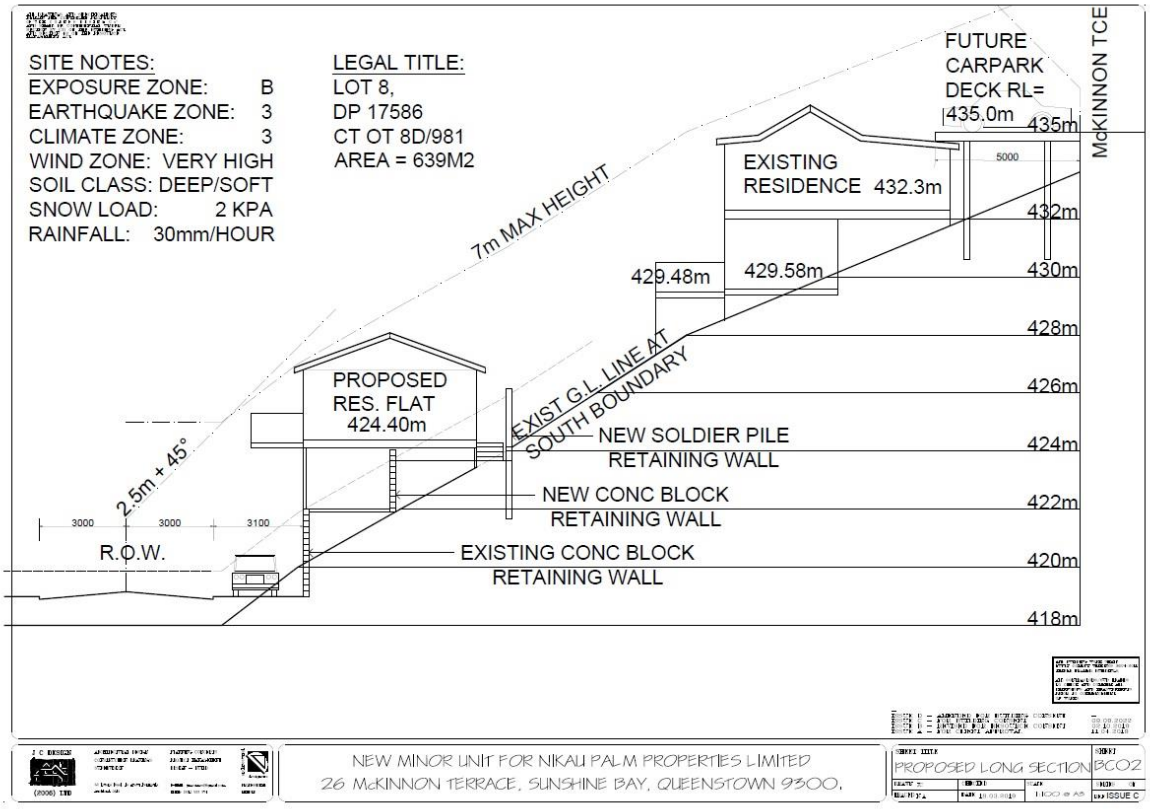
SPECIFICATION of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Proposed New Minor Unit Residence

Project Specification

26 Mckinnon Ave, Sunshine Bay, Queenstown, New Zealand
Project Ref: 220909
Printed: 09 September 2022



Specification built using masterspec software
Masterspec ID: 249219

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
~

1.3 RESTRICTED BUILDING WORK
This project includes Restricted Building Work.

Design Construction Safety

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.

Principal's Health & Safety Matters

1.5 PRINCIPAL'S KNOWN SITE HAZARDS
Site hazards known to the principal are:
~

1.6 PRINCIPAL'S SITE HEALTH AND SAFETY PLAN
Obtain a copy of the principal's site health and safety plan.

Site

1.7 SITE
The site consists of: ~
As shown on drawing: ~

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

1.9 EXISTING SERVICES
The following are the network utility services:
Electrical: ~
Communications: ~
Water: ~
Gas: ~
Stormwater: ~
Foul water: ~

The services are also shown on the drawings.

1.10 SITE FEATURES
~

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: ~

Site environment - Wind

1.12 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 ~ (refer to NZS 3604, table 5.4)

Site environment - Seismic

1.13 EARTHQUAKE ZONE - NON SPECIFIC DESIGN
The zone is to NZS 3604, Section 5 Bracing design, 5.3 Earthquake bracing demand.
The earthquake zone is: ~

Archaeological discovery

1.14 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: -
~

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.

Some schedule sections are identified by the 4 digit CBI (Co-ordinated Building Information) number of the general section that they relate 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.

Other schedule sections that do not share a common CBI number with a general section, have their own unique 4 digit CBI number, followed by the letter "S" followed by a numeral. These schedule sections contain additional subject content relating to the schedules and the identified work sections.

1.2 SCHEDULE SECTIONS

The following Schedule sections are contained within the specification:

1237S1 Schedule of Warranties
1278SR Schedule Of Slip Resistance Testing

1237 WARRANTIES

1. GENERAL

This general section refers to the requirements for warranties/guarantees, referred to within this specification and referred to within separate specifications/documents relating to this project. It includes:
- Warranties for parts of the work required by the principal in a required form
- Installer/applicator warranties for parts of the work in the installer's/applicator's standard form
- Manufacturer/supplier warranties provided with products, appliances and the like in the manufacturer's/supplier's standard form
- Guarantees provided by contractor in the contractor's standard form

These guarantees/warranties are in addition to any warranties, implied warranties, or guarantees that are required by the Building Act, the Building Regulations, or the building consent.

1.1 SCHEDULE SECTION
Refer to 1237S1 SCHEDULE OF WARRANTIES for work sections contained in this specification that have requirements for warranties.

Warranties

1.2 PROVIDE WARRANTIES
Provide executed warranties in favour of the principal in respect of, but not limited to, materials, components, service, application, installation and finishing called for in that specified section of work. The terms and conditions of the warranty in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability under the terms of the warranty called for in that specified section of work.

- Conform to the WARRANTY AGREEMENT form included in the specification/conditions of contract.
- Commence warranties from the date of practical completion of the contract works (unless otherwise stated).
- Maintain their effectiveness for the times stated.
- Provide executed warranties prior to practical completion.

1.3 WARRANTIES - INSTALLER/APPLICATOR
Where installer/applicator warranties are offered covering execution and materials of proprietary products or complete installations, provide such warranties to the contract administrator. These warranties may be provided in lieu of the warranties that are otherwise required provided that these warranties are subject to similar conditions and periods.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

1.4 WARRANTIES - MANUFACTURER/SUPPLIER
Where warranties are offered covering materials, equipment, appliances or proprietary products, provide all such warranties to the contract administrator.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

Submission

1.5 REVIEW BY CONTRACTOR
Obtain the warranties from the installers, applicators, manufacturers and suppliers at the earliest possible date and review to ensure that they are correctly filled out and executed. Where warranties are executed as a deed, ensure that a duplicate copy is provided for execution by the owner/principal. Keep safe and secure until required for submission.

1.6 WARRANTIES - REQUIRED BY BUILDING CONSENT AUTHORITY
Obtain copies of warranties required as a condition of the building consent in the form required for submission to the BCA. Keep safe and secure until required at the time of the BCA final inspection and Code Compliance Certificate.

1.7 WARRANTIES - REQUIRED BY CONTRACT
Obtain copies of warranties listed in the contract documents. Provide all warranties at the same time. If the project has an operations and maintenance documentation provision, present the warranties with the operations and maintenance information. If no operations and maintenance documentation provision exists, present the warranties to the contract administrator in a loose-leaf binder with a contents index suitably labelled and including the project name and details. Provide a title on the binder edge "Warranties for (project name)"

2. SELECTIONS

Project warranties / guarantees

Weathertightness and watertightness warranty

2.1 WEATHERTIGHTNESS AND WATERTIGHTNESS WARRANTY
A warranty is required from the contractor for a minimum period of 2 years, covering the weathertightness of the complete building envelope and the watertightness of all liquid supply and disposal systems and fittings. This general warranty is in addition to any specific warranties required.

Provide this warranty in favour of the principal. The terms and conditions of this warranty in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

- Conform to the standard form WARRANTY AGREEMENT included in the contract documents.
- Commence the warranty from the date of Practical Completion.
- Maintain its effectiveness for the time stated.

1237S1 SCHEDULE OF WARRANTIES

1. GENERAL

This schedule section identifies work sections in the specification that have requirements for warranties.

1.1 ASSOCIATED SECTIONS
Read in conjunction with:
- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1237 WARRANTIES
- Identified Work Sections

Warranties

1.2 WARRANTIES
Refer to the following sections:

4261	Brick Veneer Cladding
4311RI	Roofing Industries Profiled Metal Roofing
4521AR	APL Residential Aluminium Windows & Doors
4554VS	Velux Opening & Fixed Skylights
4610	Glazing Residential
4710	Insulation
5171GI	GIB Intertenancy Barrier Systems
6221	Tiling Systems
6511	Carpeting
6711	Painting Exterior
6721	Painting Interior
7112	Water Storage Tanks
7120	Hot & Cold Water System
7411	Rainwater Spouting Systems
7701	Electrical Basic

1.3 PROJECT WARRANTIES
Refer to section 1237 WARRANTIES for project warranties.

1.4 WARRANTIES - ADDITIONAL ITEMS
Refer to separate documentation for warranties not contained within this specification.

1260 PROJECT MANAGEMENT

1. GENERAL

This general section relates to project management requirements including:
- Meetings
- Reporting
- Cost control
- Communicating and records
- Confidentiality
- Programming
- Hold points and notification points
- Working hours
- Health and safety

Site Meetings

1.1 PURPOSE OF SITE MEETINGS
The purpose of site meetings is to:
- Ensure that the Contractor has all information required to construct the work
- To address and clarify aspects of construction of the work including quality
- To address issues relating to project delivery including, site progress and cost.

1.2 SITE MEETING ATTENDANCE
The following persons to attend:
- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Designer
- Engineer
- Quantity surveyor
- Services consultants when needed
- Subcontractors when needed (contractor to inform them)

1.3 REPORTING
The following reports are required to be presented at site meetings:
Contractor: A detailed status report

1.4 SITE MEETING MINUTES
The contract administrator is to keep full minutes of all site meetings and arrange distribution to all those involved within 3 working days.

The minutes are to record
- Documentation and information issued and required
- Directions and variations issued
- Confirmation of contract insurances
- Programme items
- General business
- Site health and safety
- Payment claim processing including costing variations

Project Control Group (PCG) meetings

1.5 PURPOSE OF PCG MEETINGS
The purpose of PCG meetings is:
- To consider matters arising from the regular site meetings that fall outside of the scope of those meetings.
- To address issues relating to project delivery including quality, programme and cost.
- To allow reporting by consultants.

1.6 PCG ATTENDANCE

The following persons to attend:
- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Engineer
- Quantity surveyor
- Other consultants

1.7 PCG REPORTING

The following reports are required to be presented at PCG meetings:

Contract administrator: A report on matters addressed at the site meetings
Contractor: A detail status report
Consultants: A status report

1.8 PCG MINUTES

The designated person is to keep full minutes of all PCG meetings and arrange distribution to all those involved within 5 working days.

Design meetings

1.9 PURPOSE OF DESIGN MEETINGS

The purpose of design meetings is to:
- consider matters arising from design by the contractor in relation to parts of the work being carried out on a design build or performance specification basis by the contractor.
- review and assess design aspects of such work on other designed parts of the work.
- provide value engineering advice on parts of the work where design changes are required or are being considered to meet the project financial performance requirements.

1.10 DESIGN MEETING ATTENDANCE

The following persons to attend:
- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Designer
- Engineer
- Quantity surveyor
- Other consultants

1.11 DESIGN MEETING MINUTES

The designated design manager is to keep full minutes of all design meetings and arrange distribution to all those involved within 5 working days.

Reporting

1.12 CONTRACTORS DETAILED STATUS REPORT

A contractor's detailed status report is to address the following:
- Progress performance, addressing actual progress against the programme and any variance from the programme.
- Procurement progress on parts of the work being undertaken under a monetary allowance including the time by which direction must be given on monetary allowances to conform to the programme.
- Details of measures being taken to get work back on programme where there has been a delay and details of any future events that will or are likely to affect compliance with the programme.
- Compliance with the issued Building Consent and notification of any work or inspections that have not been passed by the BCA inspector.

- Compliance with the issued Resource Consent and any compliance issues.
- Site health and safety including any notifiable incidents.
- Details of any discrepancies in the contract documents that require clarification or determination
- A list of information requests by the contractor, the date when they were made, the person who they were directed to and the date by which a response is required.
- A variation report including progress on agreed variations, variations to be agreed and anticipated variations and the time implication of variations.
- Variation costing and the adjusted contract price including an assessment of the cost of known and potential variations.
- Review of sums not yet directed for expenditure.

Cash flow estimates

1.13 CASH FLOW ESTIMATES

The contractor is required to submit to the contract administrator a detailed cash flow estimate of all payments to which the contractor considers they will be entitled to under the contract. Where no time is stated in the conditions of contract, provide the cash flow estimate within 20 working days of the date of award of the contract. The contractor shall subsequently submit such revised cash flow estimates at 3 month intervals.

Cost control

1.14 MEASUREMENT

Give reasonable notice to the contract administrator before covering up work which requires to be measured.

1.15 DAYWORK VOUCHERS

To be signed by the contractor's representative as confirming the labour, times and materials used, before being supplied to the contract administrator.

Communicating and records

1.16 MEANS OF COMMUNICATION

Communications between the parties shall be as follows: -

Directions:	In writing delivered by email with a copy by post or hand
Meeting minutes:	In writing delivered by email
RFI's:	(Requests for information) by email or in writing to the contract administrator

1.17 DELIVERY OF COMMUNICATIONS

Deliver communications to the addresses listed in the contract agreement by means as allowed.

Where such addresses are not included in the contract agreement:

- deliver to the addressee by hand; or
- post to the postal address stated in the project directory; or
- deliver to the street address as stated in the Project Directory; or
- send by email to the email address stated in the Project Directory; or
- where agreed, deliver via a file hosting service or an electronic project management system.

1.18 SERVICE OF NOTICES

Serve notices to the addresses listed in the contract agreement by means as allowed.

1.19 CHANGE OF ADDRESS

The principal, contractor and the contract administrator must notify the others if they change their address for delivery or transmission of communications.

1.20 RECORDS

Ensure all records specified are kept, held and collated on site in a form that makes the information easily accessible when it is needed. Distribute copies as and when necessary to those persons entitled under the contract to that information.

1.21 EXISTING STRUCTURES PHOTOGRAPHS
Before commencing work take digital photographs recording existing conditions of existing buildings and structures, including adjacent areas that may be affected by the carrying out of the contract works. Include adjacent roadways and footpaths and neighbouring buildings and the like. Where there is existing damage to adjacent buildings and/or structures, ensure that the photographs adequately record the extent of the damage or failure. Refer to SELECTIONS.

1.22 PROGRESS PHOTOGRAPHS
Take digital photographs recording progress. Refer to SELECTIONS.

1.23 SPECIFIC PHOTOGRAPHS
Take digital photographs recording specified subject matter. Refer to SELECTIONS.

Confidentiality

1.24 CONFIDENTIALITY - PUBLICITY
Unless specifically agreed photographs and other images of the work are not to be used by the contractor, subcontractors, material suppliers and others involved in the construction of the works.

Photographs taken for record purposes may be kept but must not be passed to other persons.

1.25 CONFIDENTIALITY AGREEMENT
Where required as a condition of the contract arrange for workers to provide a confidentially agreement. Workers who have not provided such an agreement shall be excluded from the site.

Programming

1.26 PROGRAMME
Include the proposed sequence of all significant on-site and off-site activities, including any intermediate key dates mentioned in the contract. Identify the critical path. Provide a tabulated schedule of information for each activity in order of:
- brief description
- duration in suitable time unit
- earliest start and latest finish time
- total float
- key dates for the supply of information or materials by others.

Identify the dates by which particular information, material or plant need to be supplied or arranged by the contract administrator. Also identify any constraints which may have been imposed by the programme.

Supply copies of the programme to the following:

Contract administrator	1
Architect	1
Designer	1
Principal	1
Quantity surveyor	1
Site supervisor	1

Monitor the programme by:
- recording progress regularly on the site chart
- informing the contract administrator promptly of any circumstances affecting any part of the programme structure and timing
- reviewing the programme once a month making alterations as needed and agreed to and re-issuing the required copies.

Hold Points and Notification Points
Refer to section 1232 INTERPRETATION & DEFINITIONS for definition of hold points and notification points.

1.27 HOLD POINTS

The following hold points are in addition to hold points nominated in work sections. Notify of hold point work/item, do not to proceed further with work/item until advised to continue.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Hold Point Schedule

Location	Hold Point	Requirement
~	~	~
~	~	~

1.28 NOTIFICATION POINTS

The following notification points are in addition to notification points nominated in work sections. Notify of notification point work/item, continue with the work/item and subsequent work unless advised otherwise.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Notification Point Schedule

Location	Notification Point	Requirement
~	~	~
~	~	~

Working hours

1.29 WORKING HOURS

Work on site is not restricted. Comply with territorial authority consent conditions and noise and nuisance controls.

1.30 WORKING HOURS RESTRICTIONS

Comply with territorial authority consent conditions and noise and nuisance controls, in addition work on site is restricted to:

Weekdays: ~
Saturdays: ~
Sundays: ~
Public holidays: ~

Work outside these hours may be permitted with the contract administrators consent. Allow a minimum of 24 hours notice (in writing) when seeking the contract administrators consent. If the contract administrator consent is given obtain any required permits and permission for such work

Health and safety

1.31 HEALTH AND SAFETY LEGISLATION

Refer to the requirements of the Health and Safety at Work Act 2015. Comply also with all other relevant New Zealand safety legislation.

The Contractor will ensure, so far as is reasonably practicable, that, each subcontractor they engage and each separate contractor is aware of and complies with its obligations under health and safety-related law.

For the purpose of health and safety-related law, the contract administrator and others involved in contract administration and observation and construction monitoring will not at any time have management or control of the Workplace.

1.32 HEALTH AND SAFETY REGULATIONS, CODES AND GUIDES

Comply with:

- Relevant New Zealand safety legislation including, Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, also Health and Safety in Employment Regulations 1995 as amended by that Regulation and the appropriate Health and Safety at Work Regulations.

- WorkSafe publications including "Guidelines for the provision of facilities for general safety in the construction industry".
- Relevant codes of practice, guides, guidelines and standards.

Until further regulations are made under the Health and Safety at Work Act 2015 to cover them, the transitional provisions of the Act continue in force until revoked or amended.

1.33 HEALTH AND SAFETY IMPLEMENTATION

Take all practical steps to make the site and the contract works safe and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the rules governing site safety, are properly supervised and are not unnecessarily exposed to hazards and risks.

Co-operate, consult and co-ordinate health and safety matters with each PCBU including all subcontractors, suppliers, separate contractors, others engaged on the project and others who may be affected by the construction of the works.

Identify any significant hazards and risks.

Maintain proper procedures for dealing with any emergencies that may arise. Immediately investigate accidents, identify their cause and maintain a register of accidents and serious harm. Provide a copy of any report which the contractor is required to make to a public authority on any accident which is associated with carrying out the contract works and results in serious harm to any person.

Refer to individual work sections for detailed requirements on this project.

1.34 SUSPENSION OF HAZARDOUS WORK

On the request of the contract administrator, acting on reasonable grounds, suspend any identified hazardous activities and proceed to eliminate, isolate or minimise them in order to comply with the Act, without prejudice to any other rights of the principal under the contract.

1.35 SITE SAFETY PERSON

Appoint a suitably qualified site safety person to co-ordinate site safety and to attend all site meetings.

