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Elbow Architects

PROJECT SPECIFICATION

Fryer Street Townhouses

32 Fryer Street

Queenstown

Otago

Issued for Tender/Consent

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PROJECT OVERVIEW

Scope

7 x New two storey multi unit townhouses.

Address

Site Address	32 Fryer Street
Suburb	Queenstown
Region	Otago

Site Conditions

Wind Zone	H - High Wind Speed
Earthquake Zone	Zone 3
Exposure Zone	Zone B - Low
Snow Loading Zone	Zone N4

Related Parties

Engineer

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1 PRELIMINARIES & GENERAL

1.1 Project Overview

1.1.1 Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the Contract together with Schedules as specified below, any written documentation clarifications issued during tendering/estimating, any manufacturer/supplier information issued with this Specification, any list of agreed Subcontractors, the contract establishment letter and any other relevant correspondence, and any Site Instructions or additional details or instructions issued as Variations.

If the Architect/Designer has not been engaged to administer the Contract or observe the works, then the term Architect/Designer, where referred to in this specification, means Contract Administrator.

These Project Specific Conditions supersede the Standard Conditions where they are in conflict. Refer any ambiguity or apparent discrepancy within or between any Contract Documents to the Architect/Designer, whose interpretation shall be binding on all parties.

Ensure that all Trades are aware of all Conditions and that subcontract prices are accepted on this basis, and in a form acceptable to the Registered Master Builders Federation or the Certified Builders Association. Ensure that all persons engaged on the works are aware of all items in this specification and on the drawings that may in any way affect their section of the works.

1.1.2 Site

Relevant site conditions are believed to be correctly represented in the Contract Documents, however the Contractor (and Subcontractors where appropriate) are requested to inspect the site to ascertain for themselves the nature and extent of the works and the rights and interests that may be interfered with in the execution of the works, as no claims for additional payment will be recognised on the grounds of insufficient description.

1.1.3 Adjacent Owners

Carry out whatever actions or precautions are required to avoid or to absolutely minimise noise, dirt, dust, access, etc. inconvenience or disruption of any nature to the adjacent owners or tenants. Indemnify the Principal against any claims arising from this source.

1.1.4 Protection

Take all appropriate precautions to protect all third party property, services, etc., and indemnify the Principal against any claims arising from the construction operations. Any damage to third party property caused by construction activities or failure to protect shall be rectified as soon as possible by the person causing the damage, or by appropriately qualified trades-persons employed by the person responsible for the damage if necessary.
Suspend operations during weather which would affect the quality of work in progress. Secure the works as soon as possible against adverse weather, dust and vandals. Avoid structural damage that is

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caused by overloading.
Adequately protect all finished work and maintain until the date of Practical Completion. Each trade shall protect the work of all other trades, and each trade is responsible for making good any damage they cause to finished works. Arrange special protection as required for windows and doors, finished timber work, plumbing fittings and hardware, cabinets and other joinery, and similar items.

1.1.5 Responsibility

The Contractor will be held responsible for the full period of their legal responsibility in connection with this Contract for ensuring that all work execution, materials, and fittings, are completely in accordance with Contract requirements.
The Contractor is responsible to the Principal for the appropriateness and fitness, in relation to a reasonable expectation or requirement, of all of the materials and workmanship incorporated into the works by themselves or their subcontractors; for this reason few specific guarantees are required in these contract documents. The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.
No apparent expression of the Architect's/Designer's reasonable satisfaction shall be deemed to be acceptance of defective materials or workmanship within the terms of the Contract or to be an authority for any Variation except where such Variation is authorised as provided for in the Contract. Instructions that are given verbally are deemed to be instructions for proper execution of the works and do not involve extra charges.

Workmanship in all trades is required to be equal to or better than recognised good trade practice. The Contractor shall provide all necessary setting out information and component dimensions for subcontractors and shall check and be responsible for the accuracy of their work.

