dwelling)	Hose cocks	20 mm T Head Polished Brass Hose Cocks.

*Note: Standard provision for housing projects

Housing Sanitary Fixtures Schedule

Refer to PROJECT SPECIFIC REQUIREMENTS section of RFT

Location	Fixture	Proprietary Item
Kitchen	Stainless steel sink	CLARK BENCHMARK, Double Centre Bowls, Double Drainer, Single Hole, Flat Rim Sink. Size: 1538 x 471 mm. Code: 3007 – One Tap Hole
Bathroom	Vanity basin	CAROMA Cameo, 1 Tap Hole. Bedding: Bed against non-setting alkali resistant mastic. Code: 658215W
	Hand basin	CAROMA Concorde 500 or flora 500
Bathroom	Bath	CAROMA STIRLING Enamel Pressed Steel Bath Size: 1525 x 767 mm. Type: Built-in. Code: 857510W
	Soap dish	CAROMA RETRO Code: 97926C
WC (not for ambulant or AS1428.1)	Water closet assembly consisting of: - Pedestal pan	CAROMA CONCORDE SUITE Code: 986651W CAROMA CONCORDE with Concealed S Trap. Colour: White.
	-Seat	CAROMA Standard with flap. Colour: White.
	- Cistern	CAROMA SLIMLINE 4.5 / 3 litre dual flush cistern with molded plastic case. Colour: White.
	-Toilet roll holder	CAROMA Elegance Code: 631163C or CAROMA Cosmos Code: 303128C
Laundry	Stainless steel trough	CLARK 45 Litre FLUSHLINE Code: 8500 or CLARK 70 litre single bowl standard trough and cabinet with bypass and tiling flange at back. Code: 9011

*Note: Standard provision for housing projects

27. NORTHERN TERRITORY CLIMATE ZONES TABLE

*Note: Any provision in the body of the specification overrides any conflicting provision in the table

NORTHERN TERRITORY CLIMATE ZONE TABLE						
		NTCZ 01 Areas south of, and including, Tennant Creek	NTCZ 02 Areas north of Tennant Creek and south of and including Katherine, and areas more than 50 km from the coast or tidal estuaries	NTCZ 03 Areas north of Katherine and areas between 10 km and 50 km from the coast or tidal estuaries	NTCZ 04 Areas less than 10 km from the coast or tidal estuaries	NTCZ 05 Areas inside buildings
ISO 9223	Atmospheric Corrosivity Classification	3	4	5	5	2
AS 1170 (BCA)	Wind Region	A4	B	B & C	C	n/a
AS 1192	Service Condition Category	2	3	4	5	n/a
	Corrosion Category	B	C & F	D	E	C
AS 1231	Thickness Grade	AA15	AA25	AA25	AA25	AA10 Low airborne moisture levels AA15 High airborne moisture levels
AS/NZS 2312.1	Climate Category	C2	C3 & T	T	C5-I & C5 - M	C1
AS 2423 AS/NZS 4534	Climate Category	B	C & F	F	E & F	n/a
AS 2699	Durability Classification	R1 (Green mark)	R2 (Yellow mark)	R3 (Red mark)	R4 (White or blue mark)	R1 (Green mark)
AS 3566.2	Corrosion Resistance Class	3	4	4	4	n/a
AS 3715	Service Condition Category	3	4	5	5	n/a
	Atmospheric Corrosivity Classification	3	4	5	5	n/a
AS 4145	Corrosion resistance category	C6	C6	C7	C7	C6
BCA Table 3.5.1.1a	Environment category	Low	Low	Medium	High - Very High	n/a
AS 5100	Exposure Classification	A	A	B1	B2 or C	A

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