1.36 HEALTH AND SAFETY PLAN

Prepare and submit a health and safety plan to the contract administrator before commencing work on site. Include in that plan all people on site and the general public, as well as the following items and any other necessary items:

- identification of existing and potential construction hazards and risks
- Any design construction safety matters identified in section 1220 PROJECT and/or any separate project design construction safety report.
- safety procedures to eliminate, isolate or minimise construction hazards and risks
- the equipment to be used to minimise the hazards and risks
- the maintenance of a register of hazards and risks for the site
- the name and qualifications of the site safety person
- emergency procedures
- first aid facilities and safety equipment
- the methodology for notifying, recording and investigating accidents and injuries.

Advise the contract administrator of unusual or atypical features in the Plan in addition to any features already identified in section 1220 PROJECT and/or any separate project design construction safety report. Keep a copy of the plan in the site office.

1.37 MAINTAIN HEALTH AND SAFETY PLAN

Maintain health and safety plan and alter to accommodate changing situations and /or substitutions. Advise contract administrator of changes.

1.38 COMPLY WITH SITE SAFETY PLAN

Carry out all construction operations in accordance with the submitted health and safety plan.

1.39 INFORM WORKERS OF HAZARDS AND RISKS
Inform workers and others on the site of:
- hazards and risks they may be exposed to while working or other legitimate activities
- hazards and risks they may create while working which could harm others
- how these hazards and risks may be minimised
- emergency procedures
- the location of first aid facilities and safety equipment.

1.40 EXPLOSIVES
Do not use explosives except with the written approval of the territorial authority/WorkSafe. Comply with their safety requirements and use construction blasters holding a current, appropriate Approved Handler Certificate and Controlled Substance Licence issued by WorkSafe, to the Health and Safety at Work (Hazardous Substances) Regulations.

1.41 POWDER-ACTUATED FASTENING TOOLS
Comply with the requirements of WorkSafe and the Health and Safety at Work Act 2015. Powder-actuated fastening tool operators to have the appropriate current Certificate and/or Licence and tools to have the appropriate certificate of fitness if necessary.

2. SELECTIONS

Meetings

2.1 SITE MEETINGS
Frequency: ~
Start date: ~
Time: ~
Venue: ~
Convener: ~

2.2 PCG MEETINGS
Frequency: ~
Start date: ~
Time: ~
Venue: ~
Convener: ~

2.3 DESIGN MEETINGS
Frequency: ~
Start date: ~
Time: ~
Venue: ~
Convener: ~

Photographs

2.4 EXISTING STRUCTURES PHOTOGRAPHS
Copies required: ~
Recipient: ~

2.5 PROGRESS PHOTOGRAPHS
Position: ~
Frequency: ~
Copies required: ~
Recipient: ~

2.6 SPECIFIC PHOTOGRAPHS
Subject matter: ~
Frequency: ~
Copies required: ~
Recipient: ~

1278SR SCHEDULE OF SLIP RESISTANCE TESTING

1. GENERAL

This section relates to the testing of surfaces for slip resistance. It includes:
- test methods and minimum test values required for slip resistance testing.
- general reporting requirements.

This section includes schedules identifying work sections with:
- slip resistant surfaces exempt from testing and slip resistant surfaces that have been tested and comply with NZBC D1/AS1 requirements for testing.
- surfaces that require slip resistance testing.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:
- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- Work sections identified in the schedule(s)

1.2 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:

BPN	British Pendulum Number
COF	Coefficient of friction
SDV	Slope design value
SRV	Slip resistance value

Documents

1.3 DOCUMENTS

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

NZBC D1/AS1 Access routes
AS 4586 Slip resistance classification of new pedestrian surface materials

Slip resistance - surfaces not requiring testing

1.4 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces on access routes that do not require testing for slip resistance include surfaces identified in NZBC D1/AS1, Table 2 as acceptable. These surfaces are covered in the following Work sections:

6221 Tiling Systems

1.5 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE

There are no work section requirements.

Slip resistance - surfaces requiring testing

1.6 SLIP RESISTANCE - SURFACES REQUIRING TESTING

There are no work section requirements.

1.7 TEST METHODS & MINIMUM TEST VALUES

Refer to tables below for test methods and minimum test values required for the stated test condition.

Test condition:	Minimum test value required:	Test method:
Level access wet	39 SRV	Wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
Sloping access wet	Refer to sloping access wet table below, select BPN value for stated slope.	Wet pendulum test method of AS 4586, Appendix A

Stairs wet - with slip resistant nosings	39 SRV	Wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
Stairs wet - without slip resistant nosings	50 BPN	Wet pendulum test method of AS 4586, Appendix A
Wet areas primarily used barefoot	“B” Classification	Obtain classification from the ramp method of AS 4586, Appendix C
Level access dry	0.4 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Sloping access dry	Refer to sloping access dry table below, select COF value for stated slope.	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Stairs dry - with slip resistant nosings	0.4 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Stairs dry - without slip resistant nosings	0.525 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Contaminated walking surfaces	R~	Obtain classification from the oil-wet inclining platform test method of AS 4586, Appendix D

Sloping access wet - minimum test values required for a given slope

Minimum test value required (SDV)	Maximum gradient	Maximum slope in degrees
42 BPN	1 in 39	1.5°
43 BPN	1 in 29	2.0°
44 BPN	1 in 23	2.5°
45 BPN	1 in 20	3.0°
45 BPN	1 in 17	3.5°
46 BPN	1 in 15	4.0°
47 BPN	1 in 13	4.5°
48 BPN	1 in 12	5.0°
49 BPN	1 in 11	5.5°
50 BPN	1 in 10	6.0°

Sloping access dry - minimum test values required for a given slope

Minimum test value required (COF)	Maximum gradient	Maximum slope in degrees
0.433	1 in 39	1.5°
0.444	1 in 29	2.0°
0.455	1 in 23	2.5°
0.466	1 in 20	3.0°
0.477	1 in 17	3.5°
0.488	1 in 15	4.0°
0.499	1 in 13	4.5°
0.504	1 in 12	4.76°
0.521	1 in 11	5.5°
0.525	1 in 10	5.7°
0.543	1 in 9	6.5°
0.557	1 in 8	7.125°

1.8 GENERAL REPORTING REQUIREMENTS

Provide slip resistance test results to the contract administrator, including a statement that the tested surface meets or exceeds the nominated minimum test value. Refer to individual work sections for additional requirements. If no time is nominated for the submission of test results in the work section, then provide test results prior to practical completion.

If testing identifies a failure to meet performance requirements, notify the contract administrator and manufacturer/supplier. Consult with the manufacturer/supplier to identify the cause, then correct the failure and repeat the test.

Slip resistance - additional items

1.9 SLIP RESISTANCE - ADDITIONAL ITEMS
Refer to separate documentation for slip resistance requirements not contained within this specification.

2210 PREPARATION & GROUNDWORK

1. GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:
- footings and floor slabs
- backfilling behind basement retaining walls

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
WorkSafe	Good Practice Guidelines - Excavation Safety

1.2 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:

Manufacturer/supplier contact details;

Company:	~
Web:	~
Email:	~
Telephone:	~

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

1.4 ARCHAEOLOGICAL DISCOVERY
If fossils, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

2. PRODUCTS

2.1 EXCAVATED CLEAN FILL
Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

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

2.3 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.

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

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

2.6 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.

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

2.8 FREE-DRAINING AGGREGATE
Scoria or crushed gravel graded 50 to 14 clean.

3. EXECUTION

3.1 WASHOUT BAY FOR TRUCK
Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY
Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe, Good Practice Guidelines - Excavation Safety.

3.3 BURNING OF MATERIALS
Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK
Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained.

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 ROCK EXCAVATION
If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.11 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.

3.12 INADEQUATE BEARING
If localised 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:
- Below slabs on grade: Hardfill compacted in 150mm layers
- Below footings: 10 MPa concrete

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.
Confirm any changes with the territorial authority.
For inadequate bearing or over excavation of service trenches, use hardfill compacted in 150mm layers.

3.13 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.

3.14 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.

3.15 GENERAL BACKFILLING
Obtain written confirmation from the owner before using any excavated material.
Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.16 RETAINING WALLS
Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.17 SURPLUS MATERIAL
Remove surplus and excavated material from the site.

2310 FOUNDATIONS

1. GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.

1.1 RELATED WORK
Refer to ~ for ~.

Documents

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

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3605	Timber piles and poles for use in buildings
NZS 3603	Timber structures standard

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Manufacturer/supplier contact details
Company: ~
Web: ~
Email: ~
Telephone: ~

Performance

1.4 INSPECTIONS
Give notice to Engineer and contract administrator, at least 24 hours prior to foundation inspection being required. At inspection foundation to be clear of obstructions like, backfill, site concrete and reinforcing.

2. PRODUCTS

2.1 CONCRETE PILES IN SITU
To NZS 3604 for concrete, reinforcement, footing and type.

2.2 TIMBER SUB-FLOOR FRAMING
Species, grade, moisture content in service and level of treatment as set out in NZS 3602. Grading to NZS 3603 and treated to NZS 3602, table 1C.

2.3 NAILS
Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.

2.4 BOLTS
Steel, stainless steel, and galvanized steel to NZS 3604.
Refer to SELECTIONS.

2.5 NAIL PLATES
Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

2.6 CORROSION RISKS
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).

2.7 CONCRETE
For piles and footings, 17.5 MPa prescribed mix concrete to NZS 3104, section 3, and cover to reinforcing to NZS 3604, 4.5.1, generally 50mm, against ground 75mm. Provisions for prescribed mix concrete, and NZS 3604, section 6.4.5, Pile footings.

3. EXECUTION

3.1 FOUNDATIONS GENERALLY
Comply with NZS 3109, 3602 and NZS 3604 except as varied by 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 EXCAVATIONS
Refer to 2210 PREPARATION AND GROUNDWORK.

3.3 INSTALL CONCRETE PILES IN SITU
Box for, reinforce and pour in 17.5 MPa concrete the footings and piles in the various types to NZS 3604.

3.4 SUB-FLOOR FRAMING
Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6, **Foundation and subfloor framing**.

4. SELECTIONS

4.1 PILES
Brand/type: ~

4.2 TIMBER SUB-FLOOR FRAMING

Member	Size	Centres	Species / grade	Treatment
Timber piles:	125 x 125mm square or 140mm dia. round, minimum		Pinus Radiata	H5 CCA (preservative code 01 or 02)
Sub-floor framing:	~			
Jack studs:	~			
Bearers:	~			

4.3 NAILS
Material < 600mm from ground: Stainless steel
Material > 600mm from ground: ~
Location: ~

4.4 BOLTS
Material < 600mm from ground: Stainless steel
Material > 600mm from ground: ~
Location: ~

4.5 NAIL PLATES
Brand/type: ~
Material < 600mm from ground: Stainless steel
Material > 600mm from ground: ~
Location: ~

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2361 STRIP FOOTINGS

1. GENERAL

This section relates to the supply and installation of concrete strip footings of non-specific design to NZS 3604 and NZS 4229, including;
- formwork, reinforcement, concrete mixes and the placing of concrete

1.1 RELATED WORK
Refer to ~ for ~

Documents

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

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3121	Water and aggregate for concrete
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4431	Code of practice for earth fill for residential development
AS/NZS 4671	Steel reinforcing materials
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls

Requirements

1.3 QUALIFICATIONS
Concrete workers to be experienced, competent and familiar in the fabrication and erection of formwork and with the materials and the techniques specified.
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 QUALITY RECORDS
Do not place concrete/grout until all excavations, formwork/blockwork and reinforcing have been inspected and passed by the Building Consent Authority.

2. PRODUCTS

2.1 NORMAL CONCRETE
Normal concrete 17.5, 20 or 25 MPa grade (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Retain delivery dockets listing mix and despatch details.
Mass concrete 10 MPa grade.

2.2 REINFORCEMENT
To AS/NZS 4671 Grade 300E deformed mild steel except for ties in plain round mild steel and as detailed.

2.3 TYING WIRE
Mild drawn steel wire not less than 1.2mm diameter.

2.4 WATER
To NZS 3121. Water from a territorial authority/NUO water supply is acceptable.

2.5 SPACERS AND CHAIRS
Precast concrete or purpose made moulded PVC.

3. EXECUTION

3.1 STORAGE

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 SOIL BEARING

To NZS 3604 or NZS 4229, Section 3, **Site Requirements**.
All soil bearing surfaces of footings shall be horizontal and may be stepped to accommodate variations in cleared ground level. Bearing shall be upon solid bottom in undisturbed good ground to NZS 3604 or NZS 4229, or firm fill with a "Statement Of Suitability...." to NZS 4431.

3.3 DEPTH OF FOOTINGS

As shown on drawings with minimum depth of footings below cleared ground level, to NZS 3604 or NZS 4229, clause 3.4.2.
- 200mm.

3.4 MASS CONCRETE SUB FOOTING

Where good ground is greater than 600mm deep, 10 MPa mass unreinforced concrete can be used to fill up from the good ground to the required depth of the footing, to NZS 3604 or NZS 4229, clause 3.4.1. Refer to SELECTIONS for minimum dimensions.

3.5 WIDTH OF FOOTINGS

Footing to be centred on foundation wall above. Refer to drawings or SELECTIONS for minimum dimensions.

3.6 REINFORCEMENT

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.
Longitudinal reinforcing and ties, refer to SELECTIONS for size and quantity.
Stepped footings to NZS 4229, at least 50% of the lower footing reinforcement shall be turned up the step to a minimum of 450mm beyond the rebar intersection, and at least 50% of the upper footing reinforcement shall be carry on into the lower foundation wall to a minimum of 450mm (350 with hook) beyond the rebar intersection.

3.7 REINFORCING LAPS

To NZS 3604, 6.11.7, **Foundation wall reinforcement.** Horizontal reinforcing bars lapped 500mm minimum.
To NZS 4229, 6.6.3, 40 diameter laps for deformed bars.
Tie all lapping bars to each other.

3.8 STARTER BARS

Vertical starter reinforcement to NZS 4229, to match vertical wall reinforcement in size, type, location and spacing. Starters to penetrate foundation wall by 600mm minimum, and in the footing to be bent through 90° and tied to longitudinal reinforcing.

3.9 COVER

Minimum cover 75mm.

3.10 OPENINGS

Footings to be continuous under openings unless shown otherwise.

3.11 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to, NZS 3109: **7.4 Handling and placing** and **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.

Completion

3.12 PROGRESSIVE CLEANING
Clean off concrete spills as they occur, making good any damage at the same time.

3.13 FINAL CLEANING
Clean down exposed walls and remove waste material from adjoining surfaces at completion.

3.14 REMOVE
Remove from the site materials not used.

4. SELECTIONS

4.1 CONCRETE
Normal concrete: 17.5 MPa

4.2 MASS CONCRETE SUB FOOTING
Concrete strength: 10 MPa
Minimum width: ~mm
Minimum height: ~mm

4.3 FOOTING SIZE AND REINFORCING
The following are minimum requirements.
Location: ~
Footing width: ~mm
Footing height/depth: ~mm
Longitudinal steel: ~ / D~
Stirrups: R6 ties @ 600mm centres minimum (to NZS 4229 table 6.2)

2362 FOUNDATION WALLS

1. GENERAL

This section relates to the supply and installation of concrete and concrete masonry foundation walls to NZS 3604, including;
- formwork, reinforcement, concrete mixes and the placing of concrete
- concrete masonry, mortar, reinforcement and grouting
- separate concrete masonry foundation walls supporting concrete slabs

1.1 RELATED WORK
Refer to 2361 STRIP FOOTINGS for simple strip footings.
Refer to the appropriate timber framing section for sub-floor timber framing.
Refer to ~ for ~

1.2 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

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

NZBC B1/AS1	Structure
NZS 3101.1	Concrete structures standard
NZS 3103	Sands for mortars and plasters
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
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
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials

Requirements

1.4 QUALIFICATIONS - MASONRY WORK
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 4210. All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying : Structural Masonry. RBW must be supervised by an LBP. Concrete workers to be experienced, competent and familiar with the materials and the techniques specified.

1.5 CONSTRUCTION CONTROL MASONRY
Supervise masonry construction to NZS 4230, table 3.1, Observation Type C, admissible use and nominal strengths. Keep records of materials to NZS 4210, 2.4.2.
The mason is to certify in writing to the owner that the masonry observation and work has been carried out in accordance with the relevant NZ Standards. Provide a Producer Statement - Construction (PS3).

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 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 concrete/grout until all excavations, formwork/blockwork and reinforcing have been inspected and passed by the Building Consent Authority.

2. PRODUCTS

General

2.1 REINFORCEMENT
To AS/NZS 4671, 300E deformed mild steel except for ties in plain round mild steel and as detailed. Refer to Concrete section for reinforcing for slabs.

2.2 TYING WIRE
Mild drawn steel wire not less than 1.2mm diameter.

2.3 WATER
To NZS 3121. Water from a territorial authority/NUO water supply is acceptable.

Concrete masonry

2.4 MASONRY UNITS
To AS/NZS 4455.1.

2.5 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 of not less than 12.5 MPa.

2.6 GROUT
To NZS 4210, section 2.3, **Grout**.

3. EXECUTION

General

3.1 GENERAL PARAMETERS
Foundation walls to NZS 3604, 6.11**, Foundation walls....** and masonry foundation walls under slabs to NZS 3604, 7.5, **Concrete slab-on-ground floors .....** and NZBC B1/AS1, 3.0 **Timber**.

3.2 STORAGE
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 STARTER POSITIONS
Before commencing , check the location of starter reinforcement. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding.

3.4 REINFORCEMENT
Reinforce walls to NZS 3604, **6.11 Foundation walls....**
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.

3.5 REINFORCEMENT LAPS
To NZS 3604, 6.11.7, **Foundation wall reinforcement**. Horizontal reinforcing bars lapped 500mm minimum.
To NZS 4229, 6.6.3, 40 diameter laps for deformed bars.
Tie all lapping bars to each other.

3.6 COVER
Cover for reinforcement to NZS 3604, 4.5.1 for minimum concrete cover and NZS 3604, 4.5.3 for concrete masonry. For general purpose minimum 50mm cover, or varied to suit exposure conditions. Minimum cover 75mm for walls against earth.

3.7 OPENINGS
Reinforcing around openings to NZS 3604, 6.11.7.3, for opening over 300mm wide and for concrete or masonry lintels up to 600mm wide.
Form 600mm wide subfloor access point as shown on the drawings.

3.8 BRACING
Provide adequate temporary lateral bracing to ensure stability until the final supporting construction is in place and has cured sufficiently.

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

3.10 PROPRIETARY FIXINGS FOR WALL PLATES AND BOTTOM PLATES
Allow for proprietary plate fixings/anchors and install to manufacturer's instructions, as stated in SELECTIONS or as shown on the drawings.
Locate fixings to NZS 3604, 7.5.12.2, within 150mm of the ends of the plate, and maximum 900mm centres or 600mm centres for slab edges of masonry header blocks. Ensure subfloor braces have at least 2 x fixings per length of plate. All braced elements to manufacturer's specific requirements.
Drilled in expanding bolts are generally not acceptable.

Concrete masonry

3.11 MASONRY CONSTRUCTION GENERALLY
To NZS 4210 and NZS 3604, **6.11 Foundation walls (concrete and concrete masonry)**. Minimum wall widths, 140mm single storey and 190mm for 1 to 2 storeys and masonry veneer. Wall widths are also subject to minimum reinforcing cover requirements, refer COVER.

3.12 DURABILITY
Ensure that, mortar, built in components and reinforcement cover are to NZS 4210, table 2.E1 Masonry durability requirements, for the location and the Exposure Zone in the general section 1220 PROJECT. To use the table, exposure zones in NZS 3604 comparable with NZS 3101.1 (in brackets) are;
Zone D (B2), Zone C (B1), Zone B (A2), Closed Interior (A1), Walls against earth (B2), Geothermal hotspots (U), and NZBC E2/AS1 Zone E (C).