Should any tradesperson consider that the surface finish or general conditions of previous work are unsatisfactory to ensure a proper finish for their own work thereon, that tradesperson shall give immediate notice to the Contractor or Architect/Designer as appropriate and shall not proceed until all necessary improvements have been made. Failing such notice the trade concerned will not be relieved of responsibility for a poor finish due to such unsatisfactory condition.
Specialist Finishes Subcontractors are responsible for ensuring that substrates are completely appropriate for them to achieve first class results, and to this end shall, in sufficient time, instruct the Contractor with regard any fixings, primings, sealings or whatever for the substrate that vary in any way from the substrate manufacturer's standard recommendations. The Contractor shall advise the Architect/Designer with regard these variances, and not proceed until the Architect/Designer has agreed to them.

The Contractor and all Subcontractors affected shall be jointly and severally responsible for completion of the whole of the works in a completely watertight condition and shall therefore examine all details to be satisfied that this condition can be achieved. If any detail is considered unsatisfactory the Architect/Designer shall be notified immediately and he/she will then either interpret the detail to the Contractor's satisfaction, or accept responsibility for watertightness at the points in question, always assuming reasonable workmanship.

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Ensure that all materials or items incorporated into any particular construction or finish are compatible and that their individual use is approved by the manufacturers and/or suppliers of the other parts of the system.
For all electronic/electrical/mechanical operating systems all work and all necessary materials and items incidental to the primary item specified, that are incorporated into the works, shall be such as to leave a neat, efficient, easily maintained and robust installation, completely in accordance with all of the recommendations of the primary items' manufacturers. Where appropriate, source all parts of a system from a single supplier or manufacturer.

The Contractor shall make provision for all temporary works and services required for the satisfactory completion of the contract works. The Contractor shall pay all associated costs and fees; carry out all necessary maintenance, alterations and servicing requirements; and remove temporary works and services on completion of the contract works. Temporary works and services shall comply with the requirements New Zealand Building Code.

1.1.6 Specification

This Specification covers contract administration, standards, materials quality, workmanship and the scope of works only: the exact nature of the works and all specialist items, descriptions, etc., are contained on the drawings, which also take full precedence.
All clauses in all specification sections apply to their full extent and meaning to the entire Contract.
Trade sections and paragraphs have been introduced into this specification for reference only and it shall not be construed that each trade section is a complete segregation of the materials and labour of that trade. The onus is on all trades to be conversant with any and all clauses which in any way affect their work.
(Be aware that the ‘scope’ noted in the ‘Project Overview’, and scope and general extent clauses within this specification, are included to provide a general indication only and must NOT be interpreted as schedules of quantities - the exact nature and extent of all aspects of the works are shown on the drawings).

1.1.7 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), British Standards (BS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in these Contract Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue, and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.
Where Standards have a number of Divisions, e.g. AS/NZS 3500.1, AS/NZS 3500.2, etc., each of the Divisions relevant to this project is deemed to form part of this specification.
Retain current copies of significant cited documents and manufacturer's technical literature on the site.

1.1.8 Authorities and Charges

Comply with all relevant provisions of the NZ Building Code, and with all relevant territorial or statutory authority regulations, by-laws, obligations, etc. Give all required notices.

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The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the Contractor as quickly as possible after they are issued by the Territorial Authority. Note: It is an offence under the Building Act to carry out work not in accordance with a Building Consent.
Should the Building Consent be subject to any conditions which modify the requirements of the Contract Documents in any way, the Architect/Designer reserves the right to negotiate any or all of these modifying conditions with the Building Consent Authority. If after these negotiations additional work is required, it will be handled as a Variation to the Contract.

