

SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings



New Gourlay Home - Lam Residence 16 Oaklands

Project Specification

16 Oaklands Place, Ngongotaha, Rotorua, New Zealand

Project Ref: GH84

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Gourlay Homes Ltd

masterspec

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1220 PROJECT

1 GENERAL

This general section describes the project including:

- A description of the work
- Design construction safety
- Principal's Health & Safety matters
- Site description, features and restrictions
- Design parameters for design by contractor
- Archaeological discovery

1.1 READ ALL SECTIONS TOGETHER

Read all general sections together with all other sections.

1.2 DESCRIPTION OF THE WORK

New 4 bedroom dwelling on Piles with attached double garage on Raft slab.

1.3 RESTRICTED BUILDING WORK

This project includes Restricted Building Work.

1.4 DESIGN CONSTRUCTION SAFETY

The project designers are unaware of unusual or atypical features, which a reasonably experienced contractor may not be aware of, that may present a hazard or risk during a typical construction process. The Contractor is still required to undertake its own assessment, to determine if they consider there are any further safety matters and provide for these in carrying out the construction of the work.

Design Construction Safety

1.5 PRINCIPAL'S SITE HEALTH AND SAFETY PLAN

Obtain a copy of the principal's site health and safety plan.

Principal's Health & Safety Matters

Site

1.6 SITE

The site consists of: New Residential site,
as shown on drawing 01
no.

1.7 LEGAL DESCRIPTION

The site of the works, the street address and the legal description are shown on the drawings.

1.8 EXISTING SERVICES

The following are the network utility services:

Electrical:	Unison
Telecommunication:	Chorus
Water:	RDC
Gas:	N/A
Stormwater:	RDC
Foul water:	RDC

The services are also shown on drawing(s) no(s) 02

1.9 SITE FEATURES

Flat to sloping site

Site environment - Wind

1.10 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN

The design wind pressures are to [NZS 3604](#), Table 5.4 Determination of wind zone, up to and including Extra High Wind Zone.

Building wind zone High 44m/s (refer to [NZS 3604](#), table 5.4)

Site environment - Durability

1.11 EXPOSURE ZONE

The exposure zone is to [NZS 3604](#), Section 4 Durability, 4.2 Exposure zones and [NZBC E2/AS1](#).

The site zone is: B (Low)

Site environment - Seismic

1.12 EARTHQUAKE ZONE - NON SPECIFIC DESIGN

The zone is to [NZS 3604](#), Section 5 Bracing design, 5.3 Earthquake bracing demand.

The earthquake zone Zone 2
is:

Archaeological discovery

1.13 REPORT FINDING ANY ANTIQUITIES AND ITEMS OF VALUE

Report the finding of any fossils, antiquities and other items of value, to the Contract Administrator. All to remain undisturbed until approval is given for removal.

Pre-1900, items or evidence of human activity on the site, come under the [Heritage New Zealand Pouhere Taonga Act 2014](#). If such items or evidence is discovered work must stop immediately and the Contract Administrator must be notified immediately. The site may be classified as an Archaeological Site under the Act, and the Contract Administrator or Owner must contact the Heritage New Zealand for authority to proceed.

Post-1900 items remain the property of the owner, pre-1900 items may remain the property of the owner or the Crown subject to what is found.

Known archaeological information relating to this site includes the following: -

1232 INTERPRETATION & DEFINITIONS

1 GENERAL

This general section relates to definitions and interpretation that are used in this specification.

Definitions

1.1 DEFINITIONS

Hold point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may not proceed on that particular part until the contract administrator and any other nominated person has advised that work can continue. A notice period of 2 Working Days is required unless stated otherwise.
Notification point:	A stage of the construction where the contract administrator and any other nominated person requires notice to be given that particular work is to be carried out. Work may continue and the contract administrator and any other nominated person may choose whether or not they wish to witness the particular work being carried out. A notice period of 2 Working Days is required unless stated otherwise.
Product:	A thing or substance produced by natural process or manufacture.
Proprietary:	Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
Provide and fix:	"Provide" or "fix" or "supply" or "fix" if used separately mean provide and fix unless explicitly stated otherwise.
Required:	Required by the documents, the New Zealand Building Code or by a statutory authority.
Review:	Review by the contract administrator and other consultants is for general compliance only. Review does not remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Neither can the review be construed as authorising departures from the contract documents.
Working day:	Working day means a calendar day other than any Saturday, Sunday, public holiday or any day falling within the period from 24 December to 5 January, both days inclusive, irrespective of the days on which work is actually carried out.
Workplace:	Workplace means the place where work is being carried out, or is customarily carried out, for a business or undertaking including any place where a worker goes, or is likely to be, while at work (under Health and Safety at Work Act 2015).

1.2 PERSONNEL

Principal:	The person defined as "Principal" in the conditions of contract.
Contractor:	The person contracted by the principal to carry out the contract.
Contract administrator:	The person appointed by the principal to administer the contract on the principal's behalf. Where no person has been appointed by the principal, it means the principal or the principal's representative.

1.3 ABBREVIATIONS

The following abbreviations are used throughout the specification:

AAMA	American Architectural Manufacturers Association
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
ASTM	American Society for Testing and Materials
AWCINZ	Association of Wall and Ceiling Industries of New Zealand Inc.
BCA	Building Consent Authority
BRANZ	Building Research Association of New Zealand
BS	British Standard
COP	Code of practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
HERA	Heavy Engineering Research Association
LBP	Licensed Building Practitioner
MBIE	Ministry of Business, Innovation and Employment
MPNZA	Master Painters New Zealand Association Inc
NZBC	New Zealand Building Code
NZS	New Zealand Standard
NZS/AS	Joint New Zealand/Australian Standard
NZTA	New Zealand Transport Agency
NUO	Network Utility Operator
OSH	Occupational Safety and Health
PCBU	Person Conducting a Business or Undertaking (under Health and Safety at Work Act 2015)
RBW	Restricted Building Work
SARNZ	Scaffolding and Rigging New Zealand Inc
SED	Specific Engineering Design
TA	Territorial Authority
TNZ	Transit New Zealand (Transit New Zealand is now New Zealand Transport Agency NZTA - some specifications are still prefixed TNZ)

1.4 DEFINED WORDS

Words defined in the conditions of contract, New Zealand Standards, or other reference documents, to have the same interpretation and meaning when used in their lower case, title case or upper case form in the specification text.

1.5 WORDS IMPORTING PLURAL AND SINGULAR

Where the context requires, words importing singular only, also include plural and vice versa.

1232S1 EXPLANATION OF SCHEDULE SECTIONS

1 GENERAL

This General section provides an explanation of Schedule sections and their relationship to General sections and Work sections. Specific Schedule sections contained within this specification are also identified.

1.1 EXPLANATION OF SCHEDULE SECTIONS

A schedule section identifies Work sections that contain common requirements, as identified in the title of the Schedule section. For example 1235S1 SCHEDULE OF SHOP DRAWINGS identifies Work sections that have requirements for shop drawings. Details of the requirements are contained in the identified Work sections with additional requirements contained in the General section 1235 SHOP DRAWINGS.

A Schedule section is identified by the 4 digit CBI (Co-ordinated Building Information) number of the General section that it relates to, followed by the letter "S" followed by a numeral (1-9). The numeral allows for multiple schedule sections to be associated with the same General section.

1.2 SCHEDULE SECTIONS

There are no work section requirements.

1233 REFERENCED DOCUMENTS

1 GENERAL

1.1 REFERENCED DOCUMENTS

Throughout this specification, reference is made to various [New Zealand Building Code Compliance Documents \(NZBC ___\)](#), acceptable solutions ([___ AS ___](#)) and verification methods ([___ VM ___](#)) for criteria and/or methods used to establish compliance with the [New Zealand Building Code](#).

Reference is also made to various standards produced by Standards New Zealand (NZS, AS/NZS, NZS/AS), overseas standards and to listed Acts, Regulations and various industry codes of practice and practice guides. The latest edition (including amendments and provisional editions) at the date of this specification applies unless stated otherwise.

It is the responsibility of the contractor to be familiar with the materials and expert in the techniques quoted in these publications.

Documents cited both directly and within other cited publications are deemed to form part of this specification. However, this specification takes precedence in the event of it being at variance with the cited documents.

1.2 DOCUMENTS

Refer to Wilton Joubert Engineers details and drawings Job Ref#76541 dated July 2019 (Revision 1). Where discrepancies are found Wilton Jouberts' documents shall take precedence. If conflicts are found contact the Architect/Engineer.

Documents referred to in the GENERAL sections are:

NZBC F5/AS1	Construction and demolition hazards
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 3012	Electrical installations - Construction and demolition sites
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
AS/NZS 5131	Structural steelwork - Fabrication and erection
NZS 6803	Acoustics - Construction Noise
Building Act 2004	
Building Regulations 1992	
Health and Safety at Work Act 2015	
Health and Safety at Work (General Risk and Workplace Management) Regulations 2016	
Health and Safety at Work (Hazardous Substances) Regulations 2017	
Health and Safety in Employment Regulations 1995	
New Zealand Building Code	
Heritage New Zealand Pouhere Taonga Act 2014	
Resource Management Act 1991	
Smoke-free Environments Act 1990	
WorkSafe NZ	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe NZ	Good Practice Guidelines - Excavation Safety
WorkSafe NZ	Scaffolding in New Zealand - Good Practice Guidelines

2210 PREPARATION AND GROUNDWORK

1 GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:

- footings and floor slabs

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
OSH	Approved code of practice for safety in excavation and shafts for foundations

1.2 SITE SAFETY

Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

2 PRODUCTS

2.1 VOLCANIC TUFF FILL

Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.2 ROCK FILL

Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.3 SAND FILL

Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.4 HARD FILL

Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.5 GRANULAR FILL

Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.6 DRESSING COURSE

Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.7 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

3 EXECUTION

3.1 EXCAVATION GENERALLY

Carry out excavation, using plant suitable for the purpose, to the guidelines set by the OSH publication: Approved code of practice for safety in excavation and shafts for foundations.

3.2 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.3 PROTECT EXISTING WORK

Protect from damage existing buildings, structures, roads, paving and services which are being retained.

3.4 PROTECT TREES

Protect from damage trees, shrubs, natural site features and existing landscaped areas which are being retained. Ensure existing levels are undisturbed beneath the dripline of retained trees.

3.5 EROSION CONTROL

Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.6 SURFACE PREPARATION

Comply with [NZS 3604](#), section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.7 UNDERGROUND ELEMENTS AND SERVICES

Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services. Report for instructions when any unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to territorial authority approval.

3.8 STOCKPILE TOPSOIL

Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.9 GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.10 FOUNDATION EXCAVATION

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.11 INADEQUATE BEARING

If bearing is not to [NZS 3604](#), 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows. Confirm any changes with the territorial authority.

Below slabs on grade: Hardfill compacted in 150mm layers

Below footings: 10 MPa concrete

Service trenches: Hardfill compacted in 150mm layers

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.

3.12 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.13 GRANULAR BASE FOR SLABS

To conform to [NZS 3604](#), section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.14 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

3101 CONCRETE WORK - BASIC

1 GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

1.1 ABBREVIATIONS AND DEFINITIONS

The following definitions apply specifically to this section:

ACRS Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS web site - www.steelcertification.com

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC B1/VM1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to [AS/NZS 4671](#). Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

2 PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5 to 50 MPa grade, (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to [NZS 3104](#). Provide delivery dockets listing mix and despatch details.

2.2 REINFORCEMENT

Bars to [AS/NZS 4671](#). Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh Class E to [AS/NZS 4671](#), and 500E mesh to [AS/NZS 4671](#) as modified by NZS B1/VM1.

2.3 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.4 SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

3 EXECUTION

3.1 HANDLE AND STORE

Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 CUT AND BEND REINFORCEMENT

Cut and bend bars using proper bending tools to avoid notching and to the requirements of [NZS 3109](#), 3.3 Hooks and bends. Minimum radii of reinforcement bends to [NZS 3109](#), table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.3 ADJUSTMENTS

Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

3.4 TOLERANCES, BENDING

To [NZS 3109](#), 3.9, Tolerances for reinforcement.

3.5 SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums in [NZS 3109](#), 3.6, Spacing of reinforcement.

3.6 LAPPED SPLICES

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked. Wire mesh laps to [NZS 3101.1](#), lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.7 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Location and form of conduits to be approved in writing by the Contract Administrator. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

3.8 CONSTRUCTION JOINTS

Locate and construct as shown on the drawings or in accordance with [NZS 3109](#), 5.6, Type B.

3.9 PRE-PLACEMENT INSPECTION

Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.

3.10 SURFACE FINISHES

To [NZS 3114](#), 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.11 CONCRETE SURFACE TOLERANCES

To [NZS 3114](#), 104, Surface tolerances and [NZS 3114](#), 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.12 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to [NZS 3109](#), 7.4, Handling and placing and [NZS 3109](#), 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.13 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.14 SAW CUTS TO NZS 3604 OR NZS 4229

Cut slabs where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab after it has hardened (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 °C, and 48 hours for average ambient temperatures below 20°C).

3.15 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

3.16 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.17 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

4 SELECTIONS**4.1 REINFORCEMENT LAPS**

Where reinforcement laps are not shown on the drawings, lap as follows:

Bar diameter	Grade 300E deformed
10mm	400mm
12mm	500mm
16mm	650mm

4.2 NORMAL CONCRETE

Normal concrete:

17.5 MPa: for unreinforced concrete applications, for reinforced concrete either not exposed to weather or exposed to the weather in Zone B.

4.3 SURFACE FINISHES PAVEMENTS AND DRIVEWAYS

Surface finish class to [NZS 3114](#): table 2, Classes of floor, exterior pavement and invert finishes.

Finish class	Location
U2 wood float finish	Confirm with client

3155 RAFT FLOOR SYSTEM

1 GENERAL

This section relates to a raft floor system, a non specific design reinforced concrete waffle raft floor slab-on-ground.

1.1 DOCUMENTS

Refer to Wilton Joubert Engineers details and drawings Job Ref#76541 dated July 2019 (Revision 1). Where discrepancies are found Wilton Jouberts' documents shall take precedence. If conflicts are found contact the Architect/Engineer.

Documents referred to in this section are:

NZBC B1/VM1	Structure
NZS 3101.1&2	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3504	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.2 MANUFACTURER'S DOCUMENTS

Manufacturers documents relating to work in this section are:
Manufacturers documents relating to work in this section are to be supplied on site by the main contractor and available for viewing by the Owner or TA on request.

Requirements

1.3 QUALIFICATIONS

Tradespeople to be competent, experienced and familiar with the raft floor system materials and techniques specified.

1.4 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to [AS/NZS 4671](#). Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

1.5 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used during construction. Include records of workmanship during construction and photographs of as-built details. Make the information available to the Building Consent Authority inspector on request.

Performance

1.6 INSPECTION NOTIFICATION REQUIREMENTS

Refer to Engineer documentation for required inspections by certified engineer

1.7 INSPECTIONS BY BUILDING CONSENT AUTHORITY

Refer to the Building Consent conditions for required TA inspections.

2 PRODUCTS

MATERIALS (REFER WILTON JOUBERT ENGINEER NOTES FOR JOB SPECIFIC REQUIREMENTS)

- 2.1 **BLINDING**
50mm maximum compacted GAP 7.
- 2.2 **TIMBER FORMWORK**
No. 2 framing and dressing or merchantable grade radiata pine boards to [NZS 3631](#).
- 2.3 **DAMP-PROOF MEMBRANE**
0.25mm minimum polyethylene to [NZS 3604](#): clause 7.5.4, Damp-proof membrane (DPM). Refer to SELECTIONS.
- 2.4 **POLYSTYRENE PODS**
Proprietary purpose made polystyrene pods.
- 2.5 **REINFORCEMENT**
Bars to [AS/NZS 4671](#), Grade 500E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings.
- 2.6 **INTERNAL CORNER REINFORCEMENT**
Minimum 2 x D10 bars Grade 300E to [AS/NZS 4671](#).
- 2.7 **MESH**
Welded reinforcing mesh to [AS/NZS 4671](#) as modified by NZS B1/VM1, generally, Class E, minimum to [NZBC B1/AS1](#) - Grade 500E, 2.27kg/m² (1.14kg/m² in each direction). Minimum SE62 500E mesh or the equivalent.
- 2.8 **TYING WIRE**
Mild drawn steel wire not less than 1.2mm diameter.
- 2.9 **CONCRETE - RAFT APPLICATIONS**
20 MPa 100mm slump mix in either 13mm or 19mm nominal aggregate size.
- 2.10 **NORMAL CONCRETE - NON RAFT APPLICATIONS**
Normal concrete 20 MPa grade, maximum aggregate size 19mm to [NZS 3104](#).