3.13 MOISTURE CONTENT
Store masonry units clear of the ground, under cover and well ventilated until placed in the work. Ensure masonry units are air dry prior to laying.

3.14 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.

3.15 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.

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

3.17 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. Cut masonry, if necessary, true and square without chipping.
Mortar joints not exceeding 10mm thick, or less than 8mm when the units are bedded in. Joints tooled concave, unless detailed otherwise.

3.18 VERTICAL CONTROL JOINTS
Locate at major changes of wall height or thickness, at openings, and at not more than the centres scheduled below to NZS 4210 2.10.1.2(c), or, as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on NZS 4210, figure 2, Control joint, unless specifically detailed otherwise.

Spacing of control joints schedule

HEIGHT OF WALL	HORIZONTAL SPACING OF JOINTS
up to 800mm	24m maximum
up to 1.2m	12m maximum
up to 2m	8m maximum

3.19 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.

3.20 GROUT CELLS
Grout all masonry unit cells.
Use procedures set out in NZS 4210. Methods acceptable on this project are:
- high lift grouting with expansive admixture
- high lift grouting with reduced compaction, without expansive admixture
- low lift grouting.

Completion

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

3.22 FINAL CLEANING
Clean down exposed walls and remove waste material from adjoining surfaces and floors at completion.

3.23 REMOVE
Remove from the site materials not used.

4. SELECTIONS

General

4.1 FIXING BOTTOM PLATES FOR WALLS
Location: ~
Type/brand: ~

Material: ~

Concrete masonry

4.2 MASONRY UNITS
Brand: ~
Width: ~mm
Bond: Stretcher
Mortar joint: Concave

4.3 GROUT MASONRY
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.

3101 CONCRETE WORK - BASIC

1. GENERAL

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

1.1 RELATED WORK
Refer to ~ for ~

1.2 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

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

NZBC B1/AS1	Structure
NZBC 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

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents relating to this part of the work:
~

Manufacturer/supplier contact details

Company:	~
Web:	~
Email:	~
Telephone:	~

Requirements

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

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.

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.

2.5 DAMP-PROOF MEMBRANE
0.25mm minimum polyethylene to NZS 3604, 7.5.4, Damp-proof membrane.

2.6 CELLULAR POLYSTYRENE INSULATION
Proprietary expanded polystyrene (EPS) foam board to AS 1366.3.

Accessories

2.7 WATERPROOFING FOR EXTERIOR OPENINGS
Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings to CCANZ CP 01. Refer to SELECTIONS.
Do not use bituminous coatings.

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 FALSEWORK AND FORMWORK
Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 INSTALL DAMP-PROOF MEMBRANE
Apply polythene membrane to prepared basecourse with 150mm laps between sheets. Tape seal laps and penetrations with 50mm wide pressure sensitive plastic tape. Refer to drawings for perimeter details.

3.4 INSTALL CELLULAR POLYSTYRENE INSULATION
Install EPS insulation system to manufacturer's requirements.

3.5 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.

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

3.7 TOLERANCES, BENDING
To NZS 3109, 3.9, Tolerances for reinforcement.

3.8 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.

3.9 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).

3.10 REINFORCEMENT COVER TO NZS 3101.1
Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101.1, table 3.6, **Minimum required cover for a specified intended life of 50 years**. Sub-soil cover to NZS 3101.1, to suit soil and groundwater conditions. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.11 EQUIPOTENTIAL BONDING REINFORCING
If it is a project requirement, ensure that reinforcing is electrically equipotential bonded (or at least conductor cable attached) before the concrete is poured. For bonded reinforcing ensure all reinforcing is interconnected with good contact at joints and tight conductive ties.

3.12 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.

3.13 CONSTRUCTION JOINTS
Locate and construct as shown on the drawings or in accordance with NZS 3109, 5.6, Type B.

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

3.15 SURFACE FINISHES
To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.16 CONCRETE SURFACE TOLERANCES
To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.17 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.

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

3.19 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 ºC, and 48 hours for average ambient temperatures below 20ºC).

3.20 SAW CUTS
Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring.

3.21 SPACING OF SAW CUTS
Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m
Carpet on underlay flooring	6m

3.22 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.

3.23 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.

3.24 STRIKE FORMWORK
Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.25 WATERPROOFING EXTERIOR OPENINGS

Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.

Provide temporary protection from direct sunlight.

3.26 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.27 REMOVE

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

4. SELECTIONS

4.1 DAMP-PROOF MEMBRANE

Brand/type: ~

4.2 CELLULAR POLYSTYRENE INSULATION

Brand: ~
Grade: S grade
Thickness: ~mm

4.3 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

4.4 NORMAL CONCRETE

Normal concrete:
17.5 MPa: for ~

4.5 SURFACE FINISHES FLOOR SLABS

Surface finish class to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

Finish class	Location
U3	~

4.6 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	~

4.7 WATERPROOFING FOR EXTERIOR OPENINGS

Location: ~
Brand/name: ~
Type: Quick curing elastomeric unreinforced waterproofing membrane to AS/NZS 4858

4.8 WEATHERTIGHTNESS SYSTEM

The weathertightness system is covered in the following section:
~

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 RELATED WORK
Refer to 2361 STRIP FOOTINGS for simple strip footings.
Refer to ~ for ~

1.2 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

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

NZBC B1/AS1	Structure
NZBC 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
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls

1.4 MANUFACTURER DOCUMENTS
Manufacturer and supplier documents relating to work in this section are:
~

Copies of the above literature are available from ~

Company:	~
Web:	~
Email:	~
Telephone:	~

Requirements

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 TESTS
Carry out all required tests in accordance with NZS 4210: appendix 2A, Compressive strength tests for mortar and grout.

1.10 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

1.11 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
Grade 500E 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, with minimum compressive strength of 17.5 MPa.

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 EQUIPOTENTIAL BONDING REINFORCING
If it is a project requirement, ensure that reinforcing is electrically equipotential bonded (or at least conductor cable attached) before laying/grouting. For bonded reinforcing ensure all reinforcing is interconnected with good contact at joints and tight conductive ties.

3.10 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**.

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

3.12 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.

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

3.14 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.

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

3.16 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.

3.17 GROUT CELLS
Grout all masonry unit cells.

3.18 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.

3.19 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**.

3.20 MORTAR-IN COMPONENTS
Mortar-in components such as sills, copings, lintels, and steps, as work proceeds.

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

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

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

3.24 REMOVE
Remove from the site materials not used.

4. SELECTIONS

4.1 DURABILITY - PROJECT REQUIREMENTS
Refer to clause DURABILITY.
Location: ~
Exposure Zone: ~
Mortar mix: ~ to NZS 4210 2.2.2.1
Components: ~
Rebar cover: ~ (~)mm

4.2 MASONRY UNITS
Brand: ~
Width: ~mm
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: ~
Joint profile: Concave
Mortar colour: ~

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 ~ for ~.
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 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
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 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents relating to this part of the work:
~

Manufacturer/supplier contact details
Company: ~
Web: ~
Email: ~
Telephone: ~

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

1.5 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 ENGINEERED WOOD
LVL members to AS/NZS 4357.0, to required sizes and lengths and the manufacturer design properties.
Treatment to NZS 3640 and AS/NZS 1604.1.

2.3 TIMBER TRUSSES
To FTMA CoP. Moisture content 16% at supply.

2.4 WALL DWANGS, NOGS AND BLOCKING
If dwangs, nogs or blocking is required for exterior insulated walls, ensure they are not full depth of framing. Install flush with face of wall required, leaving a minimum 20mm or 45mm preferable gap to the other face to NZS 3604, 8.8. Dwangs and nogs if required to be at 1350mm centres maximum to NZS 3604, 8.8.

2.5 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.

2.6 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL
Extruded polypropylene battens, size approximately 45mm wide x 18mm thickness. Temporary fix battens before being fixed into the framing with the cladding fixings. To the scope limitations of NZBC E2/AS1, and NZS 3604 Building Wind Zones up to, and including "Extra High".

Components

2.7 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.

2.8 SCREWS
Wood screws to the requirements of NZS 3604, 2.4 Fastenings and Fabrication, and section 4, **Durability**, and of the type, number and form required for each screw application to NZS 3604, sections 6 - 10.

2.9 BOLTS AND COACH SCREWS
Bolts and coach screws complete with washers, to the requirements of NZS 3604, clause 2.4.5 Bolts and Coach Screws, and section 4, **Durability**, and of the type, number and form required for each particular junction to NZS 3604, sections 6 - 10.

2.10 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.

2.11 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.

2.12 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).

2.13 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

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

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

3.8 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**.

3.9 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**.

3.10 INSTALLING WALL UNDERLAYS
Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.11 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.).

3.12 DPC TO LOSP TREATED TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.13 DPC TO TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4. SELECTIONS

4.1 FLOOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Mid floor joists:	Radiata pine	SG8	H1.2
Boundary 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
Nogs	Radiata pine	SG8	H1.2
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
Proprietary - non structural:	Manufacturer ~	Type ~	Reference ~
Cavity closer:	Manufacturer ~	Type ~	Reference ~

4.4 ROOF FRAMING - RADIATA PINE

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 INTERIOR FRAMING - RADIATA PINE

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

4.6 SPECIAL FRAMING ELEMENTS

Member	Species	Grade	Treatment
~			

4.7 LAMINATED VENEER LUMBER (LVL)

Member	Brand/type	Treatment
~	~	~

4.8 NAILS

Location	Type	Material	Finish
~			

4.9 SCREWS

Location	Type	Material	Finish
~			

4.10 BOLTS AND COACH SCREWS

Location	Type	Material	Finish
~			

4.11 NAIL PLATES

Location	Type	Material	Finish
~			

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

1.1 RELATED WORK
~

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 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

1.3 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Performance

1.4 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 FIXINGS TO TIMBER CLADDINGS
~

3.7 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.

3.8 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.

3.9 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.

3.10 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.

3.11 INSTALL FLASHINGS
Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1.

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

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

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

4. SELECTIONS

4.1 CAVITY BATTENS
Timber species: ~
Timber grade: ~
Treatment: H3.1 (non-structural)

4.2 CAVITY CLOSER/VERMIN-PROOFING
Brand/type: ~
Material: ~

4.3 TIMBER WEATHERBOARD
Location: ~
Size/profile: ~
Species and grade: ~
Treatment ~
Priming ~

4.4 FIBRE-CEMENT SOFFIT LINING
Brand/type: ~
Thickness: ~mm
Finish: ~

4.5 TIMBER FASCIAS AND BARGE BOARDS

Species and grade: ~
Treatment: ~
Width: ~mm
Priming: ~

4.6 EXTERIOR FINISHING TIMBER

Species and grade: ~
Treatment: ~
Location: ~
Priming: ~

4.7 PVC JOINTERS

Brand: ~
Profile/type: ~
Colour: ~

4.8 NAILS, SCREWS AND FASTENINGS

Cladding	**Fixing/fastening (metal/finish)**	**Fixing/fastening (type, gauge and length)**	**Centres (general and edge)**
~			

4.9 FLASHINGS

Location	**Material/ thickness**	**Base metal thickness**	**Finish**
~			

4.10 COVERS AND TRIMS

Location	**Material/ thickness**	**Base metal thickness**	**Finish**
~			

4261 BRICK VENEER CLADDING

1. GENERAL

This section relates to clay brickwork as a veneer cladding.
It includes:
- Standard brick veneer cladding
- Proprietary two storey brick veneer system
- Proprietary stack bonded brick veneer system

1.1 RELATED WORK
Refer to ~ for ~.

1.2 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:

CB&PMA	New Zealand Clay Brick & Paver Manufacturer's Association
NZMTA	New Zealand Masonry Trades Association
BBFNZ	Brick and Blocklayers Federation of New Zealand

The following definitions apply specifically to this section:

Proprietary Two Storey Brick Veneer System	Proprietary system for two storey clay brick veneer construction as contained in BRANZ Appraisal 690 - Two Storey Brick Veneer System.
Proprietary Stack Bonded Brick Veneer System	Proprietary system for stack bonded clay brick veneer construction as contained in BRANZ Appraisal 1045 - Stack Bonded Brick Veneer System.

Documents

1.3 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 B1/AS3	Structure
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry construction - Wall ties
AS/NZS 2699.3	Built-in components for masonry construction - Lintels and shelf angles (durability requirements)
AS/NZS 2918:2001	Domestic solid fuel burning appliances - Installation
NZS 3103	Sands for mortars and plasters
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: materials and workmanship
SNZ HB 4236	Masonry veneer wall cladding
AS/NZS 4455.1	Masonry units, pavers, flags and segmental retaining wall units - Masonry units
BRANZ Appraisal 690	Two Storey Brick Veneer System
BRANZ Appraisal 1045	Stack Bonded Brick Veneer System
BRANZ	Good practice guide: Masonry veneer
CB&PMA TB1	Design Note TB1 Two Storey Clay Brick Veneer Construction - Made Easy
CB&PMA TB2	Design Note TB2 Specification For The Stack Bond Brick Veneer System
ASTM D6134	ASTM D6134 / D6134M-07(2019)e1, Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Manufacturer/supplier contact details
Company ~
Web: ~
Email: ~
Telephone: ~

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty for:
~ years: For ~

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

Refer to the general section WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER
Provide an installer warranty for:
~ years: For ~

Provide the warranty on the installer's standard form.
Commence the warranty from the date of practical completion of the contract works.

Refer to the general section WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS
Bricklayers to be experienced, competent and familiar with the materials and the techniques specified.
All work to be installed or supervised by a Registered Master Mason or Licensed Building Practitioner (LBP): Licensed for Bricklaying and Blocklaying 1: Brick/masonry Veneer.
RBW must be supervised by an LBP.

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

Compliance information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE
Provide the following compliance documentation:
- Producer Statement - Construction from the installer of proprietary brick veneer systems.
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.10 DESIGN PARAMETERS - NON SPECIFIC DESIGN - EARTHQUAKE
Design the installation to the seismic parameters of NZS 4210 Masonry construction: materials and workmanship.
Refer to SELECTIONS for details.

1.11 COMPLIANCE - TWO STOREY BRICK VENEER SYSTEM
Brickwork to comply with BRANZ Appraisal 690 - Two Storey Brick Veneer System

2. PRODUCTS

Materials

2.1 CLAY BRICKS
To AS/NZS 4455.1.

2.2 VERMIN PROOFING
Either:
- Proprietary plastic weephole vents built into open perpends.
- Galvanized hexagon 10 mm mesh of 1 mm diameter steel wire 100 mm wide, complete with galvanized steel staples. Fix across base of cavity if gaps in veneer exceed 13 mm.

2.3 FLASHING - HEAD & SILL
To NZBC E2/AS1 either:
- 2 ply asphaltic pliable waterproofing membrane to AS/NZS 2904.
- 1.5 mm butyl rubber to ASTM D6134.
- 0.5 mm pliable polyethylene to AS/NZS 2904.
- Proprietary self-adhesive flexible flashing tape to AS/NZS 2904.

2.4 FLASHING - JAMB
To NZBC E2/AS1 either:
- 2 ply asphaltic pliable waterproofing membrane to AS/NZS 2904.
- 0.5 mm pliable polyethylene to AS/NZS 2904.
- Proprietary self-adhesive flexible flashing tape to AS/NZS 2904.

2.5 DAMP-PROOF COURSE (DPC)
To NZBC E2/AS1 either:
- 2 coats bitumen-based paint to AS/NZS 2904.
- 1.0 mm min. bituminous sheet or heavy kraft strip laminate (saturated and coated with bitumen) to AS/NZS 2904.
- 1.0 mm min. butyl rubber to ASTM D6134.

2.6 DAMP-PROOF MEMBRANE (DPM)
0.25 mm min. polythene or polyethylene sheet to AS/NZS 2904.

Components - general

2.7 SILLS
Refer to SELECTIONS for type.

Components - two storey brick veneer system

2.8 LINTELS
Steel lintel angles over openings to AS/NZS 2699.3, BRANZ Appraisal 690 and CB&PMA TB1.

2.9 TIMBER SUPPORT PLATE
To BRANZ Appraisal 690 Two Storey Brick Veneer System clauses 8.16 - 8.18, H3.2 treated.

2.10 SHELF ANGLES
Steel shelf angles at base of veneer or above lower roofs to AS/NZS 2699.3.

2.11 WALL TIES
Type EM (Medium Duty Earthquake) to AS/NZS 2699.1. Metal ties screw fixed to framing.

2.12 REINFORCEMENT
Galvanized wire joint reinforcement.

Accessories

2.13 SAND FOR MORTAR
To NZS 3103. Chloride levels not to exceed 0.04% by dry weight of sand.

2.14 MORTAR
Composed of Portland cement, sand and water with an admixture to the provisions of NZS 4210: 2.2 Mortar. Obtain written approval of admixture being used. Obtain written approval if intending to use hydrated lime in the mortar.

2.15 MORTAR COLOUR
Add mineral oxide pigment conforming to requirements of NZS 4210, clause 2.2.2.2(f).

2.16 ADMIXTURES
To NZS 4210.

2.17 WATER
Clean, fresh and free from excess alkali, salt, silt and organic materials.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
To NZS 4210 for aggregates, cement, bricks and reinforcement.
Take delivery of materials and goods and store on site and protect from weather or 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 PRE-INSTALLATION / APPLICATION REQUIREMENTS - CONCRETE BASE
Check vertical and horizontal alignment. Any discrepancies exceeding the permitted tolerances shall be corrected before units are laid.

3.3 TIMBER FRAMING - TWO STOREY BRICK VENEER SYSTEM
Check timber framing is minimum 90 mm x 45 mm at 400 mm centres.
For Two Storey Brick Veneer System gable end trusses are not to be used.

3.4 PENETRATIONS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the brick veneer. Required preparatory work includes the following:
- brick veneer wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- brick veneer neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.5 MEASURE MATERIALS
Measure materials for mortar accurately by weight or volume using suitably calibrated equipment.

3.6 WET WEATHER
Keep bricks dry at all times prior to laying. Protect the top row of uncompleted brick walls. Protect freshly laid brickwork during interruption through rain and at completion of each day's work. Protect brickwork for a minimum of 6 hours.

3.7 COLD WEATHER CONSTRUCTION
When air temperature is below 5°C take the precautions required by NZS 4210: 2.18 Cold weather construction.

3.8 HOT WEATHER CONSTRUCTION
When air temperature is above 25°C or there is a drying wind, or lower temperatures, take the precautions required by NZS 4210: 2.19 Hot weather construction.

3.9 KEEP FACE WORK CLEAN
Keep clean during erection and until completion of the contract works. Turn back scaffold boards at night and during heavy rain. Do not rub face work to remove stains.

Installation - general

3.10 STANDARDS AND TOLERANCES
To NZS 4210, table 2.2 Maximum tolerances.
Refer to the general section CONSTRUCTION for general requirements.

3.11 COLOUR MIXING
Check all bricks delivered to site for colour variation, prior to commencing work. Ensure bricks are thoroughly blended from several pallets to ensure an even colour spread throughout the work.

3.12 UNIFORMITY
Carry up work with no portion more than 1500 mm above another at any time, raking back between levels.

3.13 BONDING
Lay bricks to the required bonding in the various locations. Refer to SELECTIONS/drawings.

3.14 PROVIDE WEEPHOLES
Provide weepholes at the bottom of cavities and cells to SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**, and as necessary to drain moisture to the outside air. Provide vent gap at the top of the veneer.

3.15 INSTALL VERMIN PROOFING
Either:
- Proprietary plastic weephole vents built into open perpends.
- Fold and staple one edge of the mesh to the substrate, with the mesh sloping down towards the veneer. Set the other edge into the mortar joint by half the thickness of the veneer or 50 mm, whichever is less.

3.16 CAVITY VENTILATION
Ventilate to outside air with top and bottom openings to the requirements of SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**. Seal cavity off from roof space.