1.1.9 Code Compliance Certificate

The Principal will apply for the Code Compliance Certificate (CCC) and any other licenses or approvals for the building to be used. However, Practical Completion will NOT be certified until the CCC inspection has occurred and any additional works required by the local Building Consent Authority have been completed. To this end it is recommended that the Contractor obtains all required certificates, guarantees, Producer Statements, as-built drawings, etc., required for the CCC application as work proceeds, to facilitate application for the CCC as soon as the works are completed. For their part, the Principal hereby undertakes to apply for the CCC within one day of all required material being in hand. Likewise, the Contractor should have capacity available to attend as quickly as possible to any items identified by the Building Consent Authority as being required prior to the issue of the CCC.

1.1.10 Coordination of the Works

Coordinate the works of all trades to ensure efficient progress of the works. Ensure that all holes, sleeves, penetrations, supports, etc., that are required for services are correctly incorporated as work proceeds. Identify and sufficiently forward-notify the appropriate persons of all deadlines for the supply of fittings, components, information, etc.

1.1.11 Documents Interpretation

Except where they are clearly to the contrary, all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes. Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.
The word ‘provide' and the word ‘fix' used separately in the Documents shall be taken to mean ‘provide and fix' unless otherwise stated.
When the term ‘allow' occurs in the Documents, except with reference to Monetary Allowances, the cost of the item shall be at the risk of the Contractor.
The terms ‘approved', ‘directed', and ‘selected' when used in the Documents refers to the approval, direction or selection of or by the Architect/Designer. Please give adequate notice of when these decisions are required. ‘Architect/Designer' shall mean the Architect or Designer, their representative or any Consulting Engineer engaged by the Architect/Designer.

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1.1.12 Work Shown and Mentioned

The Contract Documents show the extent and nature of the works but there is no warranty expressed or implied that they show each and every minor detail or item required to be included by the Contractor. Should any material, structural member, fixing, or item or work appear to be inadequately described, yet obviously necessary for the neat, strong and satisfactory completion of the work, it shall be incorporated into the Contract Works.

1.1.13 Site Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance. Comply with the relevant provisions of the New Zealand Building Code, in particular Clause F5.

So far as is reasonably practicable and according to a PCBU's (person conducting a business or undertaking) primary duty of care, take all necessary steps required 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 site safety rules and are not unnecessarily exposed to hazards.

Each PCBU, so far as is reasonably practicable, must ensure the health and safety of workers, and that other people are not put at risk by its work. If more than one PCBU has a duty in relation to the same matter, each PCBU with the duty must, so far as is reasonably practicable, consult, co-operate with, and co-ordinate activities with all other PCBUs who have a duty in relation to the same matter. PCBUs can enter reasonable agreements with other PCBUs to meet their duties, but cannot contract out of their duties.

Notify WorkSafe as soon as possible when a notifiable event occurs. Take all reasonable steps to preserve the site of the notifiable event in accordance with WorkSafe requirements. Ensure that the site of the event is not disturbed until authorised otherwise by WorkSafe. Keep records of all notifiable events.

Scaffolding shall comply with all Statutory and Local Authority Regulations, with the WorkSafe 'Best Practice Guidelines for Scaffolding', AS/NZS 1576 (Scaffolding equipment), AS/NZS 4576 (Guidelines for Scaffolding), and AS/NZS 4994 (Roof edge scaffolding), and shall be maintained for the duration and removed on completion.

The use of ballistic fixings must absolutely comply with all relevant safety recommendations at all times. No rubbish fires are allowed on site. Portable/personal disc/tape players, radios and iPods must not be used anywhere on the site. No smoking on site, except in the designated location in accordance with the Smoke Free Environments Act 1990, the location of which will be determined by the Contractor, with the approval of the Principal.

A PCBU's primary duty of care includes, but is not limited to, so far as is reasonably practicable:
- providing and maintaining a work environment that is without risks to health and safety;
- providing and maintaining safe plant and structures;
- providing and maintaining safe systems of work;

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- ensuring the safe use, handling and storage of plant, structures and substances;
- providing adequate facilities for the welfare at work of workers in carrying out work for the business or undertaking, including ensuring access to those facilities;
- providing any information, training, instruction, or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking;
- monitoring the health of workers and the conditions at the workplace for the purpose of preventing injury or illness of workers arising from the conduct of the business or undertaking.