Components

- 2.11 **SPACERS**
Proprietary spacers. Refer to SELECTIONS for size.

3 EXECUTION

Conditions

- 3.1 **STORAGE**
Take delivery of and accept all materials and accessories dry and undamaged. Store on timber fillets on hard ground protected from weather, contamination and damage in a secure area clear of any building operation.

Handle and store reinforcing steel and accessories without damage or contamination. Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity. Store steel fabric flat.
- 3.2 **HANDLING**
Avoid distribution and contact with damaging substances. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage.

Application - raft floor system

- 3.3 **SITE CLEARANCE**
Clear the slab area of any vegetation and topsoil down to the subgrade level.

3.4 BUILDING PLATFORM

Create a building platform to a level surface approximately 330mm below finished floor level. Cut and/or fill sloping sites. Confirm finished floor level.

3.5 POST-CUT INSPECTION

Inspect and confirm that the soil conditions are as anticipated by the geotechnical investigation and report and conform to the requirements of the raft system supplier manual.

3.6 TEMPORARY BUILDING PLATFORM DRAINAGE

Construct suitable drainage to keep excessive ground water off the building platform during and after construction as required.

3.7 HARDFILL

Place hardfill and ensure it is spread and compacted with mechanical compaction.

3.8 UNDERGROUND SERVICES

Ensure underfloor services are installed in the subsoil or hardfill in locations as shown on the drawings and according to the raft floor system manufacturer's requirements.

3.9 BLINDING LAYER

Spread GAP 7 blinding layer to a minimum 500mm past the outside edge of the slab; compact to a level layer no greater than 50mm thick and no higher than 305mm below finished floor level.

3.10 FORMWORK

Construct formwork as required, well braced and tied to remain in position, straight and plumb during construction. Ensure formwork will provide for the topping depth, including rebates and the required concrete finish.

3.11 INSTALL DAMP-PROOF MEMBRANE

Apply DPM to the prepared basecourse extending to the outside of all edge beams or fold and staple up the inside of the formwork. Overlap all joints in the DPM sheets a minimum 150mm. Tape laps and penetrations with 50mm wide pressure sensitive plastic tape. Ensure DPM is not damaged during the construction process. Repair all damage to DPM before proceeding with following procedures.

3.12 PLACE POLYSTYRENE PODS

Place polystyrene pods in a regular waffle pattern using the spacers in the specified grid pattern to fit the floor plan. Cut pods on site with a saw or suitable hot wire as required. Cut holes for services and trim around piles as required on site.

3.13 INSTALL SPACERS

Install spacers and locations to the raft floor system manufacturer's requirements.

Form standard ribs between pods using 100mm spacers. Place the spacers at a minimum of one spacer along each edge of each pod or part pod. The ribs in both directions form a waffle pattern throughout the slab.

Form the edge beam using 300mm spacers. Place the spacers at 1200mm centres maximum along the perimeter of the slab at least and one spacer per pod or part pod.

Form ribs to support load bearing walls using 300mm spacers. Place the spacers at a minimum of one spacer along the edge of each pod or part pod.

3.14 PLACE REINFORCING STEEL: RIB STEEL

Place rib reinforcing steel in the bottom of the internal ribs and supported in the correct position by spacers. Lap all steel 480mm minimum, and hook all plain bars. At the junction with the edge beam, each rib steel bar shall sit on top of the edge beam bars and extend to the outermost bar.

Allow for 75mm cover to the edge of the beam. Place 1 x H12 bar in each 100mm wide rib and 2 x H12 bars in each 300mm wide rib.

3.15 PLACE REINFORCING STEEL: EDGE BEAM STEEL

Place the two edge beam reinforcing bars in the bottom of the edge beam and supported in the correct position by the spacers. Tie one edge beam bar below the mesh at the perimeter of the area covered by the polystyrene pods. Lap all steel 480mm minimum, and hook all plain bars. At corners, the inner bottom bars and the top bars cross each other and extend to 75mm from the outside face of the edge beam. Tie these bars together where they cross. Tying of edge beam steel is only required at corners.

3.16 PLACE REINFORCING STEEL: RE-ENTRANT CORNER STEEL

Place two D10 bars, 1200mm in length across the corner. Tie to the top of the mesh at re-entrant corners at 200mm centres with 50mm side cover from the internal corner.

Install specified steel to raft floor system manufacturer's requirements. Ensure specified minimum cover requirements are maintained.

3.17 PLACE REINFORCING MESH AND CHAIRS

Place reinforcing mesh over the pods and support on the mesh chairs spaced at 1200mm centres minimum, with two mesh chairs minimum placed per pod and with one mesh chair minimum per part pod.

3.18 MESH LAPS

Welded reinforcing mesh to be lapped and tied, such that the outermost wires overlap by the greater of:

- the spacing of the cross wires plus 50mm
- 150mm or
- manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

3.19 FORM SLAB AND OPENING REBATES

Form rebates, as detailed on drawings.

Form a minimum 50mm rebate in slab for masonry veneer construction with a width dependent on the veneer width, cavity width and overhang. Waterproof the rebate with a bituminous sealer on both the vertical and horizontal faces.

3.20 TOPPING SLAB DEPTH

85mm minimum plus additional cover as required for in-floor heating.

3.21 PRE-PLACEMENT INSPECTION

Arrange for excavations, formwork and reinforcement to be inspected and passed by the Building Consent Authority.

3.22 CONCRETE PLACEMENT AND COMPACTION

Ensure the rib and edge beam canals are clean, free of debris. Pour the floor in a single pour ensuring that the pods remain in position during placing. Pour concrete onto the top of each pod prior to filling the ribs around the pod to help prevent them from floating and lifting.

Compact concrete using a suitable poker vibrator for the ribs and ground beams and into all corners of the formwork. Screed as required. Confirm levels with a laser level.

3.23 CONCRETE FINISHING

Float and trowel to provide a U3 finish to [NZS 3114](#); table 2, Classes of floor, exterior pavement and invert finishes.

3.24 CONCRETE CURING

Curing of the concrete slab must take place immediately after finishing the concrete to [NZS 3109](#) by one of the following curing methods:

- ponding or continuous sprinkling of water
- placing a wet covering or plastic membrane over the slab
- the use of liquid membrane curing compounds

3.25 SHRINKAGE CONTROL JOINTS

Cut shrinkage control joints as shown on the plans after hardening to a minimum depth of 25mm within 24 hours in summer or 48 hours in winter.

Where shrinkage control joints have not been shown on the plans, position the shrinkage control joints to coincide with major changes in the floor plan. Agree position of shrinkage control joints with the designer.

Bay dimensions formed by the shrinkage control joints to be limited to a maximum ratio of length to width of 2 to 1 with a maximum dimension of 6 metres. Place the shrinkage control joints over the 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide loadbearing rib, locate the cut directly above one edge of the 300mm rib. Do not place supplementary reinforcing bars (including re-entrant corner steel) across any shrinkage control joints.

3.26 CLEAN OUT SHRINKAGE CONTROL JOINTS

Clean out control joints. If required fill with suitable flexible sealant.

Application - other concrete work

3.27 PLACE CONCRETE

Do not place fresh concrete against the preceding layer after more than 45 minutes, or such lesser time as required by the circumstances, to NZS 3109: clause 7.4, Handling and placing.

3.28 SCREED THE SURFACE

Screed the concrete surface by straight edge or vibrating screed immediately after compaction and to tolerances in NZS 3109: table 5.2, Tolerances for in situ construction.

3.29 OTHER CONCRETE FINISHING

Screed and provide a U3 finish to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

Finishing

3.30 STRIKE FORMWORK

Strike formwork at least 12 hours after the slab has been finished without damaging or overloading structure.

3.31 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with suitable patching mortar, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

Completion

3.32 LEAVE

Leave work to the standard required by following procedures.

3.33 CLEAN UP

Clean up surrounding areas following completion of the concrete placement.

3.34 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 DAMP-PROOF MEMBRANE

Type: Thermathene Black

4.2 POLYSTYRENE PODS

Brand: As supplied

Size: 1100mm x 1100mm x 220mm standard (Refer Wilton Joubert details)

4.3 SPACERS

Brand: As supplied

4.4 CONCRETE SURFACE FINISH

Location: Entire slab unless detailed otherwise
Finish class: U3 (interior)

3320 CONCRETE MASONRY

1 GENERAL

This section relates to the supply and installation of hollow concrete masonry to [NZS 4229](#), as modified by [NZBC E2/AS3](#), including:

- concrete masonry, mortar, reinforcement and grouting
- self insulating concrete masonry

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

ACRS Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.
ACRS Web site - www.steelcertification.com

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS/NZS 2699	Built-in components for masonry
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 3121	Water and aggregate for concrete
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4230	Design of reinforced concrete masonry structures
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.3 QUALIFICATIONS

Carry out all masonry work with people competent and experienced in this type of work, under the supervision of a suitably qualified tradesperson as required in [NZS 4229](#) and [NZS 4210](#).
All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying 2: Structural Masonry. RBW must be supervised by an LBP.

1.4 CONSTRUCTION CONTROL

Supervise masonry construction to [NZS 4230](#); table 3.1, Observation type B, admissible use and nominal strengths. Keep records of materials to [NZS 4210](#); 2.4.2.

1.5 CONSTRUCTION OBSERVATION BY ENGINEER

Inspections shall confirm compliance with the design and the required standards of construction. Obtain from the engineer Producer Statements required relating to the masonry construction. Where required as a condition of the building consent, advise the engineer when inspections are required.

1.6 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to [AS/NZS 4671](#). Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

1.7 TESTS

Carry out all required tests in accordance with [NZS 4210](#): appendix 2A, Compressive strength tests for mortar and grout.

1.8 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used in the construction, and make the information available to the Building Consent Authority inspector on request.

Do not place grout until all blockwork and reinforcing have been inspected and passed by the Building Consent Authority.

The registered mason is to certify in writing that the masonry observation and work has been carried out in accordance with the relevant NZ Standards. Provide a Producer Statement - Construction (PS3).

Performance**1.9 DURABILITY**

To [NZS 4210](#), Table 2.E1 - **Masonry durability requirements**. Refer to SELECTIONS.

EXPOSURE	DURABILITY REQUIREMENT		
NZS 3604 ZONES figure 4.2	MORTAR (Note 1)	BUILT IN COMPONENTS (Note 2)	MINIMUM COVER REINFORCEMENT (Note 3)
Zone D	M4	R4	30 (60)mm
Zone C	M4	R3	20 (50)mm
Zone B	M3	R3	15 (45)mm
Closed interiors	M2	R1	5 (35)mm
Walls against earth	M4	R4	30 (60)mm
Geothermal hotspots	M4	R5	Specific engineering design
Zone E (NZBC E2/AS1)	M4	R4	30 (60)mm

Notes

- 1. Mortar mixes to [NZS 4210](#), 2.2.2.1.
- 2. Classifications to the three parts of [AS/NZS 2699](#), R1 is light to heavy galvanised, R3 is heavy hot-dip galvanised, R4 is 316 stainless steel, R5 specific performance.
- 3. Cover is measured to [NZS 4210](#) from the inside face of the block cell (or in brackets to the outside face of the block, assuming 30mm shell thickness).

2 PRODUCTS**2.1 MASONRY UNITS**

To [AS/NZS 4455.1](#).

2.2 REINFORCEMENT

To [AS/NZS 4671](#) deformed mild steel except for ties in plain round mild steel and as detailed. Refer to the Concrete section for reinforcing and mesh for slabs.

2.3 MORTAR

Sand to [NZS 3103](#). Chloride levels to not exceed 0.04% by dry weight of sand. Mortar to [NZS 4210](#): section 2.2, Mortar. Compressive strength minimum 12.5 MPa at 28 days

2.4 GROUT

To [NZS 4210](#): section 2.3, Grout.

2.5 WATER

To [NZS 3121](#). Water from a territorial authority/NUO water supply is acceptable.

3 EXECUTION

3.1 MASONRY CONSTRUCTION GENERALLY

To [NZS 4210](#), [NZS 4229](#) as modified by [NZBC E2/AS3 \(CCANZ CP 01\)](#).

3.2 STORAGE

Store masonry units clear of the ground, under cover and well ventilated until placed in the work. Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat. Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.3 MOISTURE CONTENT

Ensure masonry units are air dry prior to laying.

3.4 CHECK BASE CONCRETE

Ensure the base concrete is true to line and level, requiring a base mortar bed of 10mm (minimum) to 20mm (maximum). Ensure that all laitance, loose aggregate, or anything preventing bond is removed prior to laying masonry units.

3.5 STARTER POSITIONS

Before commencing laying masonry units, check the location of starter reinforcement by measure or by a dry trial lay up of the first course. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding.

3.6 REINFORCEMENT

Reinforcement to [NZS 4229](#) and [NZS 4210](#): 2.6, **Reinforcing details**.

Cut and bend bars using proper bending tools to avoid notching and to the requirements of [NZS 3109](#). Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.7 REINFORCEMENT LAPS

Tie all lapping bars to each other.

Minimum wall reinforcing laps schedule

BAR TYPE	LAP LENGTH
Deformed	40 diameters
Plain round (with hooks)	80 diameters

For shrinkage control joint reinforcing refer to clause VERTICAL CONTROL JOINTS.

3.8 COVER

Cover to [NZS 4210](#), Table 2.E1 - **Masonry durability requirements**, refer to DURABILITY clause in SELECTIONS.

3.9 TOLERANCES

Construct within the tolerances set out in [NZS 4210](#); clause 2.6.5, **Tolerances**, and clause 2.7.1, **General**. Lay masonry units with bedding of consistent thickness throughout. Reinforcement to [NZS 3109](#): 3.9 **Tolerances for reinforcement**.

3.10 PROTECTION

Protect fair-faced masonry walls, keeping them clear of mortar droppings, grout splashes, or stains of any kind.

3.11 LAY MASONRY UNITS

Ensure consistent, fully filled and tooled joints. Where walls are reinforced, prevent mortar droppings from entering the cells to be grouted. Provide clean out holes at base of wall, unless "low lift" ([NZS 4210](#)) grouting is used. Ensure reinforcement is accurately placed and tied. Lay in regular stretcher bond with all necessary special units and sill units. Cut masonry, if necessary, true and square without chipping.

3.12 MASONRY UNITS JOINTS

Not exceeding 10mm thick, or less than 8mm when the units are bedded in. Joints tooled concave, unless detailed otherwise.

3.13 VERTICAL CONTROL JOINTS

To [NZS 4229 12.1 Shrinkage control joints](#).

Locate at major changes of wall height or thickness, at openings, at ground slab control joints, and at not more than 6m centres, or, as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on [NZS 4229 fig. 12.2, Control joint detail...](#), unless specifically detailed otherwise.

3.14 BRACING

Provide sufficient temporary lateral bracing to ensure stability until the final supporting construction is in place.

3.15 PRE-GROUTING INSPECTION

Inspect walls prior to grouting. Ensure cells are clean and reinforcement is correctly placed. Where "high lift" (to [NZS 4210](#)) grouting is used, seal the clean out holes and brace to prevent blow outs.

3.16 GROUT CELLS

Grout all masonry unit cells.

3.17 GROUTING PROCEDURE

Use procedures set out in [NZS 4210](#). Methods acceptable on this project are:

- high lift grouting with expansive admixture
- high lift grouting without expansive admixtures
- low lift grouting.

3.18 CONSTRUCTION JOINTS

Form and treat construction joints between grout pours and between masonry walls and hardened concrete work to ensure bonding occurs. Comply with [NZS 4210: 2.16, Horizontal construction joints](#).

3.19 MORTAR IN COMPONENTS

Mortar in components such as sills, copings, lintels, and steps, as work proceeds.

3.20 BUILD IN

Build in plugs, bolts, ties, metal flashings, dowels, fastenings and fixings as required by all trades and as shown on the drawings.

3.21 PROGRESSIVE CLEANING

Clean off mortar splashes and grout spills as they occur, making good any damage at the same time.

3.22 FINAL CLEANING

Clean down masonry work and remove waste material from adjoining surfaces and floors at completion.

3.23 REMOVE

Remove from the site materials not used.