3.17 CAVITY BRICKWORK BELOW GROUND
Fill all cavities below finished grade with concrete. Place a continuous damp-proof course within the first three mortar joints above ground. Seal the face of all brickwork below ground.

3.18 FORM OPENINGS
Unless detailed otherwise form openings to typical details from BRANZ Masonry veneer - Good practice guide.

3.19 SEPARATION JOINTS
Provide for wall movements of veneer with control joints to NZS 4210: 2.10 Methods of controlling wall movements. Weatherproof as necessary.

3.20 FORM REVEALS
Form lintels, jambs and sills as detailed complete with flashings and all ready for following work.

3.21 HEAD FLASHINGS
Provide a flexible flashing extending 200 mm beyond ends of the opening and sloping to weepholes over all openings in cavity walls, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.22 JAMB FLASHINGS
Provide a flexible flashing to jambs of openings in cavity walls, fully lapped with horizontal damp-proof courses at head and sill, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.23 SILL FLASHINGS
Provide a flexible flashing under jointed sills, turned up at back and ends, in accordance with E2/AS1, 9.2.4, **Flashings**.

3.24 REBATE DAMP PROOFING
Provide damp-proof course to stepped rebates supporting brick veneer in accordance with E2/AS1, 9.2.5, **Foundation support and damp-proofing**.

Installation - two storey brick veneer system

3.25 INSTALL LINTELS
Install lintels for window and door openings in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System and as follows:
- Traditional Steel Angle method - refer to section Steel Lintel Angles clause 8.15.
- Fixing Lintel Angles to the Supporting Frame method refer to section Supporting Bricks Above Roof Lines clause 8.12.
- Timber Lintel method, refer to section Steel-less Openings clauses 8.16, 8.17 and 8.18.
- Precast Reinforced Clay Lintels, refer to manufacturers details.

3.26 VENEER ON ANGLES OVER ROOF
Install shelf angles in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System, refer to section Supporting Bricks Above Roof Lines clause 8.12.

3.27 VENEER ON ROOF FRAMING
Install shelf angles in accordance with BRANZ Appraisal 690 - Two Storey Brick Veneer System, refer to section Supporting Bricks Above Roof Lines clause 8.12.

3.28 CAVITY WIDTH
No cavity width less than 40 mm or more than 60 mm.

3.29 PLACE WALL TIES
Place wall ties as follows:
Veneers up to 140 kg/m² (70 mm thick veneers):
- Horizontally - 400 mm crs into studs
- Vertically - 400 mm crs maximum
- Opening - Within 200 mm of the edge of the all openings
- Shelf Angles - First row within 200 mm of the shelf angle
- Foundation - First row within 400 mm of the rebate

Veneers between 140 kg/m² and 180 kg/m² (over 70 mm thick veneers):
If using EH (heavy duty) ties, then as above.
If EM ties then as follows:
- Horizontally - 400 mm crs into studs
- Vertically - 400 mm crs into studs up to 3.0 m from foundations, then 300 mm crs max.

Note: If the positioning of ties is beyond the scope of BRANZ Appraisal 690 - Two Storey Brick Veneer System, then the placing of ties should be in accordance with NZS 4210.

Installation - ancillary work

3.30 BUILD IN FIXINGS
Build in necessary fixing bricks or blocks for trims.

3.31 BUILD IN ELEMENTS
Build in sills, copings, lintels, steps and other elements using mortar similar to that in adjacent walls.

3.32 BUILD IN DOORS AND WINDOWS
Build in door and window frames as the work proceeds and bed in mortar similar to that in adjacent work.

Completion

3.33 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.

3.34 EFFLORESCENCE, WATER CLEANING
To remove deposits, brush with a stiff-bristle broom and take away brushings from the locality. Remove remaining deposit with a damp sponge. Wash wall thoroughly with a plentiful supply of clean water. Repeat this process every 4 weeks from appearance through to the completion of the contract works.

3.35 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

3.36 PROTECTION
Provide the following temporary protection of the finished work:
~

4. SELECTIONS

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

Performance - seismic

4.1 DESIGN PARAMETERS - NON SPECIFIC DESIGN - EARTHQUAKE
Building seismic zone: ~ (refer to NZS 4210)

Materials - general

4.2 VERMIN PROOFING
Location: ~
Brand / type: ~ / ~
Size: ~ mm
Finish: ~

4.3 FLASHING - HEAD & SILL
Location: ~
Brand / type: ~ / ~
Width: ~ mm
Thickness: ~ mm

4.4 FLASHING - JAMB
Location: ~
Brand / type: ~ / ~
Width: ~ mm
Thickness: ~ mm

4.5 DAMP-PROOF COURSE (DPC)
Location: ~
Brand / type: ~ / ~
Width: ~ mm
Thickness: ~ mm
Application: ~

4.6 DAMP-PROOF MEMBRANE (DPM)
Location: ~
Brand / type: ~ / polyethylene sheet

Width: ~ mm
Thickness: 0.25 mm

Materials - two storey brick veneer system

4.7 CLAY BRICKS FOR TWO STOREY BRICK VENEER SYSTEM
Brand: ~
Size: ~ mm x ~ mm x ~ mm
Laying pattern: stretcher bond
Pointing ~

Components - general

4.8 SILLS
Brand / type: ~ / ~
Colour: ~

4.9 COLOURING PIGMENTS
Colour: ~

Components - two storey brick veneer system

4.10 LINTELS
Material / type: ~ / angle
Size: ~ mm x ~ mm

4.11 TIMBER SUPPORT PLATE
Species: ~
Size: ~ mm x ~ mm
Treatment: H3.2

4.12 SHELF ANGLES
Material: ~
Size: ~ mm x ~ mm
Treatment / finish: ~

4.13 WALL TIES
Brand / type: ~ / Type EM (Medium Duty Earthquake)
Material: ~

4.14 REINFORCEMENT
Brand / type: ~ / ~
Material: ~

4311RI ROOFING INDUSTRIES PROFILED METAL ROOFING

1. GENERAL

This section relates to the supply and fixing of **Roofing Industries** profiled roofing complete with accessories.

1.1 RELATED WORK
Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.
Refer to ~ for ~.

1.2 ABBREVIATIONS
The following abbreviations are used throughout this part of the specification:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
MS	Modified silicone
LBP	Licensed Building Practitioner

Documents

1.3 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 G12/AS1	Water Supplies
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 1665	Welding of aluminium structures
AS/NZS 1734	Aluminium and aluminium alloys - flat sheet, coiled sheet and plate
AS/NZS 1554.6	Welding stainless steels for structural purposes
ISO/TS 15510	Stainless steels - Chemical composition
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
ISO 9223	Corrosion of metals and alloys - Corrosivity of atmosphere - Classification determination and estimation
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

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.

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
Roofing Industries product literature including:
- Profile Technical Summary
- Selection Guide

Copies of the above literature are available from Roofing Industries product list.

Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

~ years	For failure of coating adhesion
~ years	For weatherproofing by material penetration

- Provide this warranty on the Coil Manufacturers/Roofing Industries products standard Warranty Form

- Commence the warranty from the date of practical completion of the contract works

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
5 years for workmanship

- Provide this warranty on the metal roofing installers standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

NOTE: Include a copy of the Roofing Industries maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS
Roof Installers shall be experienced, competent roofers familiar with **Roofing Industries** products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.

Carry out work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN
Building wind zone ~ / ~ kPa ULS(refer to NZS 3604, table 5.4)
Refer to **Roofing Industries** for "Wind Load Span Design Graphs" for load parameters.

1.10 FIXINGS, WIND
Design and use the fixings/fixing pattern appropriate for the wind design parameters and NZMRM CoP. Refer to **Roofing Industries** Profile Technical Summary for the selected profile. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Fixing pattern to also take into account fixing method and purlin spacings.

Performance - General

1.11 PERFORMANCE
Install roofing materials in accordance with the NZMRM CoP, and **Roofing Industries** Profile Technical Summary for the selected profile, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.12 DRINKING WATER
Roofing for collecting potable water to NZBC G12/AS1.

1.13 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. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

2. PRODUCTS

2.1 STEEL - HOT-DIPPED ALUMINIUM/ZINC ALLOY COATED, PRE-FINISHED
Formability steel sheet, G550 for roll forming or G300 for flashings, coated to AS 1397.

2.2 STAINLESS STEEL
Stainless steel sheet manufactured to ASTM A240 and ASTM A480. Welding to AS/NZS 1554.6.

2.3 FASTENERS GENERALLY
Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code. Installation is to be in accordance with E2/AS1 and/or the NZMRM CoP and Roofing Industries Profile Technical Summary. For fixing patterns refer to Roofing Industries Profile Technical Summary for the selected profile.

2.4 FIXING SCREWS
To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by Roofing Industries and with a Class 4 or 5 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm. Screw fasteners to be head stamped identifying the manufacturer and class. Refer to SELECTIONS.

2.5 RIVETS
Sealed aluminium, minimum diameter 4.0mm. Refer to Roofing Industries for requirements.

Components

2.6 FLASHINGS GENERALLY
To E2/AS1, 4.0, **Flashings**.
Formable grade 0.55 BMT for galvanized, aluminium/zinc, aluminium/zinc/magnesium - coated and pre-painted steel, and 0.70 BMT or 0.90 BMT for folded aluminium (or 0.7mm for small folded aluminium flashings) to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.7 FLASHINGS TO VERGE, RIDGE AND HIP
To E2/AS1, 4.0, **Flashings**.
Supplied by the roofing manufacturer to match or to suit the roofing.

2.8 BOOT FLASHINGS
Generally to E2/AS1, 8.4.17 **Roof penetrations** (note; E2/AS1, Figure.54 **Soaker flashing for pipe penetration**, has an error, use as guide only).
EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

2.9 ALUMINIUM FLASHINGS - WELDED
Aluminium alloy series 5000 temper H34 minimum thickness 1.6mm BMT to AS/NZS 1734. Aluminium welding to AS/NZS 1665.

2.10 STAINLESS STEEL FLASHINGS - WELDED
Welded stainless steel flashings shall be minimum thickness BMT 1.2mm and grade 304 or 316 stainless steel in accordance with Table 1 of ISO/TS 15510. Welding to AS/NZS 1554.6.
Refer to SELECTIONS for details.

Accessories

2.11 WIRE NETTING AND SAFETY MESH
Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 UNDERLAY AND REFLECTIVE FOIL
Refer to 4161 UNDERLAYS, FOIL AND DPC for roof underlays.

2.13 PLASTIC ROOFING
Refer to 4312RI ROOFING INDUSTRIES PROFILED NATURAL LIGHTING.

2.14 SEALANT
Neutral curing MS sealant or polymer sealant as required by Roofing Industries and used as directed.

2.15 CLOSURE STRIPS
Non-bituminous compressible, profiled foam strips to fit the sheet profile.

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2 FRAMING TIMBER MOISTURE
When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE
Upon delivery visually inspect sheets for damage and accept packs of undamaged roofing. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air circulation and drying between sheets.

3.4 HANDLING
Do not drag sheets across each other or other materials. Avoid distortion and contact with damaging substances, including cement. Long lengths of roofing should be lifted onto the roof using an approved load spreading beam. Protect edges and surface finishes from damage, keep under cover and remove as the product is being installed. Use soft, flat sole shoes when fixing and for all other work on the roof. Walk along the purlin line whenever possible.

3.5 SEPARATION
Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use lead sheet or copper in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.

Application

3.6 WELDING ALUMINIUM FLASHINGS
Welding to be carried out by a welder qualified under AS/NZS 1665. Preparation and welding to comply with AS/NZS 1665. Finish welds smooth and without abrupt surface changes ready for coatings. Refer to SELECTIONS for BMT and coatings.

3.7 WELDING STAINLESS STEEL FLASHINGS
Weld stainless steel flashings to AS/NZS 1554.6. Preparation and welding to comply with AS/NZS 1554.6. Finish welds smooth and without abrupt surface changes ready for coatings. Refer to SELECTIONS for BMT and coatings.

3.8 FIX INSULATION
Refer to Thermal Insulation sections.

3.9 SET-OUT
Carefully set out with consideration of the position of side laps to take account of the prevailing wind and line of sight. Ensure all sheets are square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.10 END LAPS
End laps are not permitted, except where specifically detailed.

3.11 THERMAL MOVEMENT
Fix for Thermal Movement to Roofing Industries Profile Technical Summary for Selected Profile.

3.12 FIXING GENERALLY
Install and fix in accordance with the NZMRM CoP recommendations, and to Roofing Industries required fixing patterns and details for each area of the building roofing. Use only screws as required by Roofing Industries. Paint colour matched fixings and accessories before installation.

3.13 MARKING AND CUTTING
Use ink pen, chalk line or coloured pencil for marking roof sheets prior to cutting. Do not use lead pencil for marking Zincalume®, ZAM®, Colorsteel® and Colorcote®. Cut by shear only, using nibblers or hand snips. Remove all cutting and drilling debris from the roof.

3.14 FIX SHEETS
Fix sheets in place using the fastening system required by Roofing Industries for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.15 STOP ENDS AND DOWNTURNS
Form stop-ends at the upper end of sheets. Form downturns at the gutter line where the roof pitch is less than 8 degrees. Form using the required tools.

3.16 INSTALL FLASHINGS
Flash roof to parapets, walls and penetrations to detail. Flashings to be installed on timber framing with a moisture content of less than 20%. Where no detail is provided flash to NZMRM CoP recommendations and Roofing Industries and NZBC E2/AS1 requirements. Cut accurately and fix using sealant and rivets to detail and to Roofing Industries requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.17 USE OF SEALANTS
Select and use sealants only as recommended by Roofing Industries. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.18 FLASHING PENETRATIONS
Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

Completion & Commissioning

3.19 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.
NOTE: Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

4. SELECTIONS

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

4.1 COATING SYSTEM - EXPOSURE ZONE B-C (CAT 1-3)
Project Exposure Zone B-C to NZS 3604, C 1-3 to ISO 9223.
Profile/location: ~
Base material: ~
Coating system: ~
Coating colour: ~

4.2 ROOFING INDUSTRIES - RIBLINE® RIB PROFILE ROOFING
Profile: ~
BMT/material: ~
Purlin material: ~
Fixing: ~

Accessories

4.3 UNDERLAY
Refer to RELATED section for wall underlay.

4.4 FLASHINGS - GENERALLY
Profile: ~
BMT/material: ~
Coating system: To match roofing
Coating colour: To match roofing

4.5 FLASHINGS - WELDED
Location: ~
Roofing profile: ~
Material: ~
BMT ~
Coating system: To match roofing
Coating colour: To match roofing

4.6 CLOSURE STRIPS
Brand: ~

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 RELATED WORK

Refer to ~ for ~

1.2 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

1.3 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 G4/AS1	Ventilation
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1170.2:2011	Structural design actions - Wind actions
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
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)

1.4 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 Fluoroset 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

1.5 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.

1.6 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

1.7 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: -
- Jointing 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.

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any specified APL aluminium system, or associated components and products.

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

1.10 COMPLIANCE
Windows and doors to be manufactured and installed to NZBC E2/AS1.

1.11 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

1.12 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.

1.13 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.

1.14 PASSIVE VENTILATION
To NZBC G4/AS1, 1.3.5, **Trickle ventilators** and NZS 4303.

Performance - Wind (design by contractor)

1.15 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

1.16 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, Section 2.0, **Opening windows**.

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-001543A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT-S-00230C.

Accessories

2.16 TRICKLE VENTILATORS
Refer to SELECTIONS for options.

Finishes

2.17 DURALLOY POWDER COATED ALUMINIUM
Polyester powder organic coating in accordance with WGANZ PQAS and AAMA 2603.

2.18 DURATEC POWDER COATED ALUMINIUM
High-performance polyester powder coating in accordance with WGANZ PQAS and AAMA 2604.

2.19 FLUROSET POWDER COATED ALUMINIUM
Very high-performance PVF2 fluoropolymer powder coating in accordance with WGANZPQAS 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.

3.14 PASSIVE VENTILATION
Factory fit all required and scheduled passive ventilation systems to NZBC G4/AS1, 1.3.5, **Trickle ventilators**, NZS 4303 and manufacturer's requirements.

Installation - windows and doors

3.15 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.

3.16 EXPOSED FIXINGS AND FASTENINGS
Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 304 stainless steel.

3.17 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.

3.18 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.

3.19 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.

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

3.21 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).

3.22 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 scriber width at each end.

3.23 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.

3.24 FIX HARDWARE
Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.25 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.

3.26 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.

3.27 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.

3.28 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

3.29 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.

3.30 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

3.31 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. Anodised finishes should be protected from cement products and require immediate clean-up of cement splashes. Only use tapes that have passed WGANZ testing on powder coated products. Remove protection on completion.

3.32 REPLACE
Replace damaged, cracked or marked elements.

3.33 PROTECTION
Protect finishes against damage from adjacent and following work.

3.34 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.

3.35 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.

3.36 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.

4.1 NOMINATED FABRICATOR
The nominated fabricators for this section of work are;

Company: ~
Contact: ~
Email: ~
Telephone: ~

4.2 SUPPLY AND INSTALLATION
Supply and installation of the specified APL aluminium joinery.
Supply: By fabricator
Installation: By ~

Performance

4.3 THERMAL PERFORMANCE
R-value: ~ (as determined from NZBC H1/VM1 or H1/AS1)

4.4 AIR INFILTRATION
For NZS 4211, table 3 **Air infiltration**.
Non-air conditioned zones: ~
Air conditioned zones: ~

Performance - Wind (design by contractor)

4.5 DESIGN PARAMETERS - NON SPECIFIC DESIGN
Building wind zone ~ (refer to NZS 3604, table 5.1)

Finishes - Powder Coating

4.6 DURALLOY - POWDER COATING FINISH
Type: Polyester organic powder coating
System integrity: ~
Colour: ~
Finish: ~

4.7 DURATEC - POWDER COATING FINISH
Type: Polyester organic powder coating
System integrity: ~
Colour: ~
Finish: ~

4.8 FLUOROSET - POWDER COATING FINISH
Type: PVF2 fluoropolymer powder coating
System integrity: ~
Colour: ~
Finish: ~

Glazing

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

Hardware

4.10 WINDOW HARDWARE
Window fastener: ~

Location	Item
~	Safety stays - non releasable
~	Safety stays - disconnectable
~	Sash locks
~	Louvres

4.11 DOOR HARDWARE
Locks & handles: ~

Location	Item

~	Parliament hinges
~	Hold back devices
~	Patio bolts
~	Door restrictors
~	Twin bolt bifold lock

4.12 HARDWARE FINISH
Finish: Powder coat
Colour: Black

4.13 MANIFESTATIONS
Location: ~
Type/details: ~

Flashings and Sealant

4.14 FLASHINGS
Material/type: ~
Pattern: Formed to suit details provided

4.15 WEATHERING SEALANT
Type: 1-part polyurethane moisture curing, elastic joint sealant
Colour: ~

Reveals

4.16 TIMBER JAMB REVEALS
Timber species: ~
Grade/treatment: ~ / H3.1
Thickness: ~mm
Reveals: ~
Finish: ~

Window and door system - RESIDENTIAL

4.17 APL RESIDENTIAL AWNING WINDOW
Brand/type: Altherm, First or Vantage RESIDENTIAL Series
Frame type: Non-thermally broken or Residential Thermal Heart
Window No.: ~
Fasteners: Urbo Helix

4.18 APL RESIDENTIAL SLIDING DOOR
Brand/type: Altherm, First or Vantage RESIDENTIAL Series
Frame type: Non-thermally broken or Residential Thermal Heart
Door No.: ~

4.19 APL RESIDENTIAL HINGED DOOR
Brand/type: Altherm, First or Vantage RESIDENTIAL Series
Frame type: Non-thermally broken or Residential Thermal Heart
Door No.: ~

4.20 APL RESIDENTIAL SERIES - PASSIVE VENTILATION
Brand: Aerovent
Window No.: ~
Brand: Sashvent
Window No.: ~
Brand: APL Ventient
Window No.: ~

4610 GLAZING RESIDENTIAL

1. GENERAL

This section relates to the supply and fixing of glass 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 RELATED WORK
Refer to ~ for ~

1.2 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

Documents

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

NZBC B2/AS1	Durability
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: 2011	Structural design actions - Wind actions
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 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

1.4 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available at

Company:	~
Web:	~
Email:	~
Telephone:	~

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Warrant glass under normal environmental and use conditions against failure of materials.