Before commencing work on the site, the Contractor shall prepare and submit to the contract administrator a health and safety plan. The health and safety plan shall include, but not be limited to:
- the health and safety of all people on the site and on other properties, and the general public;
- identification of existing and potential construction hazards and risks;
- safety procedures to eliminate, isolate or minimise construction hazards;
- the equipment to be used to minimise the hazards;
- the maintenance of a register of hazards 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.

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

1.1.14 Variations

The Architect/Designer will issue Site Instructions (SI) to amend or clarify the works. Upon receipt of a SI the Contractor shall immediately notify the Architect/Designer if they believes there are price or timing adjustment implications. The Architect/Designer will then issue a Variation Price Request (VPR) for pricing of the possible Variation by the Contractor, within the time stipulated, or within 10 days if no time is stipulated. If the Contractor does not return the VPR within the time stipulated the Architect/Designer will assess it at reasonable rates. Once agreement is reached on price and/or timing a Variation Order (VO) for the item will be issued. Note that works covered by a SI or a VPR must NOT be actioned until the VO is issued.

When a Variation is contemplated and timing does not allow SI and VPR action the Contractor is to advise, and record in the site diary, an estimate of price and timing implications. If accepted by the Architect/Designer, a VO will be issued immediately. The Contractor shall then co-operate with the Architect/Designer to establish agreed pricing.
Claims for Variations neither priced nor estimated prior to being put in hand (but considered valid) will be incorporated into Progress Payment Certificates or the Draft Final Accounts as claimed and accepted but with a proviso allowing 5 (five) days for written objections by either the Principal or the Contractor, to any aspect of them, for further consideration.

The Main Contractor's Variations Margin agreed pre-contract will be the maximum accepted for any trade unless higher rates are nominated pre-contract and are accepted. The Main Contractor's agreed Variations Margin shown shall be deemed to include all preliminary and general costs, overheads, variation processing costs, and profit. If no margin is given, a 5% overall margin will be

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applied.
Note that 'loss of anticipated profit' claims consequent upon reduction of works extent will NOT be recognised, and that the cost of processing Variations is deemed to be included in the P & G Allowance.
Also note that for Variations pricing all materials shall be charged at the actual net invoiced cost plus margin; i.e. recognised 'Trade Price', volume discounted where appropriate.

1.1.15 Cleaning and Completion

Clear construction debris and rubbish from the works at regular intervals, and additionally if so instructed by the Architect/Designer. Clean each space thoroughly before commencing any finishing works.

In preparation for the Practical Completion inspection carry out the following:
- Clean the works thoroughly, removing all debris, surplus materials, splashes, marks, temporary markings, etc. (All cleaning methods and materials shall be as recommended by the manufacturer of the item being cleaned).
- Remove protective wrappings and coverings unless otherwise directed.
- Touch up minor painting faults, carefully matching colour, and brushing out edges. Repaint any badly marked surfaces back to suitable break-lines.
- Adjust, ease and/or lubricate as required all doors, drawers, controls and other moving parts to ensure their efficient operation.
- Any other works required to leave all spaces ready for immediate occupation and all electronic/electrical/mechanical systems fully operational.
- Clean out all spoutings, gutters, downpipes, and gullies and flush out all drains.
- Clean all sanitary appliances and check all aspects of the water services.
- Thoroughly re-inspect all aspects of the works (and have any defects fully rectified) to be certain that the works are completely ready for the Practical Completion inspection - if an unreasonable number of items are noted by the Architect/Designer during the inspection it will be terminated and then rescheduled for at least a week forward to allow proper completion to be achieved.