4 SELECTIONS**4.1 DURABILITY - PROJECT REQUIREMENTS**

Refer to clause DURABILITY:

Location:	Refer to Plans
Exposure Zone:	B
Mortar mix:	M3 to NZS 4210 2.2.2.1
Components:	R3
Rebar cover:	15 (45)mm

4.2 MASONRY UNITS

Brand:	As supplied by the installer
Width:	390mm
Bond:	stretcher

4.3 GROUT

Design strength: 17.5 MPa at 28 days

Aggregate size: 13.2mm maximum

Note: if expansive agents are used the minimum strength must be 20 MPa or the design strength whichever is greater.

4.4 MORTAR JOINTS

Location: Where required

Joint profile: Concave

Mortar colour: Confirm with client

3820 CARPENTRY

1 GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber and engineered wood.

1.1 RELATED WORK

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.4	Specification for preservative treatment - Laminated veneer lumber (LVL)
AS/NZS 1604.5	Specification for preservative treatment - Glue laminated timber products
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice
*A copy of NZS 3604 Timber-framed buildings, must be held on site.	

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 DIMENSIONS

All timber sizes except for battens are actual minimum dried sizes.

2 PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Structural grade (SG) to NZS 3604, NZS 3622 with properties to NZS 3603.

2.2 TIMBER TRUSSES

To FTMA CoP. Moisture content 16% at supply.

2.3 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL

H3.1 or H3.2 Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Temporary fix battens before being fixed into the framing with the cladding fixings. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.4 PLYWOOD

Structural plywood to AS/NZS 2269.0 for bracing, bracketing, sarking and floors.

2.5 NAILS

Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.6 BOLTS AND SCREWS

Bolts and screws of engineering and/or coach type complete with washers, to the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.7 NAIL PLATES

Comply with the requirements of **NZS 3604**, section 4, **Durability**, and of the number and form required for each particular junction to **NZS 3604**, sections 6-10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.8 CONNECTORS

Comply with the requirements of **NZS 3604**, section 4, **Durability**, and of the number and form required for each particular junction to **NZS 3604**, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.9 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

2.10 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3 EXECUTION

3.1 EXECUTION GENERALLY

To **NZS 3604** except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION

Separate all timber framing timbers from concrete, masonry and brick by: -

- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum
Timber strip flooring:	10% at time of laying

3.5 SET-OUT

Set out framing in accordance with the requirements of **NZS 3604** and as required to support sheet linings and claddings. When necessary provide framing to suit any required cladding/lining control joints and sheet joints.

3.6 FRAMING SUB-FLOOR

Frame up off foundation walls and piles, all fabricated, fastened and braced to **NZS 3604**, section 6.10, **Framed subfloor walls**.

3.7 FRAMING FLOORS

Framed and fastened to **NZS 3604**, section 7, **Floors**.

3.8 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to **NZS 3604**, section 8, **Walls**.

3.9 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to [NZS 3604](#), section 9, **Posts** and 10, **Roof framing**.

3.10 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to [NZS 3604](#), section 13, **Ceilings**. Trim for openings in ceilings and hatches to [NZS 3604](#) section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to [NZS 3604](#), section 13.4, **Water tanks in roof space**.

3.11 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.12 FIT CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to [NZS 3604](#). Fit and fix related flashings. Make allowance for cladding control joints where required. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.13 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.14 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

4.1 SUB-FLOOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Bearers (protected):	Radiata pine	SG8	H3.2
Ground floor joists:	Radiata pine	SG8	H1.2

4.2 EXTERIOR WALL FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Exterior walls:	Radiata pine	SG8	H1.2
Parapets:	Radiata pine	SG8	H1.2
Enclosed decks and balconies:	Radiata pine	SG8	H1.2
Cantilevered joists enclosed decks and balconies:	Radiata pine	SG8	H3.2
Wall battens (not cavity):	Radiata pine	Merch	H1.2
Jamb battens:	Radiata Pine	Merch	H3.1

4.3 CAVITY BATTENS

Cavity battens	Species	Grade	Treatment
Timber - Non Structural:	Radiata pine	Merchantable	H3.1

4.4 ROOF FRAMING

Member	Species	Grade	Treatment
Rafters:	Radiata pine	SG8	H1.2
Trusses:	Radiata pine	SG8	H1.2
Purlins:	Radiata pine	SG8	H1.2
Ceiling joists and battens:	Radiata pine	SG8	H1.2
Valley boards:	Radiata pine	Merchantable	H1.2
Sarking:	Radiata pine	Merchantable	H1.2
Skillion roof framing:	Radiata pine	SG8	H1.2
Enclosed flat roof framing:	Radiata pine	SG8	H1.2

4.5 EXTERIOR FINISHING TIMBERS

Member	Species	Grade	Treatment
Weatherboards:	Radiata pine	Dressing	H3.1
Fascia/barge/cover boards:	Radiata pine	Dressing	H3.1
Exterior trim:	Radiata pine	Dressing	H3.1

4.6 LAMINATED VENEER LUMBER (LVL)

Member	Brand	Type
Lintel:	CHH	As noted

4.7 INTERIOR FRAMING

Member	Species	Grade	Treatment
Non structural walls:	Radiata pine	SG8	H1.2
Structural and braced walls:	Radiata pine	SG8	H1.2

4.8 INTERIOR FINISHING TIMBERS

Member	Species	Grade
Architraves:	Radiata pine	Dressing
Skirtings:	Radiata pine	Dressing
Cornices:	Radiata pine	Dressing

4.9 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4161 UNDERLAYS, FOIL AND DPC

1 GENERAL

This section relates to the application of:

- DPC/DPM
- wall underlays includes Kraft based and synthetic wall underlays
- roofing underlays includes kraft based and synthetic roof underlays
- foils
- vapour barriers
- accessories

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.
W2	Wall underlay Kraft/bituminous based Heavy grade
W3	Wall underlay Synthetic based non-absorbent
W4	Wall underlay Synthetic based absorbent
R1	Roof underlay Kraft/bituminous based Heavy grade
R2	Roof underlay Kraft/bituminous based Self-supporting
R3	Roof underlay Synthetic based Heavy grade
R4	Roof underlay Synthetic based Self-supporting

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1 , covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.
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Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZS/AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays
AS/NZS 4347.0	Damp-proof courses and flashings - Methods of test - General introduction, list of methods and test specimen requirements
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

Requirements

1.3 INSTALLATION SKILL LEVELS

Installers to be familiar with the manufacturer's technical literature and the [NZMRM CoP](#) NZ Metal Roof and Wall Cladding Code of Practice.

2 PRODUCTS

Materials

DPC

2.1 POLYETHYLENE DPC

Polyethylene film to [AS/NZS 2904](#) and to the appropriate test methods set out in [AS/NZS 4347.0](#). Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings to doors and windows.

2.2 BITUMINOUS IMPREGNATED DPC

Heavy Kraft impregnated with high grade bitumen and coated with higher heat resistant bitumen to [AS/NZS 2904](#) and to the appropriate test methods set out in [AS/NZS 4347.0](#).

DPM

2.3 DAMP PROOF MEMBRANE - CONCRETE FLOOR

Polyethylene sheet with minimum thickness of 0.25mm to [NZS 3604](#), 7.5.6, **Polyethelene (polythene) sheet damp-proof membranes.**

Wall Underlays

2.4 BITUMINOUS HEAVY WEIGHT WALL UNDERLAY (W2)

Wall underlay tested to [NZS 2295](#).

2.5 ABSORBENT SYNTHETIC WALL UNDERLAY - POLYPROPYLENE - FIRE (W4)

Absorbent, breathable, fire retardant, non-woven, white soft spun-bonded polypropylene membrane. Designed for use as fire retardant membrane, with Flammability Index of 1, when tested to [NZS/AS 1530.2](#).

2.6 ABSORBENT SYNTHETIC WALL UNDERLAY - POLYOLEFIN - FIRE (W4)

Absorbent, breathable, fire retardant polyolefin (polyethylene) woven into sheet form with micro sized pores that allow the membrane to breathe with a fire retardant flammability index of 1, tested to [NZS/AS 1530.2](#).

2.7 ABSORBENT SYNTHETIC WALL UNDERLAY - POLYPROPYLENE (W4)

Absorbent, breathable spun bonded polypropylene type building membrane, coated with a breathable water resistant film.

2.8 NON-ABSORBENT SYNTHETIC WALL UNDERLAY - POLYOLEFIN (W3)

Non-absorbent, breathable very fine high density white polyolefin fibres bonded with heat and pressure to form a wide sheet.

Rigid Wall Underlays

2.9 RIGID WALL UNDERLAYS

Plywood or fibre cement sheet over-fixed with flexible wall underlay to E2/AS1 9.1.7.2. Refer to the appropriate section.

Rigid Air Barriers

2.10 RIGID AIR BARRIERS

For rigid air barriers refer to the appropriate section.

Roofing Underlay

2.11 BITUMINOUS SELF-SUPPORTING ROOFING UNDERLAY (R2)

Self supporting roofing underlay tested to [NZS 2295](#).

Vapour Barriers

2.12 MOISTURE VAPOUR BARRIER

Moisture vapour barrier film to [AS/NZS 4200.1](#), complete with adhesive pressure-sensitive tape required by the film manufacturer, used for the prevention of moisture damage.

Accessories

2.13 WINDOW DOOR SEALING SYSTEM

Proprietary window and door flashing tape and accessories to E2/AS1, paragraph 4.3.11, **Flexible flashing tape**, paragraph 9.1.5, **Wall underlays to wall openings**.

2.14 STUD STRAPS

19mm wide polyethylene straps, for cavity construction with framing centres greater than 450mm.

2.15 WIRE NETTING

75mm galvanized hexagonal wire netting to [AS/NZS 4534](#).

2.16 SAFETY MESH

Galvanized or PVC coated safety mesh [AS/NZS 4389](#).

2.17 GUTTER AND UNDER FLASHINGS

Bituminous breather type underlay cut to width by manufacturer for use under valley, apron flashing and internal gutters. Soffit liner cut to width from bituminous breather type underlay.

2.18 ADHESIVE TAPE

Adhesive tapes to compliment the underlay. Pressure sensitive tapes for joining foil insulation and vapour barriers.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To [NZBC E2/AS1](#) Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.

Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

3.2 STORAGE

Store wall and roofing underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

3.3 INSPECTION

Before starting work, check that the framing will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application - DPC

3.4 POLYETHYLENE DPC TO TIMBER

Lay polyethylene DPC under treated and untreated timber, including LOSP treated timber, of all timber framed walls on concrete and concrete masonry, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.5 BITUMINOUS DPC TO TIMBER

Lay bituminous DPC under timber of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

NOTE: Do not use bituminous DPC under LOSP treated timber.

3.6 DPC TO MASONRY AND BRICK VENEER

Lay DPC along base of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

3.7 DPC BETWEEN DISSIMILAR MATERIALS

Lay DPC between dissimilar materials where required.

Application - DPM

3.8 DPM TO CONCRETE FLOOR

Lay DPM under concrete floor substrate over sand binding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier.

Application - Wall Underlay**3.9 WALL UNDERLAY**

Fix horizontally to outside face of substrate in true alignment, with succeeding sheets overlapping 150mm to [NZBC E2/AS1](#), clause 9.1.7. **Wall underlay** and refer to manufacturer for requirement for fastenings. Fix to manufacturers requirements. Scribe neatly around penetrations and openings to leave no gaps. Tape all penetrations. Keep clean, undamaged and without visible weather deterioration until closed in.

3.10 INSTALL STUD STRAPS

Over underlay, install 19mm wide polyethylene straps horizontally at 300mm centres, draw taut and fix to studs with stainless steel staples.

3.11 METAL CLADDING ON TIMBER CAVITY BATTENS

Fix strip of underlay to face of batten before fixing the metal cladding.

Application - Roofing Underlay**3.12 INSTALL WIRE NETTING**

Lay 75mm galvanized wire netting at right angles across the purlins and drawn taut before fixing. Tie edges of netting together with galvanized wire clips.

3.13 INSTALL SAFETY MESH

Lay and fix safety mesh to [AS/NZS 4389](#).

3.14 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixing clips. Lay underlay to avoid excessive dishing between purlins. When used vertically limit individual runs to 10 metres for bituminous based roofing underlays, 7 metres for fire retardant underlays and 20 metres for synthetic roofing underlays. Do not lay vertically on roof pitches under 10°.

Lay horizontally across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations. Avoid prolong exposure by installing the roof immediately. UV exposure to manufacturers requirements, maximum 7 days.

3.15 GUTTER AND UNDER FLASHINGS

Lay bituminous breather type underlay cut to width by manufacturer for use as an underlay to valley, apron flashings, internal gutters and soffit liner. Lap under flashings with adjoining underlays. Fix soffit liner from top plate down 150mm past ribbon plate.

Application - Vapour Barrier**3.16 FIX VAPOUR BARRIER**

Fit and fix between insulation and lining with joints lapped and sealed with pressure-sensitive tape.

Completion**3.17 CLEAN UP**

Clean up as the work proceeds.

3.18 LEAVE

Leave work to the standard required by following procedures.

3.19 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS**4.1 DPC**

Location:	Underframe
Brand / type:	Masons Dry fix DPC

4.2 DPM - CONCRETE FLOOR

Location: Underslab
Brand / type: Thermathene / polyethylene DPM
Thickness: 250
Jointing tape: Polypropylene

4.3 WALL UNDERLAY

Location: Generally
Brand / type: Tekton Wall underlay
Jointing tape: To suit underlay

4.4 ROOFING UNDERLAY

Location: Generally
Brand / type: Thermakraft 215
Jointing tape: To suit underlay

Accessories

4.5 WINDOW/DOOR SEALING SYSTEM

Brand / type: Protecto Wrap One piece Sill Tape

4230 WALL CLADDING

1 GENERAL

This section relates to the supply and installation of exterior cladding, including:

- associated flashings
- timber fascias
- timber barges
- timber trims
- timber beads
- timber facings

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
AS/NZS 1491	Finger jointed structural timber
AS/NZS 2269.0	Plywood - Structural - Specification
AS/NZS 2908.2	Cellulose-cement products - Flat sheets
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards fascia boards and flooring
NZS 3631	New Zealand timber grading rules
BRANZ BU 601	Sealants for cladding joints

Performance

1.2 PERFORMANCE

Accept responsibility for the weathertight performance of the completed cladding system, including all penetrations.

Requirements

2 PRODUCTS

2.1 WALL UNDERLAYS

For flexible wall underlays, rigid wall underlays and rigid air barriers, refer to the appropriate separate section(s).

2.2 EXTERIOR CAVITY WALL BATTENS

Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Treatment to NZBC B2/AS1 and NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.3 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Perforated uPVC, aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.4 TIMBER WEATHERBOARD

Dressing grade to NZS 3631, to NZS 3617 for profile and treated to NZS 3602, table 2, reference 2.A1, Requirements for wood-based building components to achieve a 15-year durability performance.

2.5 FIBRE-CEMENT SOFFIT LINING

Cellulose cement autoclaved sheets to AS/NZS 2908.2.

2.6 TIMBER FASCIAS AND BARGE BOARDS

Dressing grade to [NZS 3631](#) and treated to [NZS 3602](#), table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance. Finger jointed timber to [AS/NZS 1491](#).

2.7 PVC JOINTERS

To suit sheet thickness.

2.8 NAILS, SCREWS AND FASTENINGS

Metal, size and pattern, to cladding manufacturer's requirements and complying with the relevant aspects of [NZS 3604](#), section 4, Durability.

2.9 FLASHINGS

To [NZBC E2/AS1](#), 4.0 **Flashings**. Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

3 EXECUTION

3.1 MOISTURE CONTENT

Maximum allowable moisture content to [NZS 3602](#) for:
Equilibrium moisture content (EMC)

- Framing: 20% at closing in
- Weatherboards: 14% at time of fixing
- Exterior joinery and trim: 14%

3.2 EXECUTION METHODS AND PRACTICES

To [NZS 3604](#) except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 PENETRATIONS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall underlay/rigid air barrier to openings finished and dressed off with flashing tape ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.4 INSTALL DRAINED CAVITY

20mm Minimum thickness drained cavity to [NZBC E2/AS1](#): 9.0 Wall claddings, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs over the wall underlay. Seal the top of the cavity. Install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Do not use horizontal cavity battens. Use cavity spacers where fixing is required between cavity battens.