10 years: for insulating glass units
10 years: for laminated glass
10 years: for toughened glass

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

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

Materials

2.1 CLEAR FLOAT GLASS
Clear ordinary annealed transparent float glass for general window glazing. Thickness to NZS 4223.1 and NZS 4223. Supp 1.

2.2 TEXTURED, PATTERNED OR OBSCURE GLASS
Translucent, annealed, rolled glass with a decorative pattern on one surface.

2.3 LAMINATED GLASS
Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

2.4 TOUGHENED GLASS
Grade A Safety Glass to AS/NZS 2208.
Heat soaked toughened glass to NZS 4223.1, Appendix E required for critical areas.
Refer to SELECTIONS.

2.5 INSULATING GLASS UNITS (IGU'S)
To AS/NZS 4666, NZS 4223.2 and the IGU 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

2.6 SAFETY MIRROR GLASS
4mm, 5mm and 6mm annealed float glass mirror vinyl back safety glazing material to AS/NZS 2208.

Materials, screens

2.7 GLASS SCREENS SHOWER & BATH
Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, aluminium and uPVC glazing

2.8 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.

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

Components, wall mounted glass (mirrors and splashbacks)

2.10 GLASS ADHESIVE
Adhesive mirror-mastic and double-sided adhesive tape.

2.11 MIRROR DE-MISTER
Refer to BATHROOM AND TOILET FIXTURES for type.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZS 4223.1, NZS 4223.3, 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.

3.3 GLASS CONDITION
All glass to 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 sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1. For windows tested to NZS 4211, ensure glass meets the requirements of the window testing.
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.

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY
Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 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 for thickness and maximum areas of safety glass.

3.8 SAFETY GLAZING MATERIAL
Use only safety glazing materials defined in NZS 4223.3, 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.

3.9 CONTAINMENT
Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS
All working of glass as required in NZS 4223.1.

3.11 EDGE WORK AND BEVELLING
Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.12 SURFACE TREATMENT
Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING
Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS
To NZS 4223.3.

Application aluminium

3.15 INSTALL GLASS TO ALUMINIUM FRAMES
Install glass to NZS4223.1.
- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

Application - wall mounted glass (mirrors and splashbacks)

3.16 WALL MOUNTED GLASS, 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.

Application miscellaneous

3.17 INSTALL GLASS SHOWER & BATH SCREENS
Install shower and bath screens and doors to manufacturer's requirements.

Finishing

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

3.19 MANIFESTATIONS
To NZS 4223.3, 2.2 Manifestation (making glass visible).

Completion

3.20 TRADE CLEAN
Clean off or remove safety indicators at completion of the building.

3.21 REPLACE
Replace damaged, cracked or marked glass.

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

Performance - wind

4.1 WIND ZONE - NON-SPECIFIC DESIGN
Building wind zone: ~ (as determined from NZS 3604, NZS 4223.4)

Glass by type

4.2 CLEAR FLOAT GLASS
Location: ~
Brand/type: ~
Thickness: ~

4.3 TEXTURED, PATTERNED OR OBSCURE GLASS
Location: ~
Brand/pattern: ~
Pattern: ~
Thickness: ~ mm

4.4 PVB LAMINATED GLASS
Location: ~
Brand/type: ~ PVB
Colour: ~
Interlayer: 0.38mm Standard
Thickness: ~mm nominal overall

4.5 TOUGHENED GLASS
Location: ~
Brand/type: ~
Thickness: ~mm

4.6 INSULATING GLASS UNITS (IGU'S)
Location: ~
Brand/type: ~
Outer glass type: ~
Coated surface: ~
Outer glass: ~ mm
Spacer width: ~ mm
Space gas: air
Inner glass type: ~
Coated surface: ~
Inner glass: ~ mm

Mirrors

4.7 MIRROR
Location: ~
Brand/type: ~
Dimensions: ~ mm x ~ mm
Thickness: ~ mm
Fixing method: ~
Screw holes: ~ (number)
Edgework: ~

Splashbacks

4.8 SPLASHBACKS
Location: ~
Brand/type: ~
Thickness: ~ mm
Type: ~

Bath and shower screens and doors

4.9 FRAMELESS GLASS SHOWER SCREENS AND DOORS
Location: ~
Brand/type: ~ / ~ Safety Glass
Glass name: ~
Thickness: ~ mm
Hardware: ~

4710 INSULATION

1. GENERAL

This section relates to materials installed, laid, hung or fitted as thermal and/or acoustic insulation.

1.1 RELATED WORK
Refer to 3101 CONCRETE WORK - BASIC for insulation under concrete slabs.
Refer to 4161 UNDERLAYS, FOIL AND DPC for wall underlays and roofing underlays and foils.
Refer to roofing sections for roofing underlays.

1.2 QUALIFICATIONS GENERALLY
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.3 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:

BIB	Building Insulation Blanket
EPS	Expanded polystyrene sheets

Documents

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

NZBC H1/AS1	Energy efficiency
AS/NZS 3000	Electrical installations
NZS 4218	Thermal insulation - Housing and small buildings
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
Health and Safety at Work Act 2015	

1.5 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents related to this section are:
~

Manufacturer/supplier contact details

Company:	~
Web:	~
Email:	~
Telephone:	~

Warranties

1.6 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

~ years	For ~

- 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.

Requirements

1.7 QUALIFICATIONS GENERALLY
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

2. PRODUCTS

Materials

2.1 GLASS FIBRE THERMAL INSULATING PADS
Glass fibres bonded with a thermosetting resin to form a rectangular insulating pad.
NOTE: When insulation abutting or covering recessed downlights is intended to be in contact with IC, CA 80, CA 135 luminaires the insulation must withstand a 30s Needle Flame test to AS/NZS 60695.11.5.

Components

2.2 NAILS
Galvanized steel clouts, 25mm gauge.

2.3 STAPLES
Stainless steel gauge and length to suit application and to manufacturer's requirements.

2.4 WIRE NETTING
Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting used to support the insulation.

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

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 HAZARD & RISK MANAGEMENT
To Health and Safety at Work Act 2015 and take all safety precautions necessary to reduce potential hazards and risks.

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

Application - general

3.5 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. Allow a clear gap around metal flues as recommended by the fireplace manufacturer. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.6 RECESSED LIGHT FITTINGS - RESIDENTIAL

Residential recessed light fittings to AS/NZS 3000, 4.5.2.3.5;
- Existing fittings or retrofit situations, fittings maybe unmarked
- New fittings can only be labelled - CA 80, CA 90, CA 135, IC, IC-F & IC-4.

Refer to clause INSULATION CLEARANCES GENERALLY for clearances.

3.7 CLEARANCE TO ROOFING UNDERLAY

Ensure a minimum 25mm clearance is maintained between the insulation and any non-rigid roofing underlay.

3.8 INSULATION CLEARANCES GENERALLY

Insulation may need to have a gap to some mechanical and electrical services and equipment, including ducts and chimneys. The gaps should be to the NZS 4246 based tables below or to the equipment manufacturers requirements if they require larger gaps. Smaller gaps to manufacturers requirements can be used for equipment specifically manufactured with heat shielding or similar (excludes light fittings). Installed gap not to be more than 50mm bigger than the required gap.

The following tables are subject to:
- The requirements of NZS 4246
- The insulation is exposed to the source of heat or equipment etc.
- Insulation, has passed the needle flame test to AS/NZS 60695.11.5 and/or is non-combustible
- Gaps to hot surfaces may have to be increased with non-compliant insulation and plastic/polymeric type insulation (EPS, XPS, PIR, etc), check with insulation manufacturer
- Gaps to hot surfaces may be able to be reduced with non-combustible insulation, check with equipment manufacturer
- "Secure insulation" if required means, glue, mechanical fix, or provide fixed barriers at gap edge of insulation to hold in place. Rigid or semi rigid insulation may only need a firm friction fit (secure loose pieces).
- Loose fill insulation will require fixed barriers to NZS 4246 to maintain gaps

LIGHT FITTINGS

Type of fitting	Minimum insulation clearance	Comments
Recessed, marked NON-IC, or unmarked	100mm(increase if over 100W)	NON-IC fittings and new or old unmarked & unknown fittings, and/or insulation. Secure insulation.
Recessed, CA 80, CA 90 or CA 135	Abut fittings	Do NOT cover the fittings
Recessed, IC, IC-F or IC-4	Abut & cover fittings	Ensure insulation complies
Recessed, marked Do-Not-Cover	Manufacturers clearances	Do not cover the fittings
Independent control gear	Place on top of insulation & 50mm from fitting	If not on top allow 50mm clearance to insulation, do not cover. Includes, transformers, ballasts & drivers etc.
Surface fittings not exposed to insulation	Nil	Where surface fittings are isolated from insulation by appropriate linings. Excludes high heat fittings.
Surface fittings & exposed insulation	200mm	This is exposed insulation to any part of the exposed fitting & bulb/tube (e.g. exposed light in an unlined basement). Secure insulation.

INBUILT RECESSED HOT APPLIANCES

Appliance	Minimum insulation clearance	Comments
Electrical heaters	100mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Gas appliance exposed flame	200mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Excludes uncommon appliances, refer NZS 4246.
Gas appliance flues	75mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation. Excludes uncommon appliances refer NZS 4246.
Oil-fired appliances and flues	230mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Open fireplace opening	200mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Brick masonry chimneys	50mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Metal chimneys & flues	75mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Solid fuel appliance	600mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Solid fuel appliance flue	600mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.

EXTRACTS, VENTS, PIPES & ROOF UNDERLAY

Application	Minimum insulation clearance	Comments
Ducted fan motors	50mm	Includes ducted rangehoods, extractors etc. Applies to the motor unit and electrical enclosures (not the ducts)
Ducted fan ducts	Abut	Excludes motor unit and electrical enclosures.
Unducted fan motors usually discharging to ceiling space	200mm	Includes unducted, rangehoods, extractors etc, discharging into roof space. To prevent debris falling into motor. Clearance may be able to be reduced, by providing a fixed barrier around the vent.
Passive vents (still in use)	200mm	To prevent debris falling through. Clearance may be able to be reduced, with more cohesive insulation, like some of the rigid plastic types or providing a fixed barrier around the vent.
Plumbing penetrations through floors	100mm	Keep gap between pipe penetration and floor insulation in case of leaks.
Roofing material/underlay	25mm	From underside of roofing or flexible roofing underlay, to prevent wicking

3.9 LAY WIRE NETTING - OVER PURLINS

Lay at right angles across the purlins with enough slack to allow insulation to retain its nominal thickness between. Tie edges of netting together with galvanized wire clips.

3.10 LAY WIRE NETTING - UNDER JOISTS / PURLINS

Lay at right angles across the rafters/roof joists (under purlins). Pull tight and fix.

3.11 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.

3.12 FIT GLASS FIBRE THERMAL INSULATING PADS
Friction fit insulating pads in place to completely fill the whole of the cavities. Carefully scribe cut insulating pads slightly oversize to maintain friction fit to each other, to smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the insulating pads over the whole of the installation. Do not cover vents and cut around metal flues to the safety requirements of the fireplace manufacturer.

Completion

3.13 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.14 CHECK WALL WRAPS AND ROOF UNDERLAYS
Ensure these are dry, clean, undamaged and free of debris before being covered.

4. SELECTIONS

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

4.1 GLASS FIBRE INSULATION

Location:	~
Brand:	~
R Value:	R~
Thickness:	~mm

4821 FLASHINGS

1. GENERAL

This section relates to the fabrication and installation of flashing systems not forming part of a proprietary system.

1.1 RELATED WORK
Refer to ~ for ~.

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 E2/AS1	External moisture
AS/NZS 2728	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
AS 3566	Self-drilling screws for the building and construction industries - General requirements and mechanical properties
NZS 3604	Timber-framed buildings
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

Requirements

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

1.4 VERIFY DIMENSIONS
Verify dimensions against site measurements prior to fabrication.

Standards of performance

1.5 DURABILITY REQUIREMENTS
Design and install the flashings appropriate for the durability applications in accordance with NZBC B2/AS1. The Building Code B2, 3.2 requires that all hidden elements have at least the same durability as that of the element that covers it. Refer to NZBC B2/AS1 Table 1: Durability Requirements of Nominated Building Elements and NZBC E2/AS1 Table 20 Material selection.

1.6 COMPATIBILITY REQUIREMENTS
Each flashing material shall be selected in accordance with NZBC E2/AS1 Table 20 to minimise corrosion. Refer to either NZS 3604 Clause 4.2 or AS/NZS 2728 for the relevant exposure conditions. For compatibility of materials in contact and subject to run-off, refer to NZBC E2/AS1 table 21 and NZBC E2/AS1 table 22.

1.7 PROTOTYPES - REVIEW
Refer to the general section 1270 CONSTRUCTION for details of how prototypes will be reviewed and how instructions to proceed will be given. For flashings where there are no specific details or drawings, provide full size prototypes of the flashings to integrate components into the weathertight system. Co-ordinate with the trades affected by the installation. Provide the prototype flashings to the contract administrator for review.

2. PRODUCTS

2.1 FLASHING MATERIALS
Acceptable materials for flashings are described in NZBC E2/AS1, 4.0. Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the building and cladding materials and their fixings.

2.2 FLASHING FABRICATION
Fabricate flashings generally to NZBC E2/AS1, 4.0, from a ductile grade of metal designed for lateral strength by folding, stiffening or ribbing on external edges, having a maximum un-stiffened width of 300mm. Provide all hooks, hems, kick outs, bird's beaks, stop ends, soft edges and turn downs etc. to NZBC E2/AS1, 4.0, or as shown on the drawings.

2.3 FIXINGS
Rivets, screws, nails and cleats to be compatible with the materials being fastened. Fasteners complying with the corrosion requirements of AS 3566 are suitable for use with ZINCALUME® steel products. Use only low carbon non-conductive sealing washers.

2.4 JOINTS - SEALANTS
Neutral Curing silicone or MS polymer sealant as required, with low resistance to compression and be-able to withstand large temperature variations. MS polymer sealant to be used where the sealant is exposed and the surrounding surfaces are to be subsequently painted or coated.

3. EXECUTION

Conditions

3.1 DELIVERY
Keep flashings dry in transit. Take delivery of flashings in an undamaged condition. Reject all damaged materials.

3.2 STORAGE
Store materials and accessories on a level, firm base, in dry conditions, well ventilated, out of direct sunlight and completely protected from weather and damage. Ensure storage areas are away from current work areas. Cover to keep dry until fixed.

3.3 HANDLING
Avoid distortion and contact with potentially damaging surfaces/substances. Do not drag flashings across each other, or across other surfaces. Protect edges, corners and surfaces from damage.

3.4 SUBSTRATE
Do not commence work until the substrate is of the standard required by the installer for the specified flashings, level and in true alignment.

3.5 PROTECT
Protect surfaces, window and door joinery, and finishes already in place, from the possibility of damage during the installation process.

3.6 CONFIRM LAYOUT
Before commencing work confirm the proposed installation of the flashings and expansion joints and other visual considerations of the finished work.

3.7 CO-ORDINATE INSTALLATION
Co-ordinate installation of flashings with associated trades.

Application

3.8 INSTALLATION
Install flashings in accordance with NZMRM CoP and in compliance with NZBC E2/AS1, 4.0 Flashings. For very high wind zones and where the pitch of the roof is below 15° the flashing joint laps shall be sealed with sealant at each end of the lap to prevent the ingress of water.

Refer to NZBC E2/AS1 Table 7 for general dimensions of flashings.

3.9 FIXINGS

Fix flashings with fasteners appropriate to the situation. For fixing flashings with proprietary brackets or clips ensure they are aligned to allow for movement and are compatible with the flashing material.

Fix screws with the shank perpendicular to the surface of the flashing with the washer fitted firmly against the flashing. Screws to be compatible with the flashing material.

Rivets 'blind' or 'pop' are to be sealed when used. Aluminium rivets are compatible with zinc or AZ coated steel. Monel and stainless steel rivets can be used to fix galvanized steel flashings. Minimum diameter of rivet to be used is 4.0mm. Drill hole 1mm larger than the rivet size. Seal head of rivet with neutral cured silicone.

3.10 JOINTING - SEALANTS

Clean surfaces to be lapped using a solvent ensuring all traces of the solvent are removed with a clean rag. Apply sealant by gun in a continuous bead of approximately 5mm diameter. Width of sealant when compressed should not exceed 25mm. Sealant joints shall be mechanically fixed for strength. Refer to NZMRM CoP for details.

3.11 FINAL INSPECTION

A final inspection by the installer to take place after completion of the flashing work. Any defects or subsequent damage to be made good.

Completion

3.12 PROTECT

Protect new work from damage.

3.13 REPLACE

Replace all damaged or marked elements.

3.14 LEAVE

Leave work to the standard required for following procedures.

3.15 REMOVE

Remove debris, unused materials and elements from the site.

4. SELECTIONS

4.1 FLASHINGS

Type	Material and finish/colour
General flashings:	~
Window/doors:	
- Head:	~
- Sill:	~
Beam caps:	~
Cladding:	
- External corner:	~
- Internal corner:	~
Balustrade capping:	~
Garage door:	~
Meter box:	~
Chimney flue:	~
Soffit:	~
Wall/roof junctions:	~
Barge:	~
Apron:	~
Parapet capping:	~
Saddle:	~
Change of pitch:	~
Gutter apron:	~
Curved:	~
Roof penetrations:	~

4910 METALWORK

1. GENERAL

This section relates to the fabrication, delivery, specialist coating and installation of interior and exterior metal items:
It includes:
- Interior stair and stair frames, balustrades, handrails, ladders, screens, louvres, skirting, sheet metal decorative and specialist finishes, hoods, cowls, bench tops, sinks and tubs and similar items.
- exterior wall and door cladding systems, structural items, column and beam cladding, screens, grilles, louvres, fins and other external features, stairs, handrails, balustrades, ladders, canopies, signs and signage, street furniture, flues and cowlings, decorative and specialised sheet finishes, wire mesh and expanded metal sheet finishes and associated fasteners and hardware.

1.1 RELATED WORK
Refer to ~ for ~

1.2 DOCUMENTS
Documents referred to in this section are:

NZS/BS 1387	Screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or screwing to BS 21 pipe threads
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS/NZS 1554.6	Structural steel welding: Welding stainless steel for structural purposes
AS 1566	Copper and copper alloys - Rolled flat products
AS/NZS 1567	Copper and copper alloys - Wrought rods, bars and sections
AS 1572	Copper and copper alloys - Seamless tubes for engineering purposes
AS/NZS 1594	Hot-rolled steel flat products
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning
AS/NZS 1665	Welding of aluminium structures
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1865	Aluminium and aluminium alloys - Drawn wire, rod, bar and strip
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AS/NZS 1867	Aluminium and aluminium alloys - Drawn tubes
AS/NZS 2312:2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS 3679.1	Structural steel - Hot rolled bars and sections
AS/NZS 3750.9	Paints for steel structures - Organic zinc-rich primer
AS/NZS 3750.15	Paints for steel structures - Inorganic zinc silicate paint
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4792	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process
BS 6497	Powder organic coatings for application and stoving to hot-dip galvanized hot-rolled steel sections and pre-formed steel sheet
BS EN 1011.3	Welding. Recommendations for welding of metallic materials. Arc welding of stainless steel
GANZ:	Galvanizing Association of New Zealand - After-Fabrication Hot Dip Galvanizing. A practical reference for designers, specifiers, engineers, consultants, manufacturers and users

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/SUPPLIER DOCUMENTS
Manufacturer and supplier documents relating to this part of the work:
~

Manufacturer/supplier contact details;
Company: ~
Web: ~
Email: ~
Telephone: ~

Requirements

1.4 QUALIFICATIONS
Metalworkers to be experienced, competent trades people familiar with the materials and techniques specified.