(Note that a Code Compliance Certificate must be obtained before Practical Completion will be certified. Obtain all required certificates, guarantees, as-built drawings, etc., as work proceeds to enable the CCC application to be submitted as soon as construction is completed).

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2 SITE & EXTERNAL

2.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

2.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

4402.4.1.1:1986(NZS)	Soil compaction tests - Determination of the dry density/water content relationship - Test 4.1.1 New Zealand standard compaction test
4431:1989(NZS)	Code of practice for earth fill for residential development
NZBC E1	Surface Water

2.3 Siteworks

2.3.1 Scope

This section sets out the general requirements for sitework necessary for the satisfactory completion of the contract works. All aspects of this work shall be carried out to comply with all statutory obligations and regulations of regulatory bodies controlling the execution of the contract works, and in accordance with the project design documentation.

2.3.2 Requirements

2.3.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

2.3.2.2 Compliance

Allow for all work associated with the safe and orderly execution of the siteworks, including complying with all Territorial Authority requirements, Building Consent, Building Act, Health and Safety requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the works.

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2.3.2.3 Existing Subsoil Conditions

Carry out all necessary inspections of existing subsoil conditions. Review and assess any factual geotechnical information available for the site or surrounding area included in the contract documents or from any other readily-available source (e.g. the Territorial Authority). Take full account of such information, and ensure that any proposed earthworks methodology and machinery is appropriate for the ground conditions.

2.3.2.4 Contaminated Ground

Comply with the conditions of the Resource Consent/Building Consent related to contaminated material, and with the approved Site Management Plan (SMP), prepared in accordance with Ministry for the Environment Contamination Land Management Guidelines No.1: Reporting on Contaminated Sites in New Zealand and the NES Soil Regulations.

All material classified as sufficiently contaminated and requiring removal from site shall be stripped and transported to a suitable and approved disposal site. No material is however to be removed from the site without the prior approval of the contract administrator.

The Contractor's project-specific Health and Safety Plan shall complement the SMP and address all other health and safety requirements applicable to the works.

2.3.2.5 Definition of Good Ground

Good Ground means any soil or rock capable of permanently withstanding an ultimate bearing pressure of 300 kPa (i.e. an allowable bearing pressure of 100 kPa using a factor of safety of 3.0), but excludes:
- Potentially compressible ground such as topsoil, soft soils such as clay which can be moulded easily in the fingers, and uncompacted loose gravel which contains obvious voids;
- Expansive soils being those that have a liquid limit of more than 50% when tested in accordance with NZS 4402:Test 2.2, and a linear shrinkage of more than 15% when tested, from the liquid limit, in accordance with NZS 4402:Test 2.6, and
- Any ground which could foreseeably experience movement of 25mm or greater for any reason including one or a combination of: land instability, ground creep, subsidence, (liquefaction, lateral spread - for the *Canterbury earthquake region only)*, seasonal swelling and shrinking, frost heave, changing ground water level, erosion, dissolution of soil in water, and effects of tree roots.

Soil below concrete foundations, footings and slabs-on-ground: unless specified otherwise, the general intent is to excavate to a stable, undisturbed sub-grade of 300 kPa ultimate bearing capacity.

Unless specified otherwise, soils (except those excluded from the Good Ground definition) tested with a dynamic cone penetrometer in accordance with NZS 4402: Test 6.5.2, shall be acceptable as good ground for building foundations if penetration resistance is no less than:
- 5 blows per 100mm at depths down to twice the footing width;
- 3 blows per 100mm at depths greater than twice the footing width.

Depths shall be measured from the underside of the proposed footing.

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2.3.2.6 Geotechnical Report

A geotechnical investigation of the site has been carried out - refer to the Geotechnical Report appended.

2.3.2.7 Stormwater & Sediment Control

Ensure the environmental protection of the site during the works. Carry out construction works and operations to ensure that they fully comply with the relevant controlling environmental authority's sediment control and stormwater discharge guidelines.