3.5 PRIME OR SEAL TIMBER WEATHERBOARDS AND TRIM

Prime or seal all front and back faces, edges and end grain before fixing weatherboards and exterior trim, to the finish and quality specified in painting sections.

3.6 INSTALL TIMBER WEATHERBOARDS

Install level, true to line and face, to [NZBC E2/AS1](#): 9.4 Timber weatherboards. Refer to [NZS 3604](#) for fixings durability requirements for specific provisions.

3.7 INSTALL FIBRE CEMENT SOFFITS WITH JOINTERS AND CAPPING MOULDS

Cut sheets dry and scribe fit to fully support all edges and joints. Nail and drill for and insert fasteners to the sheet manufacturer's requirements. Fit complete with jointers and capping moulds. Refer to the cladding manufacturer's literature for fixing details and [NZS 3604](#) for fixings durability requirements for specific provisions.

3.8 INSTALL FLUSH JOINTED FIBRE CEMENT SOFFIT SHEETS

Cut sheets dry, and scribe fit to fully support all edges and joints. Fit expansion joints to limit finished areas to 9 metre x 6 metres maximum, confirm with the sheet manufacturer's requirements. Flush joints with bedding compound reinforcing tape and finishing compound to flush width of 150mm. Refer to the sheet manufacturer's requirements and details.

3.9 INSTALL EXTERIOR TIMBER FINISHINGS

Install timber fascias, barge boards, facings, beads, trim and enclosures level, true to line and face, with all end grain sealed and joints mitred.

3.10 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to [NZBC E2/AS1](#).

3.11 USE OF SEALANTS

Selection and use of sealants to follow BRANZ BU 601: Sealants for cladding joints.

3.12 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

3.13 REPLACE

Replace damaged or marked elements. Remove unused materials from the site.

4 SELECTIONS**4.1 CAVITY BATTENS**

Timber species: Radiata Pine
Timber grade: merch
Treatment: H3.1 (non-structural)

4.2 CAVITY CLOSER/VERMIN-PROOFING

Brand/type: James Hardies
Material: uPVC

4.3 TIMBER WEATHERBOARD

Location: Refer to Plans
Size/profile: Bevelback - Confirm size with client
Species and grade: Radiata pine
Treatment: H3.1
Priming: Confirm with client

4.4 TIMBER FASCIAS AND BARGE BOARDS

Species and grade: Radiata Pine
Treatment: H3.1
Width: 200mm Confirm onsite
Priming: Confirm with client

4323G GERARD® STEEL TILE ROOFING

1 GENERAL

This section relates to Gerard® interlocking pressed metal roofing tiles complete with underlay, battens and accessories.

It includes:

- Gerard® metal roofing tiles
- Associated flashings and accessories

1.1 RELATED WORK

Refer to 7411 RAINWATER SPOUTING SYSTEMS for down-pipes.

Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC

Refer to relevant timber framing section for timber battens

1.2 ABBREVIATIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations used throughout the specification.

MBIE Ministry of Business, Innovation and Employment

NZMRM New Zealand Metal Roofing Manufacturers Inc

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC B2/AS1	Durability
NZBC C/AS1-AS2	Protection from Fire
NZBC E2/AS1	External moisture
NZBC G12/AS1	Water Supplies
AS 1397	Continuous hot-dip metallic coated steel sheet and strip – coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1530.3	Methods for fire tests on building materials, components & structures – simultaneous determination of ignitability, flame propagation, heat release & smoke release
AS/NZS 4680	Hot dip galvanised coatings on fabricated ferrous articles – galvanising of nails
AS/NZS ISO9001	Quality management systems - requirements
NZS 2295	Pliable, permeable building underlays
NZS 3602	Timber and wood based products for use in building
NZS 3604	Timber-framed buildings
NZS 4217	Pressed metal tile roofs
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice
MBIE	Design Guide: Fire Safety – Residential Community Housing (2018)

1.4 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

Gerard – Brochures
 Gerard – Specification manual
 Gerard – Statement of Building Code Compliance
 Gerard – Technical Note - "Aluminium Zinc Substrate performance"
 Gerard – Technical Note - "Installation of Gerard Roofs in all wind zones including extra high wind zones"
 Gerard – "Builders check-list"
 AHI Roofing Ltd [ISO 9001](#) Certificate

Manufacturer/supplier contact details:

Company: RoofTG Pacific Limited
 Web: www.gerardroofs.co.nz
 Email: info@gerardroofs.co.nz
 Telephone: 0800 244 737

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER - STANDARD WARRANTY

Provide a material manufacturer/supplier warranty:

Textured Finish Roof

50 years, pro rata	For weatherproofing, with textured finish roof
20 years, pro rata	For surface coating, with textured finish roof

Satin Finish Roof

50 years, pro rata	For weatherproofing, with satin finish roof
15 years, pro rata	For surface coating, with satin finish roof

- Provide this warranty on the manufacturer/supplier standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER /APPLICATOR

Provide an installer/applicator warranty:

5 years	For installation of roof
---------	--------------------------

- Provide this warranty on the installer/applicator standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Gerard® system, or associated components and products.

1.8 QUALIFICATIONS

Installers to be experienced in installation of Gerard® roofing tiles and certified by Gerard®. Visit <https://gerardroofs.co.nz/CertifiedRoofers> for a list of certified installers. If requested provide evidence of qualification / experience prior to commencing work.

Performance - Wind

1.9 FIXINGS, WIND - NON SPECIFIC DESIGN

Design and use the fixings appropriate to Gerard® systems – Specification manual requirements and as appropriate for the project wind design stated above. To [NZS 3604](#), table 10.12 Tile Battens for all Wind Zones. Refer to Gerard® – Specification manual & Technical Note: "Installation of Gerard Roofs in all wind zones including extra high wind zones" for the selected profile, fixing requirements.

1.10 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Complete Gerard® – "Builders check-list."

1.11 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets. Comply with [NZMRM CoP](#) for performance, loadings, design, flashings, penetrations and installation recommendations, and section 15.3, **Pressed metal Tiles**.

2 PRODUCTS

Materials

2.1 UNDERLAY

Self supporting, kraft-based roofing underlay or self supporting, synthetic roofing underlay to comply with [NZS 2295](#). Refer to 4161 UNDERLAYS, FOILS AND DPC for details.

2.2 BATTENS

To [NZS 3604](#), 10.2.1.16 **Purlins and tile battens**. Radiata Pine or Douglas Fir, SG6, treated H1.2. Moisture content to [NZS 3602](#), size, spacing and fixing to [NZS 3604](#) table 10.12 **Tile Battens for all wind zones** or to Gerard® requirements for Wind -specific design.

2.3 PRESSED METAL TILES

To [NZS 4217](#), and [NZBC E2/AS1](#), 8.3 Pressed metal tiles. Aluminium/Zinc coated steel AZ 150, 0.39mm BMT to AS 1397. Tiles available in a range of profiles & may be finished either in a stone chip texture or satin acrylic finish. Refer to SELECTIONS for type.

Components

2.4 TILE FIXINGS

Hot-dipped galvanized steel flat head 50mm x 2.8mm painted tile nails to Gerard® specification.

2.5 FLASHINGS, CAPPINGS AND COVERS

To [NZS E2/AS1](#), 4.0 **Flashings**. Gerard® proprietary ridge, hip, gable, valley & wall flashings, cappings and trims manufactured from aluminium-zinc coated steel AZ 150, to AS 1397, coated to match adjacent roofing where required, as part of the selected Gerard® profile's roofing system.

3 EXECUTION

Conditions

3.1 INSPECTION

Inspect the roof framing and supporting structure and do not start work until it is complete and fully braced ready for tiling, all to the requirements of [NZS 3604](#) or specific design where required. Ensure Gerard® – "Builders check-list" has been completed

3.2 COMPLY

Comply with the preparation, laying and fixing requirements of [NZS 4217](#), [NZBC E2/AS1](#) 8.0 **Roof claddings**, and the Gerard® requirements where these are of a higher standard.

Application

3.3 SET-OUT

Carefully set out the roof with a measuring rod to position the battens accurately taking account of rafter lengths, overhangs into gutters and spoutings and verge overhangs, all to minimise tile cutting. Batten setout in accordance with requirements for selected Gerard® profile.

3.4 LAY UNDERLAY

Roof underlay to be installed horizontally with a minimum 75mm overlap, all vertical laps to be taken past rafters and lap by a minimum of 150mm to [NZBC E2/AS1: 8.1.5 Underlays](#), and Gerard® requirements. Roofing underlay is installed under the roofing battens but over the bottom batten over fascia into gutters, drawn tight over rafters from ridges and hips and into valleys. If damaged, make good with full lap inserts as the work proceeds.

3.5 FIX BATTENS

To [NZS 3604](#), table 10.12 and/or to Gerard® requirements for specific design wind loads. Fix battens over the underlays in straight courses, spanning at least 3 rafters, between fascia and ridge and elsewhere to Gerard® required details. Nail or screw as required at every crossing. Square-cut ends to form butt joint over rafters with joints staggered.

3.6 LAYING

Do not take heavy equipment onto the roof. Plan work to minimise foot traffic. Work on the roof only using appropriate footwear. Interlock, lap and lay tiles to [NZBC E2/AS1: 8.3 Pressed metal tiles](#), and Gerard® requirements. Finish ridge, hip, valley, barge and eaves to Gerard® required details if not detailed elsewhere.

3.7 NAILING TILES

Nail tiles to battens generally through the upstand and downturn of the tile lap as well as all elements to Gerard® details and to [NZBC E2/AS1](#).

Bottom course of tiles are fixed driving vertical nails into face of tile, and into eaves batten. Eaves nails to satin finish tiles are sealed with a synthetic washer, textured tiles to be sealed with the touch-up kit base coat and stone chip.

Successive rows of tiles are fixed driving 50mm Gerard® approved nails into the face of battens.

3.8 CUTTING AND BENDING

Cut, bend and straighten tiles neatly to finish true to line and plane when in place, using installation equipment maintained in the proper condition, all to [NZS 4217](#) and to Gerard® details.

3.9 FIT FLASHINGS, COVERS AND CAPPINGS

Cut, fit and fix all elements true to line and plane, to [NZBC E2/AS1: 4.0 Flashings](#), [NZBC E2/AS1: 5.0 Roof/wall junctions](#) in accordance with Gerard® requirements and the [NZMRM CoP](#), section 15.3 **Pressed Metal Tiles**, if not detailed elsewhere.

Tiles must be turned up a minimum of 40mm and covered to prescribed cover by Gerard® factory produced flashings.

3.10 EPDM FLASHINGS TO PENETRATIONS

Form to [NZBC E2/AS1: 8.1.7](#) and [8.3.10 Roof penetrations](#), in accordance with Gerard® requirements and to the [NZMRM CoP](#).

Install EPDM proprietary flexible sleeve/boot flashing in accordance with manufacturer's requirements, ensuring installed 45° to horizontal.

3.11 PENETRATIONS AND JUNCTIONS

Form to [NZBC E2/AS1: 8.1.7](#) and [8.3.10 Roof penetrations](#), in accordance with Gerard® requirements and to the [NZMRM CoP](#).

Check that adjoining walls and parapets are prepared ready for the installation of the roofing.

Confirm that openings have been prepared ready for the installation of skylight, chimneys and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions including proprietary Gerard® PVC stop ends
- installation of flashings, either custom-made flashings made from Gerard® supplied sheet or a supported membrane flashing.
- install selected sealant between flashing and roofing tile to Gerard® requirements.
- where applicable, touch up membrane flashings where they overlap roofing tiles with Gerard® touch-up kit base coat and/or stone chip.

Completion

3.12 MAKE GOOD

Touch up all damaged coatings with Gerard® touch-up kit base coat and/or stone chip

3.13 LEAVE

Leave this work complete with all necessary flashings, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.14 REMOVE

Remove trade rubbish and unused materials from the roof and surrounds regularly during the work. Sweep down the completed roof and clean out spoutings, gutters and rainwater pipes. Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.gerardroofs.co.nz/DesignTech. Substitutions are not permitted to the following, unless stated otherwise.

4.1 UNDERLAY

Refer to 4161 UNDERLAYS, FOILS AND DPC.

Roof tiles**4.2 GERARD® CORONA SHAKE STEEL TILES**

Finish: As selected

Colour: As selected by owners

Compliance Information**4.3 INFORMATION REQUIRED FOR CODE COMPLIANCE**

Provide the following compliance documentation:

- Applicators approval certificate from the manufacturer / importer / distributor
- Manufacturer's / suppliers warranty
- Installer's warranty
- Producer Statement - Construction from the applicator / installer

4.4 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone: HIGH / 1.20 kPa ULS (refer to [NZS 3604](#), table 5.4)

4.5 BATTEN FIXINGS

90x3.15mm gun nails or self drilling screws in accordance with [NZS 3604](#) table 10.12 Tile Battens for all wind zones and Gerard® - Technical Note: "Installation of Gerard Roofs in all wind zones including extra high wind zones".

4.6 STORAGE AND HANDLING

Take delivery of materials and goods and store on-site and protect from damage. Stack tiles on ground no more than two pallets high, on a level, hard base, ventilated and protected from damage and weather.

Protect finished surfaces, edges and corners from damage. Move/handle goods in accordance with manufacturer's requirements without soiling, scratching, crushing or other damage. Reject and replace goods that are damaged or will not provide the required finish.

4.7 TOUCH-UP KITS

Gerard® touch-up kits of base colour and stone chip texture for application over membrane roofing which overlaps panels.

4.8 DISSIMILAR METALS / MATERIALS

Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible or inert materials. Place isolators between metals and treated timber, cement based materials, and mixing aluminium sheet and steel mesh. Do not use unpainted lead sheet, copper or brass in contact with or allow water run-off onto galvanized or aluminium-zinc coated steel.

Ensure all fixings are compatible with the roof tile material.

4.9 FIX VALLEY

To **NZBC E2/AS1: 8.1.6.2 Valley Gutters & hidden gutters** and in accordance with Gerard® requirements. Valley overlaps to be at least 150mm, do not fix through valleys, tag top edge of valley join to eliminate valley creep.

4.10 CUSTOM VALLEY FLASHINGS

To NZS E2/AS1, 4.0 Flashings. Custom made, pre-painted 0.55mm BMT G300 AZ150 aluminium coated steel.

4.11 FLASHINGS, CAPPINGS AND COVERS

Trim type: As selected

4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

This section relates to the fabrication, supply and installation of **APL Window Solutions** residential window and door systems manufactured by either **Altherm**, **First** or **Vantage**.

It includes:

- APL Residential aluminium windows and doors
- APL Metro Series aluminium windows and doors
- APL Architectural Series aluminium windows and doors
- APL Metro Thermal Heart aluminium windows and doors
- APL Smartwood composite aluminium / timber windows and doors
- APL Roof windows and overhead glazing
- APL Ventient trickle ventilators
- APL Balustrading
- Hardware and furniture
- Flashings and sealants

1.1 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ
WEERS	Window Energy Efficiency Rating System
PQAS	Powder Coating Quality Assurance System

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4303	Ventilation for acceptable indoor air quality
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
BRANZ BU 636	Protecting Glass From Damage
Window & Glass Association NZ (WGANZ) documents:	
Window Installation Guide	Guide to Window Installation as described in E2/AS1 Amendment 7
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)
US Federal Specification:	
TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:

Altherm Specifier's Guide

First Specifier's Guide

Vantage Specifier's Guide

Vantage Guide to Fluoraset FP - Selling, Fabricating, Handling, Care and Maintenance

APL Guide to specifying powders and issuing/applying for warranties

APL Window Energy Efficiency Rating System (WEERS) Report Series

Manufacturer/supplier contact details

Company: **APL Window Solutions**

Web: www.altherm.co.nz

www.firstwindows.co.nz

www.vantage.co.nz

www.aplnz.co.nz

Email: specifiersguide@aplnz.co.nz

Telephone: 07 849 2113

Warranties**1.4 WARRANTY - MANUFACTURER/SUPPLIER**

Provide a material manufacturer/supplier warranty:

5 years:	For fabrication
----------	-----------------

2 years:	For hardware
----------	--------------

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years:	For installation
----------	------------------

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements**1.6 NO SUBSTITUTIONS**

Substitutions are not permitted to any specified APL aluminium system, or associated components and products.

1.7 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

1.8 COMPLIANCE

Windows and doors to be manufactured and installed to [NZBC E2/AS1](#).