1.5 HOT WORK - FIRE SAFETY
Refer to section 1270 CONSTRUCTION

1.6 SHOP DRAWINGS
Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show the general arrangement including, but not be limited to:
~

If requested provide the following additional information:
~

Submit shop drawings for review to ~

~ working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Complete shop drawing review before commencing fabrication.

2. PRODUCTS

Fabricated items

2.1 ITEMS
Refer to SELECTIONS.

Materials

2.2 ALUMINIUM COIL, SHEET, PLATE, BARS, ANGLES, CHANNELS, RODS AND TUBE
To comply with the following:
- Anodised/plain finish sheet/coil to AS/NZS 1734.
- Drawn wire, rod, bar and strip to AS/NZS 1865.
- Extruded rod, bar, solid and hollow products to AS/NZS 1866.
- Aluminium drawn tube to AS/NZS 1867.

Components

2.3 SCREWS
Brass, bronze, steel or stainless steel self-tapping screws with type of head, length, gauge and thread to suit the work and its location.

2.4 CLIPS, FLASHINGS
Form clips to detail of the same metal as the metal sheet to be fixed/secured.

Finishes

2.5 EXTERNAL ORGANIC COATING
Polyester exterior grade coating to BS 6497.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.
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 PRE-INSTALLATION REQUIREMENTS
Check work previously carried out and confirm it is of the required standard for this part of the work.

3.3 PRE-COATING/FINISHING REQUIREMENTS
Check work previously carried out and confirm it is of the required standard for specified finish. Carry out such additional preparatory work as required to bring the substrate to suitable condition.

Fabrication - general

3.4 CORNERS
Unless specified or detailed otherwise, mitre junctions of identical sections.

3.5 HOLES
Form without distortion of surrounding metal.

3.6 CLEANING
Remove all burrs and sharp arrises which would be visible after fixing, or a hazard to the user.

3.7 BONDING
Prepare surfaces of metals to receive adhesives by degreasing and abrading mechanically or chemically. Use adhesives in accordance with the manufacturer's requirements. Form bond under pressure.

3.8 RIVETED JOINTS
Draw riveted joints tightly together, with rivets closed to completely fill holes.

3.9 MECHANICAL JOINTS
Ensure mechanical joints are tight with no visible gaps.

3.10 MECHANICAL JOINTS, ELEMENTS
Bed in mastic all mechanical joints of elements which will be located externally, including all mating surfaces, cleats and other fixings.

3.11 MECHANICAL JOINTS, CLEATS
Unless specified otherwise connect cleats to frames with countersunk screws where they will be visible after the component has been fixed and where raised heads would interfere with any moving part.

Fabrication - welding

3.12 PREPARATION FOR WELDING
Remove grease, dirt, moisture and oxide from edges to be welded. Remove scale and residue from arc and power cutting by machining or hand grinding. Ensure accurate fit using clamps and jigs where practical. Use tack welds for temporary attachment where jigging is not practical.

3.13 WELD QUALITY
Make joints with parent and weld metal fully fused throughout with no inclusions, holes, porosity or cracks. Prevent weld spatter falling on surfaces of materials which will be self finished and visible in completed work. Ensure complete removal of flux residues and

slag. Butt welds which will be visible in completed work to be ground smooth and flush with adjacent surfaces.

3.14 WELDING ALUMINIUM
Grind flush visible welds.

Fabrication - sheet products

3.15 FABRICATE SHEET PRODUCTS
Fabricate and assemble in a workshop wherever practicable.

3.16 MARK OUT
Mark out the work accurately, square and true to line allowing for correct radius folds and laps to give the dimensions required for neat, close fits when in place. Use marking methods that do not damage, deface or cause future corrosive attack to the sheet metal being worked.

3.17 CUT SHEETS
Cut sheets by mechanical methods leaving edges true to line, square, smooth and free from all burrs.

3.18 FORMING
Use mechanical methods wherever possible and form and fold sheets square and true to line and face free of all deformation and defects. Minimise cold-working and stress build-up and their effects by limiting the amount of working and avoiding sharp radius bends (minimum 1 x sheet thickness).

3.19 PRE-ASSEMBLE
Pre-assemble in the workshop and match mark elements being assembled or erected on site. Do not strain, twist, bend or open such elements to force them into the correct position while assembling or erecting.

3.20 JOINING ALUMINIUM SHEET
Use self-secured seams, aluminium pop rivets, bolts and welding as best suits the form and location of the work.

Separation

3.21 SEPARATION
Isolate copper, brass and bronze from all other metals. Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber and cement-based materials.

Polishing and coating

3.22 PREPARATION FOR COATINGS
Before applying coatings remove welding slag, weld spatter, anti-splatter compounds, paints, grease, flux, rust, burrs and sharp arrises. Make good defects which would show after application of coating. Remove burrs and sharp arrises which would be visible after fixing, or which could be a hazard to the user. Finish surfaces smooth.

Handling

3.23 HANDLING
Avoid distortion of elements during transit, storage and handling. Prevent pre-finished surfaces rubbing together, and any contact with mud, plaster or cement. Keep protective coverings dry.

3.24 SUBSTRATE
Ensure location and substrate is ready to receive the fabricated metalwork elements.

Installation

3.25 INSTALL ITEMS
Locate fixings accurately and use in accordance with the metalwork manufacturer's requirements. Fix to comply with the specified standards and installation details, including bedding compounds and sealants, and with work plumb, level and true to line.

3.26 MOVING PARTS
When assembled, moving parts to move freely and without binding.

3.27 EARTHING OR EQUIPOTENTIAL BONDING METALWORK
If it is a project electrical requirement, ensure that any electrically at-risk metalwork, is earthed or equipotential bonded (or at least conductor cable attached) before enclosure.

Completion

3.28 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.

3.29 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

3.30 PROTECTION
Provide the following temporary protection of the finished work:
~

4. SELECTIONS

Fabricated items

4.1 ALUMINIUM ITEMS
Location/item: ~
Manufacturer: ~
Brand/type: ~
Finish: ~
Alloy designation: ~
Temper: ~
Section profile: ~
Thickness: ~
Dimensions: ~
Anodic colour/finish: ~

Finishes

4.2 EXTERNAL ORGANIC COATING
Brand: ~
Colour: ~
Gloss level: ~ %
Thickness: ~ microns

4.3 HARDWARE
Hardware:~

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 RELATED WORK
Refer to ~ for ~.

1.2 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

1.3 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	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents which refer to work in this section:
GIB® Site Guide (September 2018)
GIB® Noise Control Systems (September 2017)
GIB® Fire Rated Systems (October 2018)
GIB® Wet Area Systems (April 2021)
GIB Toughline® Aqua (July 2018)
GIB Ezybrace® Systems (August 2016)
GIB Ezybrace® Bracing Design Software
GIB Ezybrace® Bracing Supplement Document (December 2016)
GIB Ezybrace® for Light Steel Frame Systems (March 2017)
GIBFix® Framing System (August 2016)
GIB Rondo® Metal Batten System (August 2012)
GIB-Cove®
GIB RocTape®
GIB® Goldline™ Platinum Tape-on Trims
GIB® UltraFlex high impact corner mould

GIB® Tough Systems (November 2014)
BRANZ Appraisal 289 GIB® Fire Rated Systems
BRANZ Appraisal 394 GIB® Noise Control Systems
BRANZ Appraisal 427 GIB® Wet Area Systems
BRANZ Appraisal 928 GIB EzyBrace® Systems
BRANZ Appraisal 940 GIB® Intertenancy Barrier Systems for Terrace Homes

GreenTag Certification WWL:G102:2021:GR - GreenTag™ GreenRate Level A for:
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)

GreenTag Certification WWL:G103:2021:GR - GreenTag™ GreenRate Level C for:
GIB Ultraline® (10mm & 13mm)

Manufacturer/supplier contact details
Company: Winstone Wallboards
Web: www.gib.co.nz
Telephone: 0800 100 442

Requirements

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.6 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

1.7 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.

1.8 FIRE RATING REQUIREMENTS
Provide the GIB® fire resistant rated garage boundary wall systems. Refer to SELECTIONS for system/FRR.

1.9 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 Design Software
- GIB Ezybrace® Bracing Supplement Document (December 2016)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software 2011 (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2. PRODUCTS

Materials

2.1 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 Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Toughline® Aqua

Components

2.2 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.

2.3 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.4 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.5 CONTROL JOINTS

GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims
GIB® plastic W-profile control joints.

Accessories

2.6 ADHESIVE

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

2.7 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

2.8 JOINTING TAPE

GIB® jointing tape.

2.9 FIRE/ACOUSTIC SEALANT
GIB Fire Soundseal® ultra low VOC, mulit use acoustic sealant that resists passage of smoke and fire.

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

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 LEVELS OF PLASTERBOARD FINISH
Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

3.4 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.

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

3.6 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).

3.7 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 LINING WALLS AND CEILINGS GENERALLY
Form to GIB® Site Guide (September 2018). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.9 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.

3.10 FORM WET AREA SYSTEMS
Form to GIB Aqualine® Wet Area Systems requirements.

3.11 FORM BRACING SYSTEMS
Form bracing systems to:
- GIB Ezybrace® Systems (2016)

3.12 FORM CONTROL JOINTS
Form control joints to GIB® Site Guide (September 2018) requirements.

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

Finishing

3.14 FINISHING GENERALLY
To GIB® Site Guide (September 2018) and AS/NZS 2589.

Completion & Commissioning

3.15 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4. SELECTIONS

Plasterboard

4.1 GIB® STANDARD SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
~	GIB® Standard plasterboard	10mm	
~	GIB® Standard plasterboard	13mm	
~	GIB Ultraline® plasterboard	10mm	
~	GIB Ultraline® plasterboard	13mm	

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
~	GIB Aqualine® plasterboard	10mm	
~	GIB Aqualine® plasterboard	13mm	
~	GIB Toughline® Aqua	13mm	

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
~	GIB® Standard plasterboard	13mm	
~	GIB Ultraline® plasterboard	13mm	

4.4 GIB® FIRE RATED SYSTEMS
Refer to GIB® Residential Garage Boundary Walls.

Location / Type	Plasterboard type / Lining requirements	FRR / System specification	Finish Level
~	~	~	~

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 GIB® TAPE ON EDGE OR CORNER TRIMS
Brand/type: ~

4.7 GIB® EDGE PROFILES
Brand/type: ~

5151 INTERNAL TRIM

1. GENERAL

This section relates to simple lengths of trim fixed on site as of isolated internal members, with simple end joints.
It includes:
- timber
- MDF
- metal
- plastic

1.1 RELATED WORK
Refer to ~ for ~.

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, C/AS2	Protection from fire
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3610	Specification for profiles of mouldings and joinery

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Manufacturer/supplier contact details
Company: ~
Web: ~
Email: ~
Telephone: ~

Requirements

2. PRODUCTS

Materials

2.1 TIMBER TRIM
To NZS 3610 and to profiles detailed on the drawings. Timber species, grade and treatment to NZS 3602.

Components

2.2 NAILS
Bright steel to dimension requirements of NZS 3604. Use galvanized where prone to dampness.

2.3 BRADS
Bright steel of a length three times the thickness of the member being fixed. Use cadmium plated where prone to dampness.

2.4 SCREWS, STEEL
Bright steel of a length to penetrate the substrate up to the shank. Use stainless steel in wet areas.

2.5 SCREWS, CHROME PLATED
Chrome plated of a length to penetrate the substrate up to the shank.

3. EXECUTION

Conditions

3.1 GENERALLY
To comply with 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 STORAGE
Take delivery of trims undamaged and unmarked and store on site under cover, away from moisture, heat and direct sunlight in adequately ventilated area and clear of areas where work is in progress, to ensure materials are of the required standard when fixed in place.

3.3 ACCLIMATISE MATERIALS
Remove materials from packaging, separate and allow to acclimatise in the proposed installation area for 48 hours minimum prior to installation.

3.4 ENSURE
Ensure that the substrate to trims will allow work of the required standard. If it does not, do not proceed until the substrate has been remedied.

Application - Generally

3.5 INSTALL TIMBER TRIM
Use full lengths. Fit with scribed internal joints, mitred external joints and, mitred and returned at stop ends. Fix plumb, level and true to line and face using nails or brads to suit. Leave secure and with no movement possible.

Finishing

3.6 PUNCH
Punch all nail heads below the face of trim ready to receive stopping, as specified under painting preparation.

3.7 COUNTERSINK
Countersink screw heads not less than 2mm below the faces of trim to be painted. Stop and finish off flush with the face, as specified under painting preparation.

3.8 PELLETING
Countersink screw head 6mm below the faces of trim which is to be clear finished. Glue in grain-matched pellets not less than 6mm thick and cut from matching timber. Finish off flush with the face.

Completion

3.9 LEAVE
Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following procedures.

3.10 PROTECTION
Protect the completed work and make good before any surface finish is applied.

3.11 REPLACE
Replace damaged or marked elements.

3.12 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

4.1 INTERNAL TIMBER TRIM

Manufacturer: ~
Species/grade: ~
Finish: ~

Member	**Reference**	**Code reference**
Architrave	~	
Skirting	~	
Cornice	~	
Mould	~	
Bead	~	
Batten	~	
Rail	~	
Pelmet	~	

5230 INTERIOR DOORS

1. GENERAL

This section relates to the supply and installation of interior doors.

1.1 RELATED SECTIONS
Refer to glazing section/s for glass type and thickness.

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

NZS 3602	Timber and wood-based products for use in building
NZS 3610	Specification form profiles of mouldings and joinery

1.3 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Requirements

2. PRODUCTS

2.1 TIMBER
To NZS 3602.

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES
Traditional profiles to NZS 3610. Proprietary profiles and special profiles as detailed. Pencil radius corners of profiled schedules for paint finish.

2.3 DOORS, PAINTED
Doors as scheduled (without clashing strips).

2.4 CAVITY SLIDERS
Doors hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.5 DOOR HINGES
Size and gauge to carry door. 3 hinges per door.

3. EXECUTION

3.1 SITE MEASURE
Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding or bi-fold door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

3.2 EXECUTION GENERALLY
Manufacture to the 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 FACTORY FIT HARDWARE
Factory fit the following where specified: -
- Hinges

3.4 FACTORY FINISHING
Before delivery to site: -
- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

Internal doors

3.5 INTERNAL JOINERY FRAMES
Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish.

3.6 DOOR FRAMES, SOLID REBATED
Fabricate as detailed. Hang doors to operate freely on hinges, sliding, or bi-fold gear and to the door manufacturer's requirements. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.7 DOOR LINERS
Heads and jambs finished minimum 18mm, with 10mm planted door stops. Width to match width of lined walls. Hang doors on hinges, sliding, or sliding-folding gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.8 DOOR LINERS, EXTENDED
Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.9 CAVITY SLIDERS
Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion

3.10 CHECK
Check and adjust operation of all sashes, doors, hardware and furniture.

3.11 TEMPORARY PROTECTION
On completion remove any temporary protection and leave ready for following work.

4. SELECTIONS

4.1 HOLLOW CORE DOOR, PAINT FINISH
Brand/type: ~
Door facing: ~
Glazing: ~
Finish: ~
Hardware: ~

4.2 CAVITY SLIDER DOOR
Brand/type: ~
Door size: ~
Finish: ~
Hardware: ~

Accessories

4.3 DOOR HINGES
Interior doors

Type:	Loose pin

Size:	89mm
Material:	Zinc-plated steel
Pin:	Loose-pin zinc-plated steel

4.4 MISCELLANEOUS HARDWARE

Description	Location	Brand/model
Rolling gear:	~	~
Sliding folding gear:	~	~
Louvre sets:	~	~

5430 WOOD BASED SHEET FLOORS

1. GENERAL

This section relates to the supply and fixing of sheet based floors over timber framing.
It includes:
- Particleboard sheet as a floor
- Plywood sheet as a floor

1.1 RELATED WORK
Refer to ~ for ~

Documents

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

AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 1860.1	Particleboard flooring - Specifications
AS/NZS 2269.0	Plywood - structural - specifications
NZS 3604	Timber-framed buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents relating to this part of the work:
~

Manufacturer/supplier contact details

Company:	~
Web:	~
Email:	~
Telephone:	~

Requirements

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

1.5 SURFACE FIRE PERFORMANCE - UNFINISHED FLOORING
Unfinished flooring, ≥12mm thick and ≥ 400kg/m³ density, has a critical radiant flux 2.2kW/m2 as defined by NZBC C/VM2 Appendix B, Table B1 and in accordance with performance requirements of NZBC C/AS2, 4.17.3 and Table 4.5 Critical Radiant Flux Requirements for Flooring.

2. PRODUCTS

Materials - general

Plywood

2.1 PLYWOOD FLOORS
Radiata pine veneer ply to AS/NZS 2269.0, face sanded, grade as scheduled. H3 CCA treated to AS/NZS 1604.1, when used as a wet area substrate. Confirm compatibility with adhesives being used with the waterproofing membrane. F11 grade to be used for flooring.

2.2 SCREWS - PLYWOOD
Counter-sunk screws, stainless steel for treated plywood, minimum Class 3 or stainless steel for untreated plywood. Refer to the plywood manufacturer requirements for size and use.

15mm ply:	No. 8 x 40mm

17mm ply:	No. 10 x 40mm
19 - 21mm ply:	No. 10 x 45mm
25mm ply:	No. 10 x 50mm

2.3 ADHESIVE - PLYWOOD
One-component polyurethane based construction adhesive to Floor Manufacturer requirements.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 SUBSTRATE
Do not commence work until the framing is plumb and level, in true alignment and to suit the floor manufacturer's requirements.
Ensure framing suits the required laying pattern.

3.4 FLOOR DIAPHRAGMS
Install floor diaphragms in accordance with NZS 3604, 7.3 **Structural floor diaphragms** and floor manufacturer requirements. Support all edges of sheets.

3.5 EXPANSION JOINTS - LARGER FLOORS
Lay flooring to allow for a large expansion gap for large floor areas to manufacturer requirements. Locate as shown, under internal walls where possible.

Installation - Plywood

3.6 ADHESIVE FIXING
Apply a 10mm adhesive bead to joists.

3.7 FIXING PLYWOOD SHEETS
Lay and fasten to the floor manufacturer requirements and NZS 3604, section 7.2.3, **Wood-based sheet flooring**. Lay sheets in a staggered layout, face-grain of sheet at right-angles to support and with sheets in square, true alignment and plane. Do not cramp sheets. Fixings minimum 10mm, maximum 15mm from the edge, 150mm centres along edges and 300mm centres on intermediate supports.
Do not allow water to pond on the floor surface. Clean surface of flooring daily to remove sawdust and shavings. Protect work from the weather until it is covered, coated or sealed.

Completion & Commissioning

3.8 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4. SELECTIONS

4.1 PLYWOOD - FLOORING

Location:	~
Manufacturer:	~
Brand/grade:	~ CD
Edge detail:	~
Stress grade:	F11

Thickness:	~mm
Ply treatment:	H3.2 CCA
Fixing type/finish:	~ / ~
Fixing size:	~

4.2 DIAPHRAGM CONSTRUCTION METHOD

Method: 1200mm wide sheets with all edges supported, nail or nail plus adhesive fixed, sheet edge to perimeter of building with all wall plates on top of sheet.

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

1.1 RELATED WORK
Refer to ~ for ~

Documents

1.2 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 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

1.3 MANUFACTURER/ SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Copies of the above literature are available from ~
Company: ~
Web: ~
Email: ~
Telephone: ~

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
~ years: For ~

- 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 - 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.