Provide suitable measures to prevent or minimise sediment generation and silt runoff in accordance with the requirements of the controlling Territorial Authority. Where required, detailed design of mitigation measures such as fences, cut off ditches, detention ponds, etc., shall be undertaken by a suitably qualified person employed by the Contractor.

Erosion and sediment control measures shall be maintained and remain in place until surface reinstatement has been established. If at any time the performance of the stormwater and sediment control measures, or ongoing review of them, indicates that they need to be extended or modified, the design modification and construction of these shall be undertaken by the Contractor at no extra cost to the Principal.

Basic management principles shall be implemented, in particular:
- areas being exposed at any one time shall be kept to a minimum;
- diversion ditches and catch drains or earth bunds to intercept and divert upslope stormwater runoff around areas of earthworks;
- waterborne silt captured by filter mesh fences, hay bales, vegetation buffer strips or settlement ponds/areas, in a way that manages adverse downstream effects;
- stockpiles of topsoil, excavated earth or other material shall not be positioned where they can be eroded or washed into any drain or watercourse.
- only pump water from trenches and detention areas using methods to prevent sediment entering any drain or watercourse.
- all soil-contaminated water shall be properly filtered before discharging into the stormwater drainage system.

2.3.2.8 Notifiable Work

Notify WorkSafe NZ of work that is notifiable (particular hazardous work) under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

2.3.3 Clearing & Stripping

2.3.3.1 Clearing

Remove from the site all vegetation and obstructions within the area of the earthworks that are not designated as remaining in the contract documents.

Clearing shall be carried out as a separate operation before stripping and excavation. Clearing shall include complete removal from the site of lightweight structures, foundations, trees, tree stumps,

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logs, roots, scrub, grass and other vegetation, paving materials, fences and rubbish, and the off-site disposal of such items.

The removal of surface grass and weeds shall be completed as part of the topsoil stripping operation.

All trees within the limits of the earthworks shall be removed unless designated as remaining by the Contract Administrator and contract documents.

Protect trees and other vegetation designated as remaining within the earthworks area, and trees and other vegetation beyond the limits of the earthworks, from damage by these operations.

Extraction of tree stumps (if any) shall include the removal of roots greater than 25mm diameter.

2.3.3.2 Disposal of Cleared Material

Unless specified or directed otherwise, all material cleared shall become the property of the Contractor, and shall be removed from the site and disposed of in a safe and legal manner, and in such a manner as to cause as little inconvenience as possible to adjacent properties and the public. Pay all required tipping and landfill fees.

2.3.3.3 Burning of Cleared Material - Not Permitted

The disposal of cleared materials by burning is NOT permitted on the site.

2.3.3.4 Stripping

Stripping shall be carried out as a separate operation after clearing and before excavation. All turf and organic topsoil shall be stripped from the areas subject to excavation before any excavation operations commence in these areas.

Except where limited by boundaries and existing structures or other limiting features, stripping shall extend no more than 500mm beyond the limits of areas subject to earthworks or construction, and to such depth as to avoid unnecessary over-excavation.

Topsoil to be kept, shall be stockpiled separately, away from other materials and as approved or directed by the Contract Administrator, for later re-spreading and use. Maintain and manage topsoil stockpiles to minimise contamination and erosion and to allow maximum reuse on the site.

2.3.4 Excavation

2.3.4.1 Excavation General

Excavate out all ground material above the finished levels or contours indicated on the design drawings, making due allowance for the construction of foundations, ground slabs, retaining walls, hard paving, underground utilities, landscaping and reinstatement of topsoil. The manner of excavations is the responsibility of the Contractor.

Excavation, as a minimum, shall include stripping of the site to remove all rubbish, noxious material and organic material, including topsoil, covering the area where the buildings, paving and other work is to be placed.

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Excavations shall be undertaken in accordance with the Excavation safety | WorkSafe'

As necessary, cross reference and coordinate excavation work with the design drawings - Architectural, Structural, Building Services, Civil.