1.9 SHOP DRAWINGS

Shop drawings to show the general arrangement of the aluminium joinery including, but not be limited to:

Construction details (minimum scale 1:5) showing the interface between joinery elements and the building structure including: -

- Joining details and method of fixing between individual elements and between this installation and adjacent work
- Interaction between claddings and linings
- Flashing details
- Sealants and air seals
- Non standard fixing details including bracketing

And where required the following: -

- Design calculations
- Producer Statement in the form PS1 Producer Statement Design
- Rebate sizes
- Dimensions of all typical elements and of any special sizes and shapes
- Provision for the exclusion and/or drainage of moisture
- Provision for adjustment of fixings to ensure true alignment of windows and doors
- Sealant types and full size sections of all sealants and backing rods
- Provision for thermal movement
- Provision for seismic movement and movement under wind loads
- Sequence of installation
- Glazing specification and details

Where requested provide the following additional information

- Information of Professional Indemnity Insurance held by the person providing the calculations and shop drawings

Complete shop drawing review before commencing fabrication.

1.10 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of [NZS 4211](#).

Performance

1.11 PERFORMANCE - WINDOWS AND DOORS

To [NZS 4211](#), including:

- deflection, opening sashes; air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.12 STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window fabricator.

Performance - Wind (design by contractor)

1.13 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of [NZS 3604](#), table 5.1.

Refer to SELECTIONS for wind zone.

Finishes

1.14 CERTIFY COATINGS - POWDER COATING

Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided. The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS

2.1 WINDOWS

Refer to SELECTIONS for type and finish.

2.2 DOORS

Refer to SELECTIONS for type and finish.

Materials

2.3 ALUMINIUM EXTRUSIONS

Alloy designation to comply with [AS/NZS 1866](#). Branded and extruded for anodising or powder coating.

2.4 ALUMINIUM SHEET AND STRIP

Complying with [AS/NZS 1734](#) of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.5 STAINLESS STEEL SHEET AND STRIP

Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

2.6 GLASS

Refer to the glazing section for glass types and installation.

Reveals

2.7 REVEALS - TIMBER PAINTED

Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

Flashings

2.8 FLASHINGS GENERALLY

To [NZBC E2/AS1](#), 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components for installation - cavity systems

2.9 STANDARD CAVITY CLOSER

A device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with [NZBC E2/AS1](#) to the spaces above the window or door.

2.10 SUPPORT BAR

WGANZ extruded aluminium support bar with built in drainage and ventilation to [NZBC E2/AS1](#), and support bar location bracket, to provide continuous support to the window unit. Size to suit cladding type.

Components

2.11 GLAZING GASKETS

Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.12 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.13 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to [NZBC F4/AS1](#), Table 2, Acceptable opening sizes for barriers.

2.14 FIXING BRACKETS

Designed by manufacturer to specific design.

2.15 WEATHERING/INSTALLATION SEALANT

Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus ($\pm 25\%$ movement) to US Federal Specification TT S 00230C.

Finishes

2.16 DURALLOY POWDER COATED ALUMINIUM

Polyester powder organic coating in accordance with [WGANZ PQAS](#), AS 3715, and AAMA 2603

2.17 DURATEC POWDER COATED ALUMINIUM

High-performance polyester powder coating in accordance with [WGANZ PQAS](#), and AAMA 2604.

2.18 FLUROSET POWDER COATED ALUMINIUM

Very high-performance PVF² fluoropolymer powder coating in accordance with [WGANZ PQAS](#) and AAMA 2605.

3 EXECUTION

Conditions - generally

3.1 DO NOT DELIVER

Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.

3.2 UNLOAD WINDOW JOINERY

Unload, handle and store elements in accordance with the window manufacturer's requirements.

3.3 AVOID DISTORTION

Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE

Store windows and doors on site in a clean and dry environment in such a manner as to prevent damage to prefinished surfaces. Stack the units in a vertical position resting on their sills, with layers interleaved between to prevent rubbing. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS

Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS

Retain protective coverings and coatings to BRANZ BU 636 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.7 ADDITIONAL PROTECTION

Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Conditions - fixings and fastenings

3.8 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with [AS/NZS 4680](#).

3.9 INSTALLATION FIXING

To **NZBC E2/AS1, 9.1.10.8, Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings. Install packers between reveals and framing at fixing points, except at the head.

Assembly

3.10 FABRICATION

Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.11 TIMBER / PVC REVEALS

Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces. Securely fix reveals through aluminium fin.

3.12 HARDWARE GENERALLY

Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.13 SAFETY STAYS

Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with **NZBC F4/AS1 4.0, Opening windows**.

Installation - windows and doors

3.14 SUPPLY OF FIXINGS

Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

3.15 EXPOSED FIXINGS AND FASTENINGS

Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 304 stainless steel.

3.16 PROTECTED FIXINGS AND FASTENINGS

Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with **AS/NZS 4680**.

3.17 CORROSION PROTECTION

Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.18 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to **NZBC E2/AS1:9.1.5 Wall underlays to wall openings**.
- Full height 20mm jamb battens to **NZBC E2/AS1 figure 72A (direct fix only)**
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).
- application of waterproof sealer to all door and window sills in concrete floor or concrete sill situations. To door sills only, apply a suitable membrane over the sealer
- all in accordance with the shop drawings, where applicable.

3.19 INSTALLATION

Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.20 INSTALLATION CAVITY CONSTRUCTION

Install to [WGANZ Window Installation Guide](#) details and drawings including WGANZ sill support bars.

For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to [NZBC E2/AS1](#), figure 62(d).

3.21 INSTALL FLASHINGS

Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm plus any jamb scribe width at each end.

3.22 COMPLETE AIR SEAL

To [NZBC E2/AS1:9.1.6 Air seals](#): Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.23 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.24 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window and sealant manufacturer and to make the installation weathertight. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.25 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.26 BACK UP

When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.27 SEALANT FINISH

Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Cleaning

3.28 REMOVE TRADE DEBRIS

Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.29 TRADE CLEAN

Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.30 PROTECTIVE COVERINGS

Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.31 REPLACE

Replace damaged, cracked or marked elements.

3.32 PROTECTION

Protect finishes against damage from adjacent and following work.

3.33 IN-SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted to minor surface scratching. Otherwise replace all damaged material.

3.34 SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

3.35 MANIFESTATIONS

To [NZS 4223.3, 2.2](#) Manifestation (making glass visible).

4 SELECTIONS

For further details on selections go to www.aplnz.co.nz.

Substitutions are not permitted to the following, unless stated otherwise.

Performance**4.1 THERMAL PERFORMANCE**

R-value: 0.26 (as determined from [NZBC H1/VM1](#) or [H1/AS1](#))

4.2 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone High 44m/s 1200 Pa ULS (refer to [NZS 3604](#), table 5.1)

Finishes - Anodising**4.3 DURALLOY - POWDER COATING FINISH**

Type: Polyester organic powder coating
 System integrity: Minimum 10 years film integrity, 7 years colour integrity
 Thickness: Average of 90 microns with a minimum of 50 microns
 Colour: Confirm with client
 Finish: Confirm with client

4.4 FROST ULTRA ANODISED ALUMINIUM FINISH

Thickness grade: AA12 microns
 Colour / finish: Confirm with client
 Brand: Confirm with client
 Temporary protection: Where required

Glazing**4.5 GLASS**

Type/thickness: Refer to glazing section/s for type and thickness.

Hardware

4.6 WINDOW HARDWARE

Window fastener: Confirm with client

Location	Item
Options as selected by owner	Safety stays - non releasable
	Safety stays - disconnectable
	Sash locks
	Louvres

4.7 DOOR HARDWARE

Locks & handles: Confirm with client

4.8 HARDWARE FINISH

Finish: Powder coat

Colour: Black

Flashings and Sealant

4.9 FLASHINGS

Material/type: As required

Pattern: Formed to suit details provided

4.10 WEATHERING SEALANT

Type: 1-part polyurethane moisture curing, elastic joint sealant

Colour: Confirm with client

Reveals

4.11 WINDOW AND DOOR REVEALS - TIMBER

Timber species: Radiata Pine

Grade/treatment: H3.1

Thickness: 19mm

Reveals: Confirm with client

Finish: Paint finish

4610MR METRO PERFORMANCE GLASS - RESIDENTIAL GLAZING

1 GENERAL

This section relates to the supply and fixing of **Metro Performance Glass (Metro)** products for external and internal joinery in residential type buildings and includes:

- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings
- balustrade systems, pool fences
- mirrors and mirror frames

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in Place
EVA	Ethylene Vinyl Acetate
IGU	Insulating Glass Unit
LSG	Laminated Safety Glass
TSG	Toughened Safety Glass
TLSG	Toughened Laminated Safety Glass
MFG	Metro Frameless Glass

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1	Energy Efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
AS/NZS 2208	Safety glazing materials in buildings
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223. Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier documents relating to this part of the work:
Metro GlassTech Catalogue & Reference and Guide - 6th edition

Manufacturer/supplier contact details

Company:	Metro Performance Glass
Web:	www.metroglass.co.nz
Email:	info@metroglass.co.nz
Telephone:	0800 65 89 45

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

- | | |
|-----------|---|
| 10 years: | for GlassTech Insulating Glass Units (IGU) |
| 10 years: | for SafeLite Laminated Safety Glass (LSG) |
| 10 years: | for TempaFloat Toughened Safety Glass (TSG) |
| 10 years: | for TempaScreen, TempaClad and TempaPrint digital printed glass |

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of completion of this part of the contract work.

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements**1.5 SAMPLES**

Submit samples of selected glass for review if required.

Performance**1.6 ENERGY EFFICIENCY**

Provide glazing to meet the energy requirements of [NZS 4218](#) and [NZBC H1/AS1](#) for housing small buildings.

Refer to SELECTIONS and schedules for location and type of glazing.

2 PRODUCTS**2.1 NO SUBSTITUTIONS**

Substitutions are not permitted to any specified Metro Performance Glass, products or systems.

Materials**2.2 CLEAR FLOAT GLASS**

Clear ordinary annealed transparent float glass for general window glazing. Thickness to [NZS 4223.1](#) and [NZS 4223](#). Supp 1.

2.3 TEXTURED, PATTERNED OR OBSCURE GLASS

Translucent, annealed, rolled glass with a decorative pattern on one surface.

2.4 LAMINATED SAFETY GLASS (LSG)

SafeLite Grade A Laminated Safety Glass to [AS/NZS 2208](#) with PVB, EVA or CIP resin interlayer.

2.5 TOUGHENED SAFETY GLASS (TSG)

TempaFloat Grade A Toughened Safety Glass to [AS/NZS 2208](#).

Heat soaked toughened glass to [NZS 4223.1](#), Appendix E, required for critical areas.

Refer to SELECTIONS.

2.6 TINTED FLOAT GLASS

Body tinted float glass.

2.7 INSULATING GLASS UNITS (IGU)

IGUs shall be GlassTech IGUs and comply with [AS/NZS 4666](#), [NZS 4223.2](#) and the Insulating Glass Unit Manufacturers Association (IGUMA) requirements.

Marking to [NZS 4223.2](#) as modified by [NZBC B2/AS1](#), 3.5.

Refer to SELECTIONS for specified surfaces of the IGU.

Surface numbering order for glass panes in an IGU are #1, #2, #3, and #4 as follows:

- Surface #1 - outer face of exterior pane
- Surface #2 - cavity face of the exterior pane
- Surface #3 - cavity face of the interior pane
- Surface #4 - outer face of the interior pane

Materials, mirrors

2.8 MIRROR GLASS

Clear annealed mirrored float glass, including silver, activation, passivation and two protective coats.

2.9 SAFETY MIRROR GLASS

Clear mirrored float glass with organic backing (vinyl) to comply as a safety glazing material to [AS/NZS 2208](#).

Materials, bath and shower screens

2.10 GLASS SCREENS BATH & SHOWER

Proprietary shower/bath screens, and doors shall be TempaFloat TSG complete with MFG hardware.

Components, general

2.11 JOINTING, PUTTY AND SEALING MATERIALS

Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Components, aluminium and uPVC glazing

2.12 GLAZING TAPE AND GASKETS

Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.

2.13 SETTING BLOCKS

Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

Components, mirrors

2.14 MIRROR ADHESIVE

Adhesive mirror-mastic and double-sided adhesive tape.

2.15 MIRROR MOUNTING CHANNELS

Refer to SELECTIONS/drawings for type and finish.

2.16 MIRROR DE-MISTER

Refer to BATHROOM AND TOILET FIXTURES for type.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To [NZS 4223.1](#), [NZS 4223.2](#), [NZS 4223.3](#) as modified by [NZBC B1/AS1](#), 7.3.1, and [NZS 4223.4](#). All external glazing to be wind and watertight on completion.

3.2 DELIVERY

Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 636, and [AS/NZS 4666](#) for IGUs.

3.3 GLASS CONDITION

All glass and panes shall have undamaged edges and surfaces.

3.4 GLASS THICKNESS

If not specifically stated in the glazing schedule determine the minimum thickness of glass for each pane as required by [NZS 4223.1](#), [NZS 4223.3](#), [NZS 4223.4](#). Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS

Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to [NZS 4223.1](#), Section 4 Glazing.

Conditions - human impact safety requirements

3.6 SAFETY GLAZING, GENERAL REQUIREMENTS

Glazing of doors, side panels, low level and window seat glazing, bathrooms, stairwell landings and similar locations, to [NZS 4223.3](#) as modified by [NZBC B1/AS1](#), 7.3.1, for thickness and maximum areas of panel Safety Glass.

3.7 SAFETY GLAZING MATERIAL

Use only safety glazing materials defined in [NZS 4223.3](#), as modified by [NZBC B1/AS1](#), 7.3.1, that also comply with the relevant requirements of [AS/NZS 2208](#). Ensure material is permanently marked and if cut by the distributor or installer mark each piece to [NZS 4223.3](#), 2.8 Identification.

3.8 CONTAINMENT

Edge cover to comply with [NZS 4223.1](#), Section 4 Glazing, table 5. Otherwise to [NZS 4223.3](#), 2.3 Edge cover.

Assembly

3.9 WORKING OF GLASS

All working of glass as required in [NZS 4223.1](#).

3.10 EDGE WORK AND BEVELLING

All edges shall be clean cut unless specified in SELECTIONS or as shown on drawings.

3.11 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.12 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

Application aluminium

3.13 INSTALL GLASS TO ALUMINIUM FRAMES

Install glass to [NZS 4223.1](#).

- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

3.14 INSTALL SAFETY GLASS

To [NZS 4223.3](#).

Application - mirrors

3.15 MIRRORS, SCREW FIXED

Fix with proprietary zinc-plated steel countersunk-head screws; fitted with black neoprene washers with fine-threaded upstands to receive chrome plated dome screw covers.

3.16 MIRRORS, CHANNEL MOUNTED

Fix with proprietary mounting channels, to the channel manufacturer requirements.

3.17 MIRRORS, ADHESIVE FIXED

For mirrors and splashbacks, fix with adhesive mirror-mastic and double-sided adhesive tape. Adhesive area 0.2 m² per 1 m² of glass to [NZS 4223.3](#).

Finishing

3.18 SAFETY

Indicate the presence of transparent glass for the construction period, with tape or signs compatible with the glass type.

3.19 MANIFESTATIONS

To [NZS 4223.3](#), clause 303.1 Manifestation (making glass visible).

Completion

3.20 TRADE CLEAN

Remove safety indicators and trade clean at completion of the building as required by the contract documents.

3.21 REPLACE

Replace damaged, cracked or marked glass that occurs during glazing.

3.22 LEAVE

Leave work to the standard required by following procedures:

3.23 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.metroglass.co.nz.

Substitutions are not permitted to the following, unless stated otherwise.

Performance - wind

4.1 WIND ZONE - NON-SPECIFIC DESIGN

Building wind zone: HIGH as determined from [NZS 3604](#), [NZS 4223.4](#) or [NZS 4211](#).

Mirrors

4710P PINK® BATTS® & PINK® BATTS® SILENCER® INSULATION

1 GENERAL

This section relates to Tasman Insulation **Pink® Batts®** insulation materials installed into residential buildings.