Requirements

1.6 QUALIFICATIONS - TILING SYSTEMS
Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.8 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.

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

1.10 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.

Performance - Slip resistance

1.11 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING
Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

2. PRODUCTS

Materials

2.1 TILES
Refer to SELECTIONS for product selection.

Materials - waterproofing

2.2 WATERPROOFING MEMBRANE
Refer to 6811 WATERPROOFING AND ACOUSTIC UNDERLAY SYSTEMS for waterproofing membranes.

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 ± 4mm 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 WATERPROOF MEMBRANE
Refer to 6811 WATERPROOFING MEMBRANE AND ACOUSTIC UNDERLAY SYSTEMS for the installation of interior or exterior wet area membrane.

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 ±4mm 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 ±4mm 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.

Application - sealing

3.20 SEALING

Apply selected sealer to tiling in accordance with manufacturer's requirements.

Cleaning

3.21 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

3.22 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.

3.23 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.

3.24 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:	~
Supplier/Brand:	~ / ~
Type:	~
Tile size:	~mm x ~mm
Tile colour:	~
Edging:	~
Grout width:	~mm
Grout colour:	~
Sealant colour:	~

4.2 WALL TILES

Location:	~
Supplier/Brand:	~ / ~
Type:	~
Tile size:	~mm x ~mm
Tile colour:	~
Edging:	~
Grout width:	~mm
Grout colour:	~
Sealant colour:	~

Materials - preparation & underlays

4.3 PRIMER / MOISTURE BARRIER

Location:	~
Substrate:	~
Manufacturer:	~
Type:	~

Materials - adhesive and grout

4.4 PROPRIETARY GROUT

Location:	~
Manufacturer:	~
Type:	~
Colour:	Refer to relevant tile selection for grout colour
Grout width:	Refer to relevant tile selection for grout joint width

Components -movement and expansion joints

4.5 MOVEMENT JOINT SEALANT - NEUTRAL CURED

Location:	~

Manufacturer: ~
Type/ID number: ~
Colour: Refer to relevant tile selection for sealant colour

4.6 MOVEMENT JOINT SEALANT - ACID CURED
Location: ~
Manufacturer: ~
Type/ID number: ~
Colour: Refer to relevant tile selection for sealant colour

Accessories

4.7 TILE AND GROUT SEALER
Location: ~
Manufacturer: ~
Type: ~

Spares & maintenance products

6511 CARPETING

1. GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double bonded (double direct stuck).
It includes:
- carpet underlay
- woven sheet carpet

1.1 RELATED WORK
Refer to ~ for ~

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
AS/NZS 2270	Plywood and blockboard for interior use
AS/NZS 2455.1	Textile floor coverings - Installation practice - General

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Manufacturer/supplier contact details

Company:	~
Web:	~
Email:	~
Telephone:	~

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

1 year:	For materials

- 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:

1 year:	For execution

- 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 QUALIFICATIONS
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

2. PRODUCTS

Materials

2.1 UNDERLAY
To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

2.2 CARPET
To AS/NZS 2455.1 Textile floor coverings.
Refer to SELECTIONS for product selection.

Components

2.3 BINDER BARS
Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS
Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER
Timber/plywood to AS/NZS 2270 with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

Accessories

2.6 TAPE
To carpet manufacturer's requirements.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS
Check work previously carried out and confirm it is of the required standard for this part of the work. Ensure all fittings and fixtures around which the carpet is to be scribed are in place. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

Confirm moisture content of substrate in accordance with AS/NZS 2455.1. Appendix B
Do not commence laying carpet until readings for the whole area are within acceptable levels as follows:

Moisture Content:	Timber substrate - 8 -12% for air conditioned buildings - 10 -14% for intermittently heated buildings - 12 -16% for unheated buildings
	Concrete substrate 75%RH

3.4 BEFORE COMMENCING WORK
Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

3.5 TEMPERATURE
Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

3.6 PROTECTION
Protect adjoining work surfaces and finishes during the carpet installation.

3.7 TAPE
Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.8 LAYING GENERALLY
Carry out the whole of the work to AS/NZS 2455.1 and to the flooring manufacturer's requirements.

3.9 LAYOUT
Plan the general layout so that:
- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

Application - general / substrate preparation

3.10 STANDARDS AND TOLERANCES
Refer to the general section 1270 CONSTRUCTION for general requirements.

3.11 PREPARING NEW CONCRETE FLOOR
To be level, smooth, clean, cured and dry. Remove loose material and dust.

3.12 PREPARING NEW WOOD PRODUCT FLOOR
To be level, sanded smooth and dry with loose material and dust removed.

Application - carpet laying

3.13 INSTALLATION, UNDERLAY
Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.14 INSTALLATION, CONVENTIONAL SYSTEM
Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.15 LAYING TO STAIRS
Install on stairs in accordance with AS/NZS 2455.1.

3.16 FIXING TRIMS
Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.17 PROTECTION
Provide the following temporary protection of the finished work:
~

3.18 SPECIAL PROTECTION
Self Adhesive carpet protective film: ~

3.19 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4. SELECTIONS

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

Materials

4.1 UNDERLAY

Location	Brand	Type/thickness/weight
~		

4.2 CARPET

Location	Brand/type/weight/code	Installation method
~		

4.3 STAIR CARPET TO AS/NZS 2455.1

Location	Brand/type/weight/code	Installation method
~		

Accessories

4.4 BINDER BARS
Brand: ~
Colour: ~

4.5 DIVIDER STRIPS
Brand/material: ~
Dimension: ~mm x ~mm
Finish: ~

6711 PAINTING EXTERIOR

1. GENERAL

This section relates to the preparation of exterior unpainted and pre-painted surfaces, and the application of exterior:
- decorative paint coatings
- protective paint coatings
- sealers
- stains
- clear finishes

Related work

1.1 RELATED SECTIONS
Refer to 6700 PAINTING GENERAL for general painting matters.
Refer to 6721 PAINTING INTERIOR for interior paint systems.

Documents

1.2 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~
Web: ~
Email: ~
Telephone: ~
Facsimile: ~

Warranties

1.3 WARRANTY
Warrant this work under normal environmental and use conditions against failure.
2 years: 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 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

2. PRODUCTS

2.1 PRODUCTS
Refer to 6700 PAINTING GENERAL for product clauses.

3. EXECUTION

3.1 EXECUTION
Refer to 6700 PAINTING GENERAL for execution clauses.

4. SELECTIONS

4.1 INSPECTION OF WORK

Stage	Coating system
~	

4.2 BACK PAINTING SCHEDULE
Paint 2 coats (including any pre-prime) to match exposed face coating.

Cladding type	Extent of back painting
~	~

Paint systems

4.3 TIMBER / PLYWOOD / HARDBOARD - PAINT
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

4.4 CONCRETE / BLOCKWORK / FIBRE CEMENT / CEMENT PLASTER
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

4.5 TIMBER TRIM / DOORS / FRAMES
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

6721 PAINTING INTERIOR

1. GENERAL

This section relates to the preparation of interior unpainted and pre-painted surfaces, and the application of interior:
- decorative paint coatings
- protective paint coatings
- sealers
- stains
- clear finishes

Related work

1.1 RELATED SECTIONS
Refer to 6700 PAINTING GENERAL for general painting matters.
Refer to 6711 PAINTING EXTERIOR for exterior paint systems.

Documents

1.2 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~
Web: ~
Email: ~
Telephone: ~
Facsimile: ~

Warranties

1.3 WARRANTY
Warrant this work under normal environmental and use conditions against failure.
2 years: 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 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

2. PRODUCTS

2.1 PRODUCTS
Refer to 6700 PAINTING GENERAL for product clauses.

3. EXECUTION

3.1 EXECUTION
Refer to 6700 PAINTING GENERAL for execution clauses.

4. SELECTIONS

4.1 INSPECTION OF WORK

Stage	Coating system
~	

4.2 BACK PAINTING SCHEDULE
Paint 2 coats (including any pre-prime) usually to match exposed face coating. If there is no coating use water resistant clear finish sealer.

Lining type	Extent of back painting
~	~

Paint systems

4.3 PLASTERBOARD
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

4.4 PLASTERBOARD - WET AREA
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

4.5 TIMBER / PLYWOOD / HARDBOARD / FIBREBOARD - PAINT
Brand: ~
Coating type: ~
System: ~
Preparation: ~
1st coat: ~
2nd coat: ~
3rd coat: ~

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: 2018	Plumbing and drainage - Water services
AS/NZS 3500.4: 2018	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS/NZS 4130	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

1.3 MANUFACTURER DOCUMENTS
Manufacturer and supplier documents relating to work in this section are:
~

Copies of the above literature are available from ~
Web: ~

Email: ~
Telephone: ~
Facsimile: ~

Warranties

1.4 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

1.5 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.

1.6 INFORMATION FOR OPERATION AND MAINTENANCE
Provide the following general operation and maintenance information as electronic PDF format documents:
~

Provide this information prior to practical completion.

1.7 HOT WATER TEMPERATURES
To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60ºC.

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:
- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 55ºC - 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

1.8 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 crox 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, table1. Protect from sunlight.

2.3 WATER METER
To the requirements of the network utility operator.

2.4 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.

2.5 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.

2.6 TEMPERING VALVE
Tempering valve to NZS 4617 to NZBC G12/AS1.

Materials - Hot water heating appliances

2.7 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
To NZS 4305, ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.

2.8 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.

Application - Pipework installation

3.12 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.

3.13 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.

3.14 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.

3.15 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES
If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

3.16 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

3.17 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.

3.18 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES
Non-gas (electric, wet-back, solar etc) water heating appliances (storage water heaters) to be restrained to manufacturer's requirements and NZBC G12/AS1, 6.11, Water Heater Installation.

3.19 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.

3.20 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY
Install drained overflow tray to storage hot water cylinder to NZBC G12/AS1.

3.21 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.

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

Installation - Valves

3.23 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.

3.24 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.

3.25 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

3.26 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.27 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.

3.28 REPLACE
Replace damaged or marked elements.

3.29 LEAVE
Leave work to the standard required by following procedures.

3.30 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)

Pipework

4.2 COPPER PIPE
Manufacturer: ~
Brand: ~
Nominal bore: ~mm
Wall thickness: ~mm

4.3 POLYBUTYLENE PIPE
Manufacturer: ~
Brand: ~

4.4 EXPOSED PIPES
Manufacturer: ~
Type: ~
Nominal bore: ~mm
Accessories: ~

Hot water systems

4.5 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
Brand: ~
Model size: ~

Valves and accessories

4.6 MAIN ISOLATING VALVE
Location: ~
Brand/type: ~

4.7 FLOOR/ZONE ISOLATING VALVES
Location: ~
Brand/type: ~

4.8 APPLIANCE ISOLATING VALVES - CONCEALED
Appliance: ~
Brand/type: ~

4.9 APPLIANCE ISOLATING VALVES - EXPOSED
Appliance: Washing machine
Brand/type: Refer to tapware selections

4.10 TEMPERING VALVE
Location: ~

Brand/type: ~

4.11 BACKFLOW PREVENTION DEVICE
Location: ~
Brand/type: ~

4.12 IN-LINE FILTER
Location: ~
Brand/type: ~

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: 2018	Plumbing and drainage - water services
AS/NZS 3500.2: 2018	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 DOCUMENTS
Manufacturer and supplier documents relating to work in this section are:
~

Copies of the above literature are available from ~
Web: ~
Email: ~
Telephone: ~
Facsimile: ~

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 SUBMIT A SUPPLIER'S SCHEDULE
~

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 SANITARY ACCESSORIES
Refer to SELECTIONS for product selection.

2.5 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 AS/NZS 3500.2
Installation work to comply with NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, AS/NZS 3500.2: 2018, as modified by NZBC G13/AS3, and the fixture manufacturer's requirements.

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

3.5 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.

3.6 INSTALLATION REQUIREMENTS INCLUDING AS/NZS 3500.2: 2018
Install to NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC E3/AS1, AS/NZS 3500.2: 2018, 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 floors, wall linings, fixtures and the tops they are in, the tops and wall linings, to NZBC E3/AS1, 3.2. Fixtures include toilets, urinals, baths, basins, tubs or sinks. Tops include, vanities, bath surrounds, sink benches, etc, and there upstands.

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

3.8 EARTHING OR EQUIPOTENTIAL BONDING METALLIC FIXTURES
If it is an electrical requirement, before installation or enclosing, ensure at-risk metallic sanitary fixtures are earthed or equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

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 - INTEGRAL BASINS
Install in accordance with the manufacturer's requirements. Connect to supply and drains through trap to the drainage system. 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. Seal shower wall lining penetrations (shower head, shower hose, mixer, taps etc) to NZBC E3/AS1, Fig. 6.

3.20 INSTALLING PROPRIETARY 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 - Sinks

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

3.23 INSTALLING CLEANERS SINKS AND TUB UNITS
Install in accordance with manufacturer's requirements. Connect to supply and drainage services.

Installation - Miscellaneous

3.24 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

3.25 GENERAL
To AS/NZS 3500.1: 2018 and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with NZBC G12/AS1.

Application - sanitary accessories

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

3.27 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.

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 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.

Completion

3.30 REPLACE
Replace damaged or marked elements.

3.31 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.

3.32 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

4.1 TOILET
Location: ~
Toilet pan: ~
Trap type: ~
Toilet seat: ~
Flush system: ~
Isolating valve: ~

4.2 BASIN
Location: ~
Basin: ~
Basin taps/mixer: ~
Waste/plug: ~
Trap: ~
Isolating valves: ~

4.3 VANITY UNIT - INTEGRAL BASINS
Location: ~
Vanity: ~
Colour: ~
Taps/mixer: ~
Waste/plug: ~
Trap: ~
Isolating valves: ~

4.4 SHOWER ENCLOSURE - PROPRIETARY
Location: ~
Shower tray: ~
Liner: ~
Door: ~
Screen: ~
Glazing hardware: ~
Trap/waste: ~
Mixer: ~
Shower set: ~
Shower seat: ~
Grab rails: ~

4.5 KITCHEN COMBINED SINK AND DRAINER
Location: ~
Sink drainer model: ~
Accessories ~
Mixer: ~
Waste/plug: ~
Trap: ~
Isolating valves: ~

4.6 LAUNDRY TUB
Location: ~
Tub model: ~
Taps: ~
Machine taps: ~

Isolating valves: ~
Waste/plug: ~
Trap: ~

4.7 TAPWARE - MISCELLANEOUS
Taps not related to and separate from sanitary fixtures:

Hose tap external: ~
Dishwasher: ~
Washing machine: ~

4.8 SANITARY APPLIANCES
Dishwasher: ~
Waste disposal unit: ~
Washing machine: ~

4.9 SANITARY ACCESSORIES
Location: ~
Roll holder: ~
Towel rail: ~
Towel ring: ~
Hooks: ~
Toothbrush holder: ~
Soap dispenser: ~
Wall cabinet: ~

4.10 ELECTRICAL SANITARY ACCESSORIES
Location: ~
Heated towel rail: ~
Hair dryer: ~
Hand dryer: ~
Finish: ~

7411 RAINWATER SPOUTING SYSTEMS

1. GENERAL

This section relates to rainwater disposal systems including spouting and downpipes in:
- metal
- PVC

1.1 RELATED WORK
Refer to ~ for ~.

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

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
Spouting	Roof gutter bracketed off the roof edge or fascia.
Gutter	Internal gutter or gutter formed as integral part of the roof fabric.

Documents

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

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
AS/NZS 3500.3: 2018	Plumbing and drainage - Stormwater drainage
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions:

10 Years	For failure of coating adhesion
10 Years	For weatherproofing by material penetration

Form:	Manufacturer's standard warranty form
From:	Commence the warranty from the date of completion of installation

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

1.6 WARRANTY - INSTALLER/APPLICATOR
Warrant this work under normal environmental and use conditions against:

3 years:	For weatherproofing by substandard workmanship:
From:	Commence the warranty from the date of completion of installation
Form:	Installers standard warranty form

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

Requirements

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

Performance

1.8 TEST
Test the completed rainwater disposal system with water to ensure spoutings are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in spoutings.

2. PRODUCTS

Materials - uPVC

2.1 UPVC SPOUTING
Rainwater system to AS 1273, profile, jointing, brackets, rainwater heads and fittings brand matched and complete to the manufacturer's requirements. Refer to SELECTIONS for type.

2.2 UPVC DOWNPIPES
To suit the spouting system, pipes solvent cement jointed and complete with stand-off brackets, galvanized screws and accessories, brand matched and complete to the manufacturer's specifications. Refer to SELECTIONS for type.

Materials - fascia/barge system

2.3 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements. Refer to SELECTIONS for type.

Components

2.4 DROPPERS
Metal or uPVC droppers, compatible with spouting material and sized to fit inside the downpipe.

2.5 FASTENERS GENERALLY
Minimum Class 4 durability and not less than the roofing material being fixed.

2.6 RIVETS
Sealed aluminium, minimum diameter 4mm.

2.7 SEALANT
MS Polymer sealant.

3. EXECUTION

Conditions

3.1 HANDLE AND STORE
Handle and store downpipes, spouting 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. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE
Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT
Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 18 metres in length for steel gutter.

3.4 CORROSION
Separate 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. Do not allow copper downpipes to discharge onto lower galvanized or zinc aluminium coated steel roofs.

Application - uPVC

3.5 INSTALL UPVC SPOUTINGS
From high points fix brackets true-to-line to give a fall of 1mm every 2 metres to outlets. Allowing for necessary expansion, fit expansion joiners, assemble and fit spouting to brackets complete with all accessories solvent welded or rubber sealed.

3.6 INSTALL UPVC DOWNPIPES
Assemble downpipes, solvent welded complete, fit to outlets, galvanized screw fix with pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet to the downpipe manufacturer's required practice.

3.7 INSTALL EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Install concealed fascia brackets to rafters with either screws or nails and fit fascia to a level line. Fit gutter brackets to fall to outlet. Cut and form corner junctions and barge junctions and fit spouting rigidly to brackets. Cut out neatly for and fit pre-formed downpipe droppers. Silicone seal and pop-rivet all lap joints. All installation to NZMRM CoP recommendations.

Completion

3.8 REPLACE
Replace damaged or marked elements.

3.9 LEAVE
Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.10 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

UPVC system

4.1 UPVC SPOUTING
Brand: ~
Profile/size: ~mm
Cross section: ~mm²
Colour: ~

4.2 UPVC SPOUTING BRACKETS
Brand: Same as spouting
Type: ~
Colour: Match spouting

4.3 UPVC DOWNPIPES
Brand: ~
Profile/size: ~ / ~mm
Colour: ~

4.4 UPVC DOWNPIPE BRACKETS

Brand:	Same as downpipe
Type:	~
Colour:	Match downpipe

Fascia/barge spouting system

4.5 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM

Brand:	~
Profile/size:	~mm
Cross section:	~mm²
Material:	~
Thickness:	0.55mm
Coating system:	~
Colour:	~

7420 SANITARY SYSTEMS

1. GENERAL

This section relates to above ground gravity flow sanitary systems;
- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS
Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.
Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS
Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2: 2018	Plumbing and drainage - Sanitary plumbing and drainage
Plumbers, Gasfitters and Drainlayers Act 2006	

1.3 MANUFACTURER DOCUMENTS
Manufacturer and supplier documents relating to work in this section are:
~

Copies of the above literature are available by phoning ~.

1.4 QUALIFICATIONS
Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES
PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS
Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3. EXECUTION

3.1 EXECUTION GENERALLY - AS/NZS 3500.2
Carry out this work to AS/NZS 3500.2: 2018, as modified by NZBC G13/AS3, and complete all tests to AS/NZS 3500.2: 2018, 15 **Testing of Sanitary Plumbing and Sanitary Drainage Installations.**

3.2 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 EQUIPOTENTIAL BONDING METALLIC WASTE PIPES
If it is an electrical requirement, before enclosing, ensure metallic waste pipes connected to metallic drains and attached metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) similar to NZBC G12/AS1, 9.0.

3.4 INSTALL TRAPS, WASTE AND VENT PIPES - AS/NZS 3500.2: 2018
Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2: 2018, as modified by NZBC G13/AS3, and jointing to AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.5 PENETRATIONS
At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.6 TEST
Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1 or AS/NZS 3500.2: 2018, 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.7 CLEAN UP
Remove labels and clean fittings. Remove unused materials from the site.

4. SELECTIONS

4.1 PVC-U WASTE, DISCHARGE AND VENT PIPES
Brand/type: ~

4.2 EXPOSED PIPES AND TRAPS
Brand/type: ~

4.3 FLOOR WASTES
Manufacturer: ~
Brand/type: ~
Grate/finish: ~

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/AS2	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - sanitary plumbing
NZBC G13/AS2	Foul water - drainage
NZBC G13/AS3	Foul water - sanitary 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
AS/NZS 3500.3: 2018	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
NZS 3111	Method of test for water and aggregate for concrete
AS/NZS 3500.2: 2018	Plumbing and drainage - sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4402 (set)	Method of testing soils for civil engineering purposes
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls
NZTA F2	Specification for pipe subsoil drain construction

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

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.

Components

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 GULLY TRAPS - NZBC G13/AS2
To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.5 SURFACE WATER SUMP GRATINGS
Cast iron frame with lift-up grating.

Foul water

2.6 TRENCH BACKFILLING MATERIAL, FOUL WATER - NZBC G13/AS2
Bedding and backfilling material to NZBC G13/AS2, 2.0 **Materials,** for methods shown in NZBC G13/AS2, figure 7, **Bedding and backfilling**.

3. EXECUTION

3.1 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.
- AS/NZS 3500.3: 2018, 6.2.8, **Installation near and under buildings**, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, **Proximity of Trench to Building**, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS
All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 FOUL WATER DRAINAGE GENERALLY - NZBC G13/AS2
Carry out foul water drainage work to NZBC G13/AS2 and NZBC G1/AS1 and complete all tests to NZBC G13/AS1, 7.1 Test Methods.
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.

3.4 SURFACE WATER DRAINAGE GENERALLY - E1/AS1
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.

3.5 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.

3.6 CONSTRUCT GULLY TRAPS - NZBC G13/AS2
Set in a minimum 75mm thick concrete with top surround 25mm above paving and 100mm above other surfaces, to NZBC G13/AS2, 3.3 Gully traps.

3.7 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.

3.8 INSTALL SURFACE WATER SUMP
To NZBC E1/AS1 or to AS/NZS 3500.3: 2018 section 7 as modified by NZBC E1/AS2, complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.9 TESTING - FOUL WATER
Confirm timing before carrying out any tests. Supply potable water and apparatus needed.
Test to NZBC G13/AS1 or AS/NZS 3500.2: 2018, 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.10 TESTING - SURFACE WATER
Confirm timing before carrying out any tests. Supply potable water and apparatus needed.
Test to NZBC E1/VM1, 8.0 Drain Leakage Tests or AS/NZS 3500.3: 2018, section 9, as modified by NZBC E1/AS2 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

Backfilling and encasement - Foul water and surface water

3.11 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.

3.12 TRENCH BACKFILLING GENERALLY - FOUL WATER
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 tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

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. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.13 TRENCH BACKFILLING GENERALLY - SURFACE WATER - NZBC E1/AS1
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 tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

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. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.14 FOUL WATER TRENCH BACKFILLING - NZBC G13/AS2
Carry out foul water trench backfilling to/AS 2, 5.3 to 5.5 and fig 7.
PVC-U pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

3.15 SURFACE WATER TRENCH BACKFILLING - NZBC E1/AS1
Carry out surface water trench backfilling to NZBC E1, 3.9.6 and fig. 13.
PVC-U pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

4. SELECTIONS

4.1 PVC-U PIPES
Brand/type: ~

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 RELATED WORK
Refer to ~ for ~.

1.2 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:

AFDD	Arc Fault Detection Device
ELV	Extra Low Voltage
GLS	general lighting service
IP	international (ingress) protection classification
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

Documents

1.3 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
NZBC G9/AS1	Electricity
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 using scattered light, transmitted light or ionization
NZS 4514:2009	Interconnected smoke alarms for houses
NZS 4246	Energy Efficiency - Installing bulking thermal insulation in residential buildings
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 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance.
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 21 January 2019).
TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services

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.

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents related to this section are:
~

Manufacturer/supplier contact details:
Company: ~
Web: ~
Email: ~
Telephone: ~

Warranties

1.5 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

1.6 COMPLY
Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2, and TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services 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.

1.7 QUALIFICATIONS GENERALLY
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE
Workers and supervisors to be appropriately qualified to applicable legislative requirements.
Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.9 QUALIFICATIONS - SECURITY SYSTEM
Installation by an installer licensed under the Private Investigators and Security Guards Act. Installation of all security equipment to comply with AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance.

1.10 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 high risk electrical work as required by regulation 70.

1.11 ELECTRICAL SAFETY CERTIFICATE
Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, Reg 74A, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

Quality control and assurance

1.12 INSPECTIONS

~	~

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: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction 2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity 2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction 2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² 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 SURGE PROTECTION
Protection for the homes appliances with IEC 61643 Class ll surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class lll surge protection to switched socket outlets.

2.7 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.

2.8 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.
Label all switch units that control electrical equipment or special lighting circuits by proprietary engraved switch mechanisms where applicable.
Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.
Refer to SELECTIONS.

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 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.

2.11 HOT WATER SYSTEM SWITCH
One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.12 BATTEN HOLDERS
Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.13 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.

2.14 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 RECESSED LIGHT FITTINGS - RESIDENTIAL
Residential recessed light fittings to AS/NZS 3000, 4.5.2.3.5:
- Existing fittings or retrofit situations, fittings maybe unmarked.
- New fittings can only be labelled - CA 80, CA 90, CA 135, IC, IC-F, & IC-4.

Refer to clause INSULATION & GENERAL CLEARANCES for clearances from insulation and other elements.

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.

2.18 EXTERIOR SWITCHES AND SWITCHED SOCKET UNITS
Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches and sockets to IP56 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

2.19 EXTERIOR LIGHT FITTINGS
Using materials with superior UV protection, impact strength, and addition chemical resistance.
Weather protection minimums:
- IP54 for protected areas under eaves or verandahs etc.
- IP55 for exposed areas not subject to pressurised water (hoses).
- IP66 for areas subject to pressurised water or major splashing.
- IP67 for inground lights
- IP68 for submerged pool fittings

Security system

2.20 CONTROL PANEL
Control panel system with a minimum of one installer code, one master code, 6 zones minimum and 6 user codes. The installer to select codes to suit installation.

2.21 DETECTORS
There are two main types of detectors:
- Standard passive infrared sensors: Install in stable environments with no wind flow and no direct bright sunlight.
- Passive infrared/ microwave sensors: Install in area where environmental stability is an issue.

2.22 AUDIBLE DEVICES
Internal sirens can be either a 12V Piezo Siren or a Horn speaker with a sound pressure level of no less than 95dB.
External siren can be either a stainless steel design or have hardened plastic casing. Both designs to be fully weatherproof but not limited to IP66 Rating. The siren box to contain a strobe diffuser in either blue or red. The siren shall contain a horn speaker, 12v speaker or an electronic siren. The external siren box to have both a cover and rear wall tamper mechanism.

2.23 CABLING
Security alarm wiring to NZS/AS 1125 for cables.
Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm^2.

2.24 PERIPHERALS
Fit anti-tamper devices to detectors, control panels and equipment housings, programmed to give a tamper indication when the system is unset and a tamper alarm when the system is set.
Standard keypad manufactured of moulded hardened plastic with either a LED or LCD screen, to match the style of the wiring accessories in diameter, colour and aesthetics.

2.25 COMMUNICATIONS
Digital dialler to be built into the PCB of all control panels, with the options for both monitoring and remote dial in windows based software. Digital dialler to comply with all the industry standard communication formats including contact I.D and SIA, and NZ Telepermit certification.
Remote software able to upload / download programming changes and or history events and change status of the security alarm with the ability to be turned off if required.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

Installation

3.3 MAIN SUPPLY
Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.4 METER BOX
Fit to meter box manufacturer and Electricity Retailer requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

3.5 DISTRIBUTION BOARD
Fit to AS/NZS 3000 and board manufacturer requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.6 CIRCUIT PROTECTION
Install MCBs at distribution board to AS/NZS 3000 to protect each final sub circuit.

3.7 EARTHING CONDUCTIVE STRUCTURE & MATERIALS
Earth all at risk structural metalwork and conductive building materials to AS/NZS 3000, 5.4.6, and the Electricity (Safety) Regulations 2010.
If they form part of the building, this includes:
- Structural steel frames or members
- Light steel framing
- Exposed conductive materials, like metal sink/tub or vanity benches etc, with attached electrical units or equipment

3.8 EQUIPOTENTIAL BONDING
Equipotential Bond extraneous conductive parts together and to the electrical installation earthing system to AS/NZS 3000, 5.6, and the Electricity (Safety) Regulations 2010 and the fitting manufacturer requirements.
If they form part of the building, this includes:
- Conductive water piping (including tap etc) and exposed related connected conductive surfaces (like metal sink benches or metal cladding etc). Not required where isolated by non-conductors (plastic pipe etc) from the mass of earth.
- Other conductive piping (not earthed by other means) and exposed related connected conductive surfaces.
- Concrete reinforcing - for floor or wall forming part of a room with a shower or bath, or the shell and surround of a swimming/spa pool
- Built-in Swimming pool and spa pool - exposed conductive parts of electrical equipment, as well as exposed conductive, fixtures, fittings and pool structures within 1.25m of pool edge

3.9 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.

3.10 ARC FAULT DETECTION DEVICE (AFDD)
To AS/NZS 3000 clause 2.9, AFDD on all final sub-circuits not exceeding 20A.

3.11 EARTH LEAKAGE PROTECTION
Install RCD protection to AS/NZS 3000.

3.12 SURGE PROTECTION
Install surge protection devices to manufacturer requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class ll protection at the switchboard, protect the device by a dedicated MCB.

3.13 RCD - RESIDENTIAL 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.

3.14 RCD-AFDD COMBINED - RESIDENTIAL INSTALLATIONS
Install a 30mARCD - AFDD combined device (RCD Type II) at the switchboard for all final sub circuits not exceeding 20A, to control and protect outlets and lighting to AS/NZS 3000, (2018, 2.6 & 2.9). Protect over 20A to 32A final sub circuits with separate RCD and to AS/NZS 3000.

3.15 RCD - SPECIFIC INSTALLATIONS
Install fixed wired RCD protected outlets (SRCD) in the following higher risk 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.

3.16 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.

3.17 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.

3.18 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.

3.19 WALL BOXES
Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.20 SWITCHES AND SWITCHED SOCKET UNITS
Fit all switch units and socket units to the manufacturers requirements with heights and mounting directions as indicated in SELECTIONS.

3.21 ISOLATING SWITCHES
Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.22 LIGHT FITTINGS
Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer requirements.

3.23 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer 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.

3.24 INSULATION & GENERAL CLEARANCES

Some electrical and mechanical services, and equipment may need to have a gap to insulation and some building elements. The gaps should be to the NZS 4246 based tables below or to the equipment manufacturers requirements if they require larger gaps. Smaller gaps to manufacturers requirements can be used for equipment specifically manufactured with heat shielding or similar (excludes light fittings).

Installed gap not to be more than 50mm bigger than the required gap.
The following tables are subject to:

- The requirements of NZS 4246 for insulation.
- The insulation is exposed to the source of heat or equipment etc.
- Insulation, has passed the needle flame test to AS/NZS 60695.11.5 and/or is non-combustible.
- Gaps to hot surfaces may have to be increased with non-compliant insulation and plastic/polymeric type insulation (EPS, XPS, PIR, etc), check with insulation manufacturer.
- Gaps to hot surfaces may be able to be reduced with non-combustible insulation, check with equipment manufacturer.
- "Secure insulation" if required means, glue, mechanical fix, or provide fixed barriers at gap edge of insulation to hold in place. Rigid or semi rigid insulation may only need a firm friction fit (secure loose pieces).
- Loose fill insulation will require fixed barriers to NZS 4246 to maintain gaps.

3.25 LIGHT FITTINGS TO INSULATION

Type of fitting	**Minimum insulation clearance**	**Comments**
Recessed, marked NON-IC, or unmarked	100mm (increase if over 100W)	To NZS 4246. NON-IC fittings and new or old unmarked & unknown fittings, and/or insulation. Insulation to be secured.
Recessed, CA 80, CA 90, or CA 135.	Abut fittings	To NZS 4246. Do not cover the fittings.
Recessed, IC, IC-F, or IC-4.	Abut & cover fittings.	To NZS 4246. Ensure insulation complies.
Recessed, marked Do-Not-Cover	Manufacturer clearances	To NZS 4246. Do not cover the fittings.
Independent control gear	Place on top of insulation & 50mm from fittings	To NZS 4246. If not on top allow 50mm clearance to insulation, do not cover. Includes, transformers, ballasts & drivers etc.
Surface fittings not exposed to insulation	Nil	To NZS 4246. Where surface fittings are isolated from insulation by appropriate linings. Excludes high heat fittings.
Surface fittings & exposed insulation	200mm	To NZS 4246. This is exposed insulation to any part of the exposed fitting & bulb/tube (e.g. exposed light in an unlined basement). Insulation to be secured.

3.26 RECESSED LIGHT FITTINGS TO COMBUSTIBLE BUILDING ELEMENTS

Type of recessed fitting	**Minimum building element clearance ****	**Comments**

Marked NON-IC, or unmarked, ≤100W	100mm, vertical & horizontal	To AS/NZS 3000:2018
Marked NON-IC, or unmarked, >100W	200mm, vertical & horizontal	To AS/NZS 3000:2007
CA 80, CA 90 or CA 135	100mm, vertical & horizontal	To AS/NZS 3000:2018
IC, IC-F or IC-4	100mm, horizontal NA, vertical	To AS/NZS 3000:2018 To be NA vertical, fitting must be covered by insulation. If not covered use 100mm clearance.
Marked Do-Not-Cover	100mm, vertical & horizontal	To AS/NZS 3000:2018. Manufacturer clearances if greater than 100mm

****** Combustible building elements exclude metal elements, but include timber framing or other timber based elements, and normal linings etc. Highly flammable materials & those likely to melt will need more clearance.

3.27 INBUILT RECESSED HOT APPLIANCES TO INSULATION

Appliance	**Minimum insulation clearance**	**Comments**
Electrical heaters	Manufacturer clearances	To NZS 4246.
Electrical heaters	100mm	Manufacturer clearances not known. To NZS 4246. Clearance may be able to be reduced with non-combustible insulation. Insulation to be secured.
Heat producing appliances & equipment	Manufacturer clearances	To NZS 4246.
Heat producing appliances & equipment	50mm	Manufacturer clearances not known. To NZS 4246. Clearance may be able to be reduced with non-combustible insulation. Insulation to be secured.

Note - Appliances and equipment excludes cables, junction boxes, light switches & power sockets etc

3.28 EXTRACTS, VENTS & ROOF UNDERLAY TO INSULATION

Appliance	**Minimum insulation clearance**	**Comments**
Ducted fan motors	50mm	To NZS 4246. Includes ducted rangehoods, extractors etc. Applies to the motor unit and electrical enclosures (not the ducts).
Ducted fan ducts	Abut	To NZS 4246. Excludes motor unit and electrical enclosures.
Unducted fan motors usually discharging to ceiling space	200mm	To NZS 4246. Includes unducted, rangehoods, extractors etc, discharging into roof space. To prevent debris falling into motor. Clearance may be able to be reduced, by providing a fixed barrier around the vent.
Roofing material/underlay	25mm	To NZS 4246. Maintain clearance from underside of roofing or flexible roofing underlay, to prevent wicking.

3.29 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.

3.30 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 requirements. Fit neatly and without damage to the surrounding finish.

3.31 ELECTRIC POWERED FITTINGS AND EQUIPMENT
Install and wire fittings and equipment to individual fittings and equipment manufacturer requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.32 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.

3.33 OUTDOOR/EXTERIOR SERVICES
Install all wiring systems in accordance with AS/NZS 3000 and in accordance with the manufacturer 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 and sockets to IP56. Install to manufacturer 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.

3.34 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.

Security system

3.35 SECURITY SYSTEM
Install to the system manufacturer requirements, control panel, detectors and associated equipment fitted neatly and without damage to surrounding finishes. Installation of security equipment to AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance. All 230v mains power connections to the security panel are to be in accordance with AS/NZS 3000. The 230V power is to be switched using a dedicated single gang Isolator switch or similar.

Completion & Commissioning

3.36 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.37 COMPLETION - TESTS & CERTIFICATION
Refer to 1270 CONSTRUCTION for general test and certification requirements at completion.

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3.38 COMMISSIONING - TESTS & CERTIFICATION
Refer to 1270 CONSTRUCTION for general test and certification requirements for commissioning.

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4. SELECTIONS

Materials

4.1 SELECTIONS - FITTINGS AND HARDWARE
Confirm selections of all outlet fittings and hardware with the owner in writing before ordering.

4.2 METER BOX
Location: ~
Brand / type: ~

4.3 DISTRIBUTION BOARD
Location: ~
Brand / type: ~
MCB: ~
RCCB: ~
RCBO: ~
Surge protectors: ~
Modular contactors: ~
Main switch: ~
Timers ~

4.4 SECURITY SYSTEM

Location	Brand / type	Detector
~	~	~

Outlets - fittings

4.5 INTERIOR SWITCHES AND SWITCHED SOCKET UNITS

Item	Brand / type
Switch / socket outlets:	~
Coverplate colour:	~
Switch module colour:	~

Item	Brand / type
Light dimmers:	~
Timer switch:	~
Push button switch:	~
Symbol switch:	~
PIR sensor switch:	~
Toggle switch:	~
Waterproof switches:	~

Item - RCD	Brand / type
Socket outlet:	~
Shaver outlet:	~
Safety switch:	~

4.6 INTERIOR LIGHT FITTINGS

Fitting	Brand / type
Pendant lights:	~
Pendant cord:	~
Ceiling lights:	~
Recessed ceiling lights:	~
Recessed wall lights:	~
Recessed floor lights:	~
Wall lights:	~

Spotlights: ~
Fluorescent lights: ~
Strip lights: ~
Emergency lights: ~
Transformers: ~
LED Drivers: ~

4.7 SMOKE ALARMS

Location: ~
Brand / type: ~

4.8 EXTERIOR SWITCHES AND SWITCHED SOCKET UNITS

Item	Brand / type
Weatherproof socket outlets:	~
Timer switch:	~
Weatherproof switch:	~
Daylight switch:	~

4.9 EXTERIOR LIGHT FITTINGS

Fitting	Brand / type
Wall lights:	~
Bulkhead lights:	~
Spotlights:	~
Recessed lights:	~
Strip lights:	~
Floodlights:	~
Pole lights:	~
Security lights:	~
Security light sensors:	~
Transformers:	~
LED Drivers:	~

4.10 MISCELLANEOUS ELECTRICAL ITEMS

Item	Brand / type
Door bell system:	~
Extractor fan:	~
Water heater:	~

4.11 HEATED TOWEL RAILS

Location	Brand / type
~	~

4.12 MIRROR DE-MISTERS

Location	Size	Wattage
~	~mm x 550mm	~ watts
Brand:	~	

4.13 BATHROOM FANS AND HEATERS

Location	Brand / type
Bathroom / ensuite-Heating:	~
Bathroom / ensuite-Extract:	~

4.14 ELECTRICAL APPLIANCES

Item	Brand / type
Range:	~
Wall oven:	~
Cooker top/hob:	~
Waste disposal unit:	~
Range hood:	~