It includes:

Thermal:

- **Pink® Batts® Ceiling Insulation** (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**)
- **Pink® Batts® Skillion Roof Insulation**
- **Pink® Batts® Wall Insulation** (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**)
- **Pink® Batts® Masonry Wall Insulation**
- **Pink® Batts® 140mm Wall Insulation**
- **Pink® Batts® Steel Wall Insulation**
- **Pink® Batts® Narrow Wall Insulation**
- **Pink® Batts® SnugFloor® Underfloor Insulation**

Acoustic:

- **Pink® Batts® Silencer®**
- **Pink® Batts® Silencer® Midfloor**

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NRC	Noise Reduction Coefficient
STC	Sound Transmission Class
IIC	Impact Insulation Class

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS2	Protection from fire
NZBC H1/AS1	Energy efficiency
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS/NZS 3000	Electrical installations
NZS 4218	Thermal insulation - Housing and small buildings
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy Efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 60598.2.2:2001	Luminaires- Particular Requirements - Recessed luminaires
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents related to this section are:

Tasman Insulation New Zealand: Product Data Sheets and Installation Instructions

BRANZ Appraisal 238 - **Pink® Batts® Insulation**

BRANZ Appraisal 632 - **Pink® Batts® SnugFloor® Underfloor Insulation**

BRANZ Appraisal 767 - **Pink® Batts® Skillion Roof Insulation**

Manufacturer/supplier contact details

Company: **Tasman Insulation New Zealand**

Web: www.pinkbatts.co.nz

Telephone: **0800 746 522**

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

Lifetime Warranty	For Pink® Batts® insulation products
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- Commence the warranty from the date of practical completion of the contract works.
- Provide this Warranty on the **Pink® Batts® Lifetime Warranty Certificate** form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS, PINK® BATTS®

Installers to be **PinkFit® - Preferred Pink® Batts® Installers**. A list of approved installers can be obtained from the web, by telephone or from the local building supplies merchant.

Web: www.pinkbatts.co.nz

Telephone: Freephone 0800 746 534

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Tasman Insulation **Pink® Batts®** insulation or associated products, components or accessories.

2 PRODUCTS

Materials - thermal

2.1 PINK® BATTS® CEILING INSULATION

Pink® Batts® Ceiling Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular slabs. Refer to SELECTIONS for R values and thickness options.

NOTE: When insulation abutting or covering recessed downlights is intended to be in contact with IC, CA 80, CA 135 luminaries the insulation must withstand a 30s Needle Flame test to [AS/NZS 60695.11.5](#). Pink® Batts® insulation meets this requirement.

2.2 PINK® BATTS® WALL INSULATION

Pink® Batts® Wall Insulation (Pink® Batts® Classic and Pink® Batts® Ultra®) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular slabs. Refer to SELECTIONS for R values and thickness options.

2.3 PINK® BATTS® SNUGFLOOR® UNDERFLOOR INSULATION

Pink® Batts® SnugFloor® Underfloor Insulation is a bio-soluble glass wool underfloor product manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular slabs. Refer to SELECTIONS for R values and thickness options.

NOTE: When insulation abutting or covering recessed downlights is intended to be in contact with IC, CA 80, CA 135 luminaries the insulation must withstand a 30s Needle Flame test to [AS/NZS 60695.11.5](#). Pink® Batts® insulation meets this requirement.

Components

2.4 FASTENERS

Insul anchors complete with retaining washer.

2.5 PLASTIC STRAPPING TAPES

Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall, ceiling and underfloor locations.

For drained cavities where stud spaces are greater than 450mm and only flexible underlay is used, strapping required to [NZBC E2/AS1 9.1.8.5 Wall framing behind cavities](#).

2.6 ADHESIVE TAPE

Pressure sensitive adhesive tape.

3 EXECUTION

3.1 STORAGE

Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, compression, puncturing and damage to edges of materials. Do not use damaged or wet insulation materials.

3.2 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.3 INSPECTION

Before starting installation of blankets and slabs, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, wall underlays and vapour barriers are in place.

Application - general

3.4 INSTALL INSULATION - GENERAL

Lay, install, fit and fix to [NZBC H1/AS1](#): Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to [NZS 4218](#) and [NZS 4246](#). Install in large buildings to [NZS 4243.1](#) and [NZS 4220](#). Allow insulation to re-loft/relax prior to installation. Do not cover vents. Confirm with fireplace manufacturer for clearances: **Pink® Batts®** insulation need not be separated except if used in conjunction with, or attached to other heat sensitive materials. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.5 RECESSED LIGHT FITTINGS - CLEARANCE

Non-residential applications;

The clearance between insulation and recessed downlights

- 100mm gap to [AS/NZS 3000](#), figure 4.9.
- Provide larger clearances where required by the light manufacturer.

Residential applications;

- Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#): CA 80, CA 135, IC and IC - F
- Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides (wrapping around the sides)
- Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- Provide larger clearance where required by the light manufacturer.
- In a retrofit situation where recessed downlights are unclassified or unknown, ensure 100mm clearance from the insulation to [AS/NZS 3000](#), figure 4.9.

Application, thermal insulation

3.6 INSTALL PINK® BATTS® CEILING INSULATION

Ensure that the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Ceiling Insulation** beneath electrical wiring and plumbing. Install to the outer edge of the top plate. Maintain a 25mm gap clearance between the **Pink® Batts®** insulation and roof underlay. Refer to [NZS 4246](#) for installation guidelines and **Pink® Batts®** installation instructions for detailed information.

3.7 INSTALL PINK® BATTS® WALL INSULATION

Ensure the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Fill gaps around windows and doors with off-cuts. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Wall Insulation** behind electrical wiring and plumbing. Ensure there are no gaps, folds or undesirable compression at edges.

Refer to [NZS 4246](#) for installation guidelines and **Pink® Batts®** installation instructions for detailed information.

3.8 INSTALL PINK® BATTS® SNUGFLOOR™ UNDERFLOOR INSULATION

Install **Pink® Batts® SnugFloor®**

in dry protected environment. Label location of wires, pipes and cables for future reference. Pieces must be 30mm wider than the distance between joist faces. Friction fit each piece between the joists, leave no gaps. Fold on one side.

Do not cover over wiring with insulation. Cut neatly around penetrations. Secure each piece with Danband or equivalent strapping (no less than 2 per piece).

Pieces must be butted together leaving no gaps. Ensure strapping is wide enough for staples/clouts (strapping may be cut for each piece or continuous). Use two staples for each fixing point. Fold must not extend below bottom joist, trim if required. Refer to [NZS 4246](#) for installation instructions.

3.9 LAY PLASTIC STRAPPING TAPE

Lay at right angles across the framing at a minimum of 300mm centres, staple tape to each framing member with stainless steel staples.

Completion

3.10 CLEAN UP

Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.

3.11 LEAVE

Leave work to the standard required by following procedures.

3.12 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.pinkbatts.co.nz. Substitutions are not permitted to the following, unless stated otherwise.

Thermal insulation

4.1 PINK® BATTS® CLASSIC CEILING INSULATION

Location:	Generally
Brand:	Pink® Batts® Classic Ceiling
R-value:	3.2
Thickness:	170mm

4.2 PINK® BATTS® SNUGFLOOR™ UNDERFLOOR INSULATION

Location:	Under timber subfloor
Brand:	Pink® Batts® SnugFloor®
R-value:	R1.6
Thickness:	70mm

4.3 PINK® BATTS® CLASSIC WALL INSULATION

Location:	Generally
Brand:	Pink® Batts® Classic Wall
R-value:	2.2
Thickness:	90mm

5113G GIB® PLASTERBOARD LININGS

1 GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- superior finish quality systems
- bracing systems
- fire rated garage boundary wall systems
- wet area systems
- GIBFix® Framing systems

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AWCINZ Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600:2005	Cold-formed steel structures
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)
NASH Standard Part 2	May 2019 Light Steel Framed Buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and Supplier documents relating to this part of the work:

- GIB® Site Guide (September 2018)
- GIB® Noise Control Systems (September 2017)
- GIB® Fire Rated Systems (October 2018)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB Toughline® Aqua (July 2018)
- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Bracing Software (2016)
- GIB Ezybrace® Systems (June 2011), with amendments (December 2014)
- GIB Ezybrace® for Steel Frame Housing (NASH) software (2011)
- GIBFix® Framing System (2016)
- GIB Rondo® Metal Ceiling Batten Systems
- GIB-Cove®
- GIB RocTape®
- GIB Goldline™ Platinum Tape-on Trims (January 2006)
- GIB UltraFlex® high impact corner mould (September 2004)
- GIB® Tough Systems (November 2014)

BRANZ Appraisal 427 (2007)

GIB Aqualine® Wet Area Systems

BRANZ Appraisal 928 (2016)

GIB Ezybrace® Systems 2016

GreenTag Certification

WWL-002-V2-2018 - GreenTag™ GreenRate / Level A

- GIB® Standard (10mm & 13mm)
- GIB Fyreline® (10mm, 13mm, 16mm & 19mm)
- GIB Braceline® (10mm & 13mm)
- GIB Noiseline® (10mm & 13mm)
- GIB Toughline® (13mm)
- GIB Wideline® (10mm & 13mm)

Copies of the above literature available at:

Company:

Winstone Wallboards

Web:

www.gib.co.nz

Telephone:

0800 100 442

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.5 INSTALLER WORK SKILLS AND QUALIFICATIONS

GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.6 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.7 BRACING REQUIREMENTS

Braced wall systems to [NZS 3604](#) when tested to BRANZ Technical Paper P21, using:

- GIB Ezybrace® Systems (2016) and/or GIB Ezybrace® Bracing Software (2016)
- GIB Ezybrace® Systems (2011)
- GIB Ezybrace® Software for steel framing

Refer to drawings for location and type.

2 PRODUCTS

2.1 SURFACE FIRE PROPERTIES - UNFINISHED BOARD

All GIB® unfinished plasterboard sheet materials achieve a Group Classification of, Group 1-S to [NZBC C/AS2](#), Table 4.3, following testing in accordance with ISO 5660.1 and ISO 5660.2.

Materials

2.2 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to [AS/NZS 2588](#). Refer to SELECTIONS for location, type, thickness and finish.

GIB® Standard plasterboard

GIB Wideline® plasterboard

GIB Ultralite® high quality surface plasterboard

GIB Fyrelite® fire resistant plasterboard

GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard

GIB Aqualine® wet area plasterboard

GIB Toughline®

GIB Toughline® Aqua

2.3 GIB® COVING

GIB-Cove® plasterboard coving. Refer to SELECTIONS for profile and size.

Components

2.4 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

2.5 SCREWS

GIB® Grabber® drywall type screws as follows:

Grabber® type	Used for fixing:
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber
Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.6 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims

GIB® UltraFlex® high impact corner mould

GIB® Levelline® Tape on Trim

2.7 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.8 CONTROL JOINTS

GIB® Rondo® P35 control joints.

GIB® Goldline™ tape-on trims

GIB® plastic smooth control joints.

GIB® plastic W-profile control joints.

Accessories

2.9 ADHESIVE

Timber frame and/or steel frame:
 GIBFix® One ultra low VOC water based wallboard adhesive
 GIBFix® All-Bond solvent based wallboard adhesive

2.10 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GiB-Cove® Bond

2.11 JOINTING TAPE

GIB® jointing tape.

2.12 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 STORAGE

Store GIB® plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB® Site Guide (September 2018).

3.2 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in [AS/NZS 2589](#).

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE

Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to [AS/NZS 2589](#).

3.4 SUBSTRATE

Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer requirements. Refer to GIB® Site Guide (September 2018).

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to [AS/NZS 2589](#) for timber framing at lining: 18% or less for plasterboard linings. Refer to [NZBC E2/AS1](#) and GIB® Site Guide (Sept 2018).

3.6 METAL FRAMING

Metal framing, to which gypsum lining is fixed, shall comply with AS 1397, [AS/NZS 4600](#), or NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria, as applicable. Where adhesion of gypsum linings is required, surfaces shall be free of oil, grease, dust and other foreign materials. Refer to the metal framing manufacturers specifications where high density gypsum linings (>800 kg/m²) such as GIB Braceline® and GIB Noiseline® are specified for fixing to light gauge steel framing.

3.7 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide (Sept 2018).

Application

3.8 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems.

3.9 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide (September 2018). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.10 BOARD ORIENTATION

Minimise joints by careful sheet layout using the largest sheet sizes possible; and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.11 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.12 FORM BRACING SYSTEMS

Form bracing systems to:

- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Systems (2011)

3.13 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide (September 2018) requirements.

3.14 INSTALL COVES

Install to GIB-Cove® literature using GIB-Cove® Bond.

3.15 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.16 FINISHING GENERALLY

To GIB® Site Guide (September 2018) and [AS/NZS 2589](#).

Completion

3.17 REPLACE

Replace damaged sheets or elements.

3.18 CLEAN DOWN

Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer requirements, to leave completely smooth and clean.

3.19 REMOVE

Remove debris, unused materials and elements from the site.

3.20 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

Plasterboard

4.1 GIB® STANDARD SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Walls generally	GIB® Standard plasterboard	10mm	L4
Where required	GIB Ultralite® plasterboard	13mm	L4

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Wet area walls	GIB Aqualite® plasterboard	10mm	L4

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Ceilings generally	GIB® Standard plasterboard	13mm	L4
Where required	GIB Ultralite® plasterboard	13mm	L4

4.4 GIB® WATER RESISTANT SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Wet area ceilings	GIB Aqualite® plasterboard	13mm	L4

4.5 GIB® BRACING SYSTEMS

Refer to:

- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Systems (2011)

For bracing element location refer to drawn documentation.

Accessories

4.6 CORNICE

Size/brand/type: 55mm GIB cove classic

4.7 TAPE ON EDGE OR CORNER TRIMS

Brand/type: Goldline tape on trims

6221 TILING SYSTEMS

1 GENERAL

This section relates to the supply and installation of interior and exterior floor and wall tiles. It includes:

- Underlays
- Screeds and levelling compounds
- Primers
- Waterproofing systems
- Tile adhesives
- Grouts and sealants
- Tiles
- All other required components and accessories necessary to complete installation

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4586	Slip resistance classification of new pedestrian surface materials
AS/NZS 4671	Steel reinforcing materials
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide: Tiling

Warranties

1.2 WARRANTY - INSTALLER/APPLICATOR - FOR TILING SYSTEMS

Provide an installer/applicator warranty:

2 years: For installation of tiling systems

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR - FOR WATERPROOFING SYSTEMS

Provide an installer/applicator warranty:

5 years: For installation of waterproofing systems

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS - TILING SYSTEMS

Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.5 QUALIFICATIONS - WATERPROOFING SYSTEMS

Waterproofers to be experienced, competent trades people familiar with the materials and techniques specified.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.7 DEFLECTION CRITERIA FOR SUSPENDED FLOORS

Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.8 ADHESIVES COMPATIBILITY

Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

1.9 INTERNAL / EXTERNAL MOISTURE

Wet area membranes under tiled areas to AS 3740, [NZBC E2/AS1](#) (exterior), [NZBC E3/AS1](#) (interior) and to BRANZ Good Practice Guide: Tiling.

2 PRODUCTS

Materials

2.1 TILES

Refer to SELECTIONS for product selection.

Materials - waterproofing

2.2 LIQUID WATERPROOFING MEMBRANE

To AS 3740. Refer to SELECTIONS for details.

Materials - adhesive and grout

2.3 TILE ADHESIVE

To AS ISO 13007.1.

2.4 SAND AND CEMENT GROUT

1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.5 PROPRIETARY GROUT

Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

Components

2.6 MOVEMENT JOINT SEALANT

To BRANZ Good practice guide: Tiling, section 5.0.

- Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage.

Protect finished surfaces, edges and corners from damage.

Move/handle goods in accordance with manufacturer's requirements.

Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY

Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions

3.6 INSPECT BACKGROUND CONDITIONS

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

Inspect background and substrate materials for any conditions unsuitable for tiling over. Substrate material must be even and true with a maximum variation in plane of no greater than 4mm in every 2m, in accordance with AS 3958.1, section 4.

Do not commence work until the affected area is rectified. Commencement of installation constitutes acceptance of site conditions.

3.7 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.8 MOISTURE CONTENT

Ensure concrete floors & concrete and/or concrete block walls are cured and dry. Ensure moisture content is such that shrinkage is complete and thermal movement has been accommodated.

If in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

3.9 LIGHTING

Light the tile work as closely and clearly as possible to that of the finished lighting, to ensure that differences in plane surface are highlighted during installation.

Application - preparation

3.10 PREPARE SUBSTRATES

Prepare backgrounds as described in AS 3958.1, Section 4 as modified by BRANZ Good practice guide: Tiling. All surfaces to be structurally sound, dry, clean and free from movement, dirt, dust, oil, grease, wax, curing compounds, release agents and any other loose or contaminating materials.

Ensure surfaces are flat and true to a tolerance of ± 4 mm in 2 metres from the required plane. Remove projections, unevenness and loose material to leave a clean dust and dirt free surface.

Suitably prepare backgrounds and substrates in accordance with the manufacturer's instructions of the tiling installation products for the relevant substrate type.

3.11 PRIME SUBSTRATES

Surfaces should be primed as per manufacturer's instructions for the selected products and substrate types. Refer to SELECTIONS.

Application - movement joints

3.12 FORM MOVEMENT AND EXPANSION JOINTS

Install movement joints to go right through the tile and bed to the background, maintaining any waterproofing. Ensure any slip layer backing (bond breaker) required, is installed.

Joint width minimums:

- 4-6mm interior tiles on concrete (with low moisture content)
- 6-8mm interior tiles on dry timber structure
- 8-10mm exterior tiles on concrete (with low moisture content)
- 10-12mm exterior tiles on dry timber structure
- To match grout width, if equal/larger than above
- Larger to suit joint infill requirements (preformed jointers)

In wall tiling provide joints at; internal vertical corners, as well as joints at, floors, columns/beams, nibs, hobs and similar. Provide joints around sanitary fixtures, around fixtures interrupting the tile surface, at junctions with joinery fixtures, including window and door frames and built in cupboards, and at changes in substrate or background. In large area wall tiling provide vertical joints at not more than 3.6 metres spacing along the length of a wall and horizontal joints at each storey rise in the height of a wall, and over all existing substrate expansion joints.

In large areas of floor tiling provide joints at not more than 4 metres spacing in both directions and 3.6 metres externally. Provide expansion joints, at the perimeter of tile floors, at changes of level or slope, around structural features, changes in substrate, around sanitary fixtures and other fixtures interrupting the tile surface, and over all existing substrate expansion joints.

3.13 MOVEMENT AND EXPANSION JOINTS, INSTALL COMPOUND/SEALANT FILL

Carefully clean out the joint, insert the backing rod if required and fill with compound/sealant placed by gun. After the correct interval, finish the surface off smooth, and flush on flat areas or concave in corners, to the compound/sealant manufacturer's requirements.

Application - waterproofing

3.14 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS

Install waterproofing membrane to manufacturers requirements and in accordance with AS3740 and BRANZ Good Practice Guide, Tiling 6.0 Wet area tiling and 7.0 Waterproofing interior wet areas.

Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide: Tiling: 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install minimum areas of waterproof membrane as follows:

Enclosed shower cubicle

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along all tiled walls and sealed to shower screens.
- To tiled shower base and hobs (upstands).

Unenclosed shower cubicle

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along walls at least 1500mm from fixed shower rose and plus hose length for flexible rose.
- To the floor within 1500mm of fixed shower rose and plus hose length for flexible rose.

Bath with a shower over

- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above floor.
- Along walls the greater of, bath length plus 300mm, or 1500mm from fixed shower rose, and 1500mm plus hose length for flexible rose.
- To the floor, waterproof under the bath and match the extent of the wall waterproofing.

Bath (no shower over)

- Around the bath to 300mm away from the bath in all directions, also waterproof under the bath.

Splashback to a vanity

- Up wall from floor and behind the vanity, to 150mm above and beyond each side of vanity.
- To floor under the vanity to match wall waterproofing and at least 600mm from wall.

Application -tile installation generally

3.15 FITTING TILES

Setting out, cutting and fitting of tiles to be as described in AS 3958.1. Ensure cut edges are smooth and installed without jagged or flaked edges. Always use whole tiles or if tiles have to be cut the largest portion of a cut tile possible. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.16 TILE FINISH AND JOINTS

Ensure finished surfaces are flat and true to a tolerance of $\pm 4\text{mm}$ in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation, measured at the tile face. Ensure joint alignment is consistent throughout the installation and to a tolerance of $\pm 4\text{mm}$ in 2 metres from the detailed joint alignment.

3.17 ADHESIVE APPLICATION

Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive. If required, mix adhesive to manufacturer's instructions.

Notched trowel method

- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method

- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations

- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

Application - grouting**3.18 APPLY GROUTING**

Grout tiling to AS 3958.1, clause 5.7. Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.19 APPLY PROPRIETARY GROUTING

Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning**3.20 CLEAN TILES**

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion**3.21 ROUTINE CLEANING**

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.22 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

3.23 PROTECTION

Provide the following temporary protection of the finished work:

Provide protection to floor tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

Materials - Tiles**4.1 FLOOR TILES**

Location:	Refer to plans
Type:	Confirm with client
Tile size:	Confirm with client
Tile colour:	Confirm with client
Edging:	Confirm with client
Grout width:	Confirm with client
Grout colour:	Confirm with client
Sealant colour:	Confirm with client

4.2 WALL TILES

Location:	Confirm with client
Supplier/Brand:	Confirm with client
Type:	Confirm with client
Tile size:	Confirm with client
Tile colour:	Confirm with client
Edging:	Confirm with client
Grout width:	Confirm with client
Grout colour:	Confirm with client
Sealant colour:	Confirm with client

Materials - waterproofing**4.3 LIQUID WATERPROOFING MEMBRANE**

Location:	Where required
Manufacturer:	Dibond
Brand/type:	Construction Chemicals Hydrathane

Spares & maintenance products**4.4 SPARES & MAINTENANCE PRODUCTS**

Refer to the general section 1270 CONSTRUCTION for details of how spares and maintenance products will be handled. Provide the following spares and maintenance products:

Item:	All tile types
Quantity:	1x box
Location:	Refer to 1270 CONSTRUCTION

7120 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC C/AS1-AS2	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS/NZS 4130:2009	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.
Gas (Safety and Measurement) Regulations 2010	
Plumbers, Gasfitters and Drainlayers Act 2006	
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps	

Warranties

1.3 WARRANTY

Provide warranty for:

2 years: For the supply and installation of the plumbing system and fixtures

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Requirements

1.4 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 HOT WATER TEMPERATURES

To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60°C.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:

- 45°C - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 55°C - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

Performance

1.6 TESTING - TO NZBC G12/AS1

Test to NZBC G12/AS1, 7.5, **Watertightness**, for hot and cold water.

- Test to a pressure of 1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.7 TESTING - TO AS/NZS 3500

Test to AS/NZS 3500.1, Section 18, **Testing and commissioning**, for cold water.

- Test reticulation system to a pressure of 1500 kpa for period not less than 30 minutes, to AS/NZS 3500.1, 18.3.1 **Hydrostatic test**. Test storage tanks to AS/NZS 3500.1, 18.3.2 **Storage tanks**.

and

AS/NZS 3500.4, Section 9, **Testing and commissioning**, for hot water.

- Test reticulation system (excluding tanks, water heaters, and some fixtures, valves etc) to a pressure of 1500 kpa for period not less than 30 minutes, to AS/NZS 3500.4, 9.3 **Testing**. Test complete system (including valves, pumps, water heaters etc) under normal working conditions for a minimum of 48 hours, then check visually, to AS/NZS 3500.4, 9.3 **Testing**.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

2 PRODUCTS

Materials

2.1 COPPER PIPE

To [NZS 3501](#) complete with copper-alloy compression fittings or crux type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), Table 1 and [NZBC G12/AS1](#), Table 1.

2.2 POLYBUTYLENE PIPE

Polybutylene tubing to [AS/NZS 2642.1](#), [AS/NZS 2642.2](#) and [AS/NZS 2642.3](#) complete with fittings and accessories brand-matched with durability to [NZBC B2/AS1](#) Durability, table 1 and [NZBC G12/AS1](#), table 1. Protect from sunlight.

2.3 PVC-U PIPE

Complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#) Durability, Table 1 and [NZBC G12/AS1](#), Table 1. Protect from sunlight.

2.4 POLYETHYLENE PIPE

To [AS/NZS 4130:2009](#) Series 1 complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to [NZBC B2/AS1](#), table 1 and [NZBC G12/AS1](#), table 1. Except for solid black PE, protect from sunlight.

2.5 WATER METER

To the requirements of the network utility operator.

2.6 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to [NZBC G12/AS1](#).

2.7 BACKFLOW PREVENTION DEVICES

Provide backflow prevention devices to [AS/NZS 2845.1](#) where it is possible for water or contaminants to backflow into the potable water supply. Refer to [NZBC G12/AS1](#) 3.4 Backflow protection, and [NZBC G12/AS1](#), table 2, Selection of Backflow Protection.

2.8 TEMPERING VALVE

Tempering valve to [NZS 4617](#) to [NZBC G12/AS1](#).

Materials - Hot water heating appliances

2.9 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

To [NZS 4305](#), ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.

Components

2.10 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION

3.1 EXECUTION GENERALLY

Generally carry out the whole of this work and tests to [NZBC G12/VM1](#) or [NZBC G12/AS1](#).

3.2 HANDLE AND STORE

Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE

Flow rates to each outlet to be no less than those given in [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in [NZBC G12/AS1](#), table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE

Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Jointing

3.10 JOINTING COPPER PIPE

Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to [NZBC G12/AS1](#).

3.11 JOINTING POLYBUTYLENE PIPE

Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

3.12 JOINTING PVC-U PIPE

Solvent welded joints using spigots and sockets, flanged joints and seal ring compression joints to [NZBC G12/AS1](#).

3.13 JOINTING POLYETHYLENE PIPE

Seal ring compression joints and electrofusion to [NZBC G12/AS1](#).

Application - Pipework installation

3.14 WATER SUPPLY CONNECTION

Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to [NZBC G12/AS1](#).

3.15 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.16 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to [NZBC G12/VM1](#) or [NZBC G12/AS1](#), table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings.

Lag all pipes with rigid insulation to the manufacturer's requirements and [G12/VM1](#) or [G12/AS1](#).

3.17 EQUIPOTENTIAL BONDING

Earth metallic water supply pipe and metallic sanitary fixtures to [NZBC G12/AS1](#), 9.0.

3.18 IN-LINE FILTER

Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.19 HOT WATER CYLINDER INSTALLATION GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to [NZBC G12/AS1](#), 6.11, Water heater installation. Valve-vented systems to [NZS 4607](#).

3.20 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES

Non-gas (electric, wet-back, solar etc) water heating appliances to be restrained to manufacturer's requirements and [NZBC G12/AS1](#), 6.11, Water Heater Installation.

3.21 INSTALLING HOT WATER PIPE INSULATION

Insulate all hot water pipes to [NZBC H1/AS1](#) Energy Efficiency, [AS/NZS 3500.4](#), section 8.2 Thermal insulation, and to the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs.

3.22 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS

Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with [NZBC G12/AS1](#): 6.11, Valve-vented systems to [NZS 4607](#).

3.23 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to [NZBC G12/AS1](#).

3.24 INSTALL TEMPERING VALVE

Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.25 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Installation - Valves

3.26 INSTALLING BELOW GROUND ISOLATING VALVE

Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.27 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.28 INSTALLING BACKFLOW PREVENTION DEVICE

Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to [AS 2845.3](#) or [NZ Backflow Testing Standard](#).

Completion

- 3.29 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.
- 3.30 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.
- 3.31 REPLACE
Replace damaged or marked elements.
- 3.32 LEAVE
Leave work to the standard required by following procedures.
- 3.33 REMOVE
Remove debris, unused materials and elements from the site.

4 SELECTIONS

Water main

- 4.1 POLYETHYLENE WATER MAIN
Size: 25mm outside diameter (i.e. DN 25 in [AS/NZS 4130:2009](#))

Pipework

- 4.2 COPPER PIPE
Nominal bore: 20, 25, & 32mm
Wall thickness: 1.02mm, 1.22mm
- 4.3 POLYPROPYLENE RANDOM PIPE
Type: PP-R 80
Size: 18mm-32mm outside diameter

Hot water systems

- 4.4 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
Brand: Rheem or Equivalent
Model size: 180L

Valves and accessories

- 4.5 MAIN ISOLATING VALVE
Location: HWC
- 4.6 BACKFLOW PREVENTION DEVICE
Location: As required by NZBC G12
- 4.7 IN-LINE FILTER
Location: As required by NZBC G12

7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES

1 GENERAL

This section relates to the supply and installation of sanitary fixtures, tapware and sanitary accessories.

1.1 RELATED WORK

Refer to 7120 or 7123 HOT AND COLD WATER SYSTEM for hot water cylinders.
Refer to 7420 or 7421 SANITARY SYSTEMS for the supply and fitting of waste disposal pipework.
Refer to the electrical section/s for electrical connection of accessories.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E3/AS1	Internal moisture
NZBC F2/AS1	Hazardous building materials
NZBC G1/AS1	Personal hygiene
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water
NZBC G13/AS3	Plumbing and drainage
AS/NZS 1730	Washbasins
AS/NZS 2023	Baths for ablutionary purposes
AS/NZS 3500.1	Plumbing and drainage - water services
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3662	Performance of showers for bathing
NZS 4223.3	Glazing in buildings - Human impact safety requirements
Plumbers, Gasfitters and Drainlayers Act 2006	

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are to be supplied by the main contractor.

Requirements

1.4 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 SUPPLIER

A specialist in the supply of tapware, and employing experienced architectural representatives available to assist during the course of the installation.

1.6 SAMPLES

Submit samples on request of nominated tapware, along with the relevant manufacturers' technical literature for review.

2 PRODUCTS

2.1 SANITARY FIXTURES

Refer to SELECTIONS for product selection.

2.2 TAPWARE

Refer to SELECTIONS for product selection.

2.3 SANITARY APPLIANCES

Refer to SELECTIONS for product selection.

2.4 ELECTRICAL SANITARY ACCESSORIES

Refer to SELECTIONS for product selection.

3 EXECUTION

Conditions - sanitary fixtures

3.1 DELIVERY

Only deliver to the site fixtures or fittings that can be immediately unloaded into suitable storage or be placed for direct installation.

3.2 STORAGE AND HANDLING

Take delivery of and store components complete with protective casings and coverings in areas that are enclosed, clean and dry and where no work is being done. Remove protection only to the extent that will allow installation.

3.3 QUALITY STANDARDS INCLUDING NZBC G13/AS1

Installation work to comply with [NZBC G1/AS1](#), [NZBC G12/VM1](#), [NZBC G12/AS1](#), [NZBC G13/AS1](#) and the fixture manufacturer's requirements.

3.4 QUALITY STANDARDS INCLUDING AS/NZS 3500.2

Installation work to comply with [NZBC G1/AS1](#), [NZBC G12/VM1](#), [NZBC G12/AS1](#), [AS/NZS 3500.2](#), as modified by [NZBC G13/AS3](#), and the fixture manufacturer's requirements.

3.5 SUBSTRATE

Ensure substrate and fixings will allow work of the specified standard.

3.6 CO-ORDINATION

Do not proceed if the points of supply and drainage services do not match the points of the fixtures without force or distortion.

3.7 INSTALLATION REQUIREMENTS INCLUDING AS/NZS 3500.2

Install to [NZBC G1/AS1](#), [NZBC G12/VM1](#), [NZBC G12/AS1](#), [NZBC E3/AS1](#), [AS/NZS 3500.2](#), as modified by [NZBC G13/AS3](#), and to the fixture manufacturer's installation requirements for each component. Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries and sealants in sequence.

Seal between all sanitary fixtures and wall linings, fixtures and the tops they are in, the tops and wall linings, to [NZBC E3/AS1](#), 3.2.2. Fixtures include baths, basins, tubs or sinks. Tops include, vanities, bath surrounds, sink benches, etc, and there upstands.

3.8 PROVIDE SUPPORT

Confirm fixing points needed for each unit and provide solid blocking at each fixing bracket location.

Conditions - tapware

3.9 RETAIN

Retain tapware in the manufacturer's original packaging and ensure that units are complete with fixings and installation instructions. Label each unit separately with its fitting name and space number.

3.10 STORE

Store tapware packages in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

Conditions - sanitary accessories

3.11 RETAIN

Retain fixtures, fittings and hardware in the manufacturer's original packaging and ensure that units are complete with associated fixings and installation instructions. Label each unit separately to match the submitted and approved schedule.

3.12 PACKAGE

Package fixtures, fittings and hardware units required in clear plastic and label each to match the drawings and the submitted schedule. Place packages in cartons selected for 'level', 'location', and/or 'sector' and label the packages and the cartons similarly.

3.13 STORE

Store items in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

3.14 INSPECTION

Before starting the installation of proprietary items, check relevant spaces and wall and floor finishes for any condition that would not allow the proper installation of any unit. Do not proceed until such conditions have been remedied.

Installation - sanitary fixtures**3.15 INSTALLING TOILET PAN**

Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries/bedding and sealants in sequence. Fit the toilet pan in position, plumb, level, flush and rigid without stressing the attachment points of the component. Fixings to be corrosive resistant. Fit seat.

3.16 INSTALLING CISTERNS

Fit firmly in place and connect the specified cisterns from the supply services through the flush pipes to the relative fixtures in the positions as detailed all plumb and level.

Installation - Basins**3.17 INSTALLING WASHBASINS**

Install to [NZBC G1/AS1](#), [AS/NZS 1730](#). Set basins firmly to walls or vanities as detailed and to comply with [NZBC E3/AS1](#). Connect to supply and drains through trap to the drainage system.

3.18 INSTALLING VANITIES - BLANK TOP

Install in accordance with the manufacturer's requirements. Cut out basin profile to basin manufacturer's template. Make penetrations for supply and drainage. Fix securely with corrosive resistant fixings. Seal top and upstand to wall surface to comply with [NZBC E3/AS1](#).

Installation - Showers**3.19 INSTALLING SHOWER FITTINGS**

Shower waste, mixer and rose to be install to [NZBC G1/AS1](#) and to [AS/NZS 3662](#).

3.20 INSTALLING SHOWER ENCLOSURES AND WALL LININGS

Install in accordance with [NZBC E3/AS1](#). Sit tray firmly in place as detailed, to levels shown and connect to drainage service, ready for following work. Fit screen and door unit to manufacturer's details. Lining materials and finishes to comply with [NZBC E3/AS1](#).

3.21 INSTALLING SHOWER DOOR AND SCREEN

To [NZS 4223.3](#) and to the product manufacturer's requirements. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating.

Installation - Baths**3.22 INSTALLING BATHS**

Install to [NZBC G1/AS1](#). Set firmly in cradle with required points fully supported, level and flush. Connect to supply and drainage services.

Installation - Sinks

3.23 INSTALLING SINK BENCHES

Install in accordance with manufacturer's/supplier's requirements. Connect to supply and drainage services.

3.24 INSTALLING CLEANERS SINKS AND TUB UNITS

Install in accordance with manufacturer's requirements. Connect to supply and drainage services.

Installation - Miscellaneous

3.25 INSTALLING STAINLESS STEEL FIXTURES

Carry out preparatory work and fit elements in position plumb, level, flush and rigid without stressing the attachment points in sequence. Connect to supply and drainage services.

Application - tapware

3.26 GENERAL

To [AS/NZS 3500.1](#) and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with [NZBC G12/AS1](#).

3.27 INSTALLING UNITS

Install each unit in accordance with the proprietary fixture manufacturer's requirements, using the templates and tools supplied or recommended by them. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating. Do not make any modifications to supplied units.

3.28 CUTTING AND FITTING

Where cutting and fitting of the substrate is necessary for installing any unit, carry out this work before the painting or finishing of that surface. Remove any hardware when required for painting, placing it in the packaging or carton originally supplied and returning it to the secure store until ready for re-installation.

3.29 LOCATE

Locate units at heights and/or locations shown on the drawings, or as required to comply with [NZBC G1/AS1](#). For any dimension not shown or known, request direction before proceeding.

Application - sanitary accessories

3.30 INSTALLING ACCESSORIES

Fit specified fittings firmly in place at required dimensions relative to floor and adjoining sanitaryware fittings, all plumb and level.

Completion

3.31 REPLACE

Replace damaged or marked elements.

3.32 PROTECTIVE COVERINGS

Leave fixtures, fittings and accessories clean and unblemished with stickers and protective coverings removed, with supply and drainage connections and all parts fully operating and working. Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.

3.33 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 REFER TO SUPPLIERS SCHEDULE

7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/VM1	Surface water
NZBC G13/AS2	Foul Water
NZBC G13/AS3	Plumbing and Drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
Plumbers, Gasfitters and Drainlayers Act 2006	

1.2 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are To be provided on site by Main Contractor.

1.3 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.4 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

Underground PVC-U pipe to be Classified as follows:

Classification:	Use:
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES

Polyethylene pipes and fittings to [AS/NZS 5065](#).

2.5 PERFORATED PIPE

Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS

To [NZBC G13/AS2](#): 3.3 Gully traps, complete with grating.

2.7 GULLY TRAPS - AS/NZS 3500.2

Gully traps complete with grating to [AS/NZS 3500.2](#), 4.6 Gullies, as modified by [NZBC G13/AS3](#).

2.8 SURFACE WATER SUMP GRATINGS

Cast iron frame with lift-up grating.

2.9 STRIP DRAIN CHANNEL

Proprietary, modular, variable invert, PVC or precast concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings.

2.10 INSPECTION COVERS

Cast iron frame with screw-down cover.

2.11 DRAINAGE AND FILLING MATERIALS

- | | |
|-----------|--|
| Granular: | Clean gravel or crushed stone or a blend of these. Particle size from minimum 7mm to maximum 20mm. |
| Selected: | Fine grain soil or granular material suitable for bedding; excluding topsoil. |
| Ordinary: | Top soil or other excavated materials. |

3 EXECUTION

3.1 TRENCH BACKFILLING MATERIAL - AS/NZS 3500.2

- | | |
|---------------------|---|
| Bedding & surround: | Crushed rock or gravel screenings of nominal size of 7 - 10 mm. |
| Backfill material: | Excavated material from the trench (free from rock, hard matter and organic material) containing no soil lumps larger than 75 mm. |

3.2 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs. Trenches running parallel, below and close to foundations of buildings to [NZS 3604](#) or [NZS 4229](#) to be separated to:

- [NZBC E1/AS1](#), 3.9.7, **Proximity of Trench to Building**, for stormwater and subsoil drains.
- [NZBC G13/AS2](#), 5.6, **Proximity of Trench to Building**, for foul water drains.

3.3 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.4 DRAINAGE GENERALLY

Carry out drainage work and tests to [AS/NZS 3500.2](#) (sanitary drainage) as modified by [NZBC G13/AS3](#), [NZBC G13/AS2](#) (foul water), [AS/NZS 3500.3](#) (stormwater drainage) as modified by [NZBC B1/AS1](#): 6.0. Lay uPVC pipe systems to relevant sections of [AS/NZS 2032](#), [NZS 2566.1](#) and [AS/NZS 2566.2](#). Lay polyethylene pipes and fittings to relevant sections of [AS/NZS 2033](#) and [NZS 2566.1](#).

3.5 DRAINAGE GENERALLY - AS/NZS 3500.2 & NZBC E1/AS1

Carry out this work to [AS/NZS 3500.2](#) and complete all tests to [AS/NZS 3500.2](#), 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations. Carry out stormwater drainage work to [NZBC E1/AS1](#), and complete all tests to [NZBC E1/VM1](#), 8.0 Drain Leakage Tests. Lay uPVC pipe systems to relevant sections of [AS/NZS 2032](#), [AS/NZS 2566.1](#) and [AS/NZS 2566.2](#). Lay polyethylene pipes and fittings to relevant sections of [AS/NZS 2033](#) and [AS/NZS 2566.1](#).

3.6 LAY FOUL WATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

3.7 INSTALL GULLY TRAPS

Set on concrete 50mm above the surrounding ground or paving and brought up to protect the top of the fitting. Trowel off.

3.8 CONSTRUCT GULLY TRAPS - AS/NZS 3500.2

Set in a minimum 100mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to [AS/NZS 3500.2](#), section 4.6, Gullies.

3.9 LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.

3.10 LAY PERFORATED GROUNDWATER PIPING

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.11 FILTER FABRIC TO DRAINAGE MATERIAL

Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.12 INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

3.13 INSTALL SURFACE WATER SUMP

To [NZBC E1/AS1](#), complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.14 INSTALL STORMWATER INSPECTION CHAMBERS

Construct as detailed on a poured concrete footing to [NZBC E1/AS1](#), 3.7, **Access for maintenance**. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.15 INSTALL FOUL WATER INSPECTION CHAMBERS - AS/NZS 3500.2

Construct as detailed on a poured concrete footing to [AS/NZS 3500.2](#), 4.7 **Inspection openings** and 4.8 **Inspection chambers**, as modified by [NZBC G13/AS3](#). Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.16 SOAKHOLES OR TRENCHES

Dispose of stormwater on site as shown on the drawings, by soakage, to suit local geology and soil structure; all as directed by the territorial authority.

3.17 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.18 TESTING

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to [NZBC G13/AS1](#) or [AS/NZS 3500.2](#), 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks. Carry out stormwater drainage work to [NZBC E1/AS1](#), and complete all tests to [NZBC E1/VM1](#), 8.0 Drain Leakage Tests.

3.19 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg.

3.20 DRAINAGE MATERIAL

Free draining crushed stone, 7 mm to 20 mm in size.

3.21 FILTER FABRIC

Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency. The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

4 SELECTIONS

4.1 PVC-U PIPES

Brand/type: As supplied

4.2 PLACING & COMPACTING TRENCH BACKFILLING MATERIAL FOR PVC-U PIPE

Place and rake in bedding material so as to support the pipe once laid.

Embedment material shall be placed uniformly along and around the pipe to ensure uniform density of side support and overlay with no distortion, dislodgment or damage to the pipeline. Following placement, the embedment material shall be compacted in layers to uniformly support the pipe.

Trench fill material shall be placed on the pipe embedment and compacted to fill the trench, with care taken to avoid impact loading of the pipe.

4.3 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

7701 ELECTRICAL BASIC

1 GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting
- electrical automation
- security system
- complete with componentry
- electrically-powered fittings
- fire rated sealers, liners and accessories

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

CFL	compact fluorescent lamp
ELV	extra low voltage
GLS	general lighting service
IP	international (ingress) protection classification
LCD	liquid crystal display
LED	light emitting diode
MCB	miniature circuit breaker
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
RCBO	residual current-operated circuit breaker with over current protection
RCCB	residual current-operated circuit breakers
RCD	residual current device
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1:2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3:2005	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
AS 3786	Smoke alarms
NZS 4514	Interconnected smoke alarms for houses
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60598.2.2:2001	Luminaires - Particular requirements - Recessed luminaires
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 61643	Components for low voltage surge protection devices
Electricity (Safety) Regulations 2010 (Reprint as at 4 April 2016)	
TCF Premises Wiring Code of Practice 2011	

Warranties

1.3 WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year: Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.4 COMPLY

Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2 and TCF Premises Wiring Code of Practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS

Carry out work under the supervision of an electrical licensed supervisor.

1.6 SAFETY OF INSTALLATION - DESIGN BY ELECTRICAL ENGINEER

Before installation work commences obtain from the electrical engineer a Certified Design. The Certified Design is to comply with the Electrical (Safety) Regulations (2010), regulation 58.

1.7 SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN

Before installation work commences provide a Certified Design. The Certified Design is to comply with the Electrical (Safety) Regulations (2010), regulations 58. It must be signed by the designer of the installation.

1.8 ELECTRICAL CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations (2010), prior to connection.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect as required by regulation 70.

1.9 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electrical (Safety) Regulations 2010, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

2 PRODUCTS**2.1 MAINS SUPPLY**

Tough plastic sheathed neutral screened cable to [AS/NZS 5000.2](#) and [AS/NZS 3008.1.2](#), with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to [AS/NZS 5000.2](#), stranded above 1.0mm², and to [AS/NZS 3008.1.2](#). Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm ² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm ² on 16 amp MCBs
Power circuits:	2.5mm ² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm ² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm ² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm ² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to [AS/NZS 3439.3](#), or AS/NZS 61439.3, and installed in accordance with [AS/NZS 3000](#). Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with [AS/NZS 3190](#). MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units. Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.

2.8 HOT WATER SYSTEM SWITCH

One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS

10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to [AS/NZS 3100](#), [AS/NZS 3112](#) and [AS/NZS 3113](#), single or multi gang as detailed.

2.10 SMOKE ALARMS

Type 1 domestic smoke alarm to [NZBC F7/AS1](#). **1.2 Descriptions of alarm systems.** Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class II surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class III surge protection to switched socket outlets.

2.12 CEILING ROSES

White plastic mounting base with screwed cover, manufactured to [AS/NZS 3113](#). Terminal type. Suspended fittings to have sheathed round flexible cord to [AS/NZS 3008.1.2](#). Refer to SELECTIONS.

2.13 BATTEN HOLDERS

Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.14 LIGHT FITTINGS

Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise; integral/non-integral LEDs, reflectors, lenses, heatsinks and drivers - 3,000K to 4,000K, CRI >80, L70.

2.15 RESIDENTIAL RECESSED LIGHT FITTINGS

Residential recessed luminaires to [AS/NZS 60598.2.2](#), types IC-F, IC, CA-80 or CA-135 only.

2.16 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to [NZBC G4/AS1](#), and compliant with [AS/NZS 60335.1](#).

2.17 HEATED TOWEL RAILS

Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with [AS/NZS 60335.1](#), scratch resistant powdercoated or chrome finish.

3 EXECUTION

3.1 MAIN SUPPLY

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX

Fit to meter box manufacturer's and Electricity Retailer's requirements. Recess into external wall in sheltered area and flash to weatherproof to [NZBC E2/AS1 fig 69](#). Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD

Fit to [AS/NZS 3000](#) and board manufacturer's requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION

Install MCBs at distribution board to [AS/NZS3000](#) to protect each final sub circuit.

3.5 EARTH BONDS

Bond together and to earth all plumbing fittings not adequately isolated, to [AS/NZS 3000](#), the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.

3.6 MAIN EARTH

Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.7 EARTH LEAKAGE PROTECTION

Install RCD protection to [AS/NZS 3000](#).

3.8 RCD - DOMESTIC INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to [AS/NZS 3000](#).

3.9 RCD - SPECIFIC INSTALLATIONS

Install 30mA RCDs at the distribution board.

Install fixed wired RCD protected outlets (SRCD) in the following areas:

- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.
- Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.10 SET-OUT

The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.11 CABLING

Install wiring systems to [AS/NZS 3000](#). All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.12 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.13 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer's requirements.

3.14 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer's requirements and as close as practicable to the lamp. Ensure transformers/drivers and rear of light fittings are adequately ventilated and appropriately clear of any building elements, to [AS/NZS 3000](#).

3.15 RECESSED LIGHT FITTINGS - CLEARANCE TO INSULATION

Non-residential applications;

The clearance between insulation and recessed downlights;

- Leave 100mm gap to [AS/NZS 3000](#), figure 4.9
- Provide larger gaps where required by the downlight manufacturer

Residential applications;

- Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#); CA 80, CA 135, IC and IC - F.
- Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides (wrapping around the sides)
- Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- Provide larger gaps where required by the light manufacturer
- In a retrofit situation where the insulation is non-approved or unknown, ensure 100mm clearance from the insulation to [AS/NZS 3000](#), figure 4.9.

3.16 ELECTRIC HOT WATER SYSTEM

For storage heaters, wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end. Hot water cylinders, thermostats and 3000 watt element supplied and fitted under the hot and cold water system section.

3.17 SMOKE ALARMS

Install Type 1 domestic smoke alarm system to [NZBC F7/AS1 3.0 Domestic smoke alarms](#), [NZS 4514](#) and to the alarm manufacturer's requirements. Fit neatly and without damage to the surrounding finish.

3.18 SURGE PROTECTION

Install surge protection devices to manufacturer's requirements and in accordance with [AS/NZS 3000](#) and [AS/NZS 1768](#). When fitting IEC 61643 Class II protection at the switchboard, protect the device by a dedicated MCB.

3.19 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.20 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heated towel rails: Install to manufacturers requirements and installed in accordance with [AS/NZS 3000](#)
- Mirror demisters: Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with [AS/NZS 3000](#) and [NZBC G4/AS1](#).

3.21 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with [AS/NZS 3000](#) and in accordance with the manufacturer's recommendations:

Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems. Refer to drawings for connection points. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches to IP56, and sockets to IP53 as a minimum. Install to manufacturer's specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

3.22 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Completion

3.23 **COMPLETION**

Leave installation operating correctly, with equipment clean and operational.

4 SELECTIONS

Materials

4.1 **SELECTIONS - FITTINGS AND HARDWARE**

Confirm selections of all outlet fittings and hardware with the owner in writing before ordering.