As necessary, coordinate excavation work with other trades as to set-out and timing to ensure that all cut faces are covered or finished etc. as soon as practicable after the excavation is complete.

If, in the opinion of the Contract Administrator, weather conditions or the excavation methods employed are such as to result in undue disturbance of adjacent ground or ground below final trimming level, suspend the work and complete the excavation in accordance with the Contract Administrator's instructions.

2.3.4.2 Excavation Inspections for Foundations

Give at least 48 hours' notice prior to commencement of each stage of excavation work. Where required, the proposed methods of completing each phase of the work shall be discussed and agreed with the Contract Administrator prior to starting.

Give at least 12 hours' notice of when a foundation inspection is required. Backfill, basecourse, site concrete, reinforcing, etc., shall not be placed in foundations until the Contract Administrator has been given adequate opportunity to inspect the relevant area.

2.3.4.3 Unearthing of Waahi Tapu & Cultural Sites

During excavation, should a waahi tapu or other cultural site be unearthed, cease excavation operations immediately, and inform the Contract Administrator. Inform the local Iwi, and inform Heritage New Zealand Pouhere Taonga and apply for an appropriate authority if required. Take appropriate action, following discussions with Heritage NZ Pouhere Taonga and Territorial Authority, and runanga/runaka/iwi if Maori, to remedy any damage and/or to restore the site.

Note; in accordance with the Heritage New Zealand Pouhere Taonga Act 2014, where an archaeological site is present (or uncovered), an authority from Heritage New Zealand is required if the site is to be modified in any way. An archaeological site is defined in the Heritage New Zealand Pouhere Taonga Act 2014 as any place in New Zealand (including buildings, structures or shipwrecks) that was associated with pre-1900 human activity, where there is evidence relating to the history of New Zealand that can be investigated using archaeological methods.

2.3.4.4 Excavation of Unforeseen Obstructions & Ground Conditions

Notify the Contract Administrator immediately in the event that any of the following conditions are encountered during excavation:

- unexpected underground obstructions or voids;
- unforeseen variations in ground material types or properties;
- observations of buried vegetation, groundwater flows or seepages.

2.3.4.5 Excavation of Hazardous and/or Contaminated Materials

Should material encountered during excavation appear to be hazardous and/or contaminated in any way such that it would not be accepted at a conventional landfill site, immediately cease all such work

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likely to spread the hazardous material or worsen the contamination, and notify the Contract Administrator and seek instruction as to how the work should proceed.

2.3.4.6 Excavation for Foundations

Foundation excavations shall be accurately cut true to line, level and angle, to minimum sizes and to the levels and grades required for all slabs, footings and foundations, and over the rest of the areas shown for levels adjustment. Foundation excavations shall extend down to firm undisturbed ground to the required depth. Refer to the foundation layout and details shown on the drawings.

2.3.4.7 Excavation for Services

Excavate trenches for all services, including drainage, plumbing, electrical, gas, telecommunications as indicated on the drawings. Cross reference and coordinate all excavations with the Architectural, Structural and Building Services drawings.

2.3.4.8 Surplus Material

Remove from site and dispose of in a safe and legal manner all surplus material as it is excavated. Fouling of the site or adjoining public or private property and roads by spilled material is not permitted. Pay all tipping and landfill fees required.

2.3.4.9 Maintain Excavations

Secure and maintain excavations free from slips, erosion, water and other fluids or fallen materials. Provide and maintain stable battered slopes, pile liners, shoring, strutting, sheet piling, planking, pumps and other materials or plant necessary for carrying out and maintaining excavations. Remove these when no longer necessary.

Allow to protect exposed faces of temporary batters and slopes as necessary using an approved protection method, to prevent slumping and collapse.

2.3.4.10 Excavation Dewatering and Stormwater Control

Keep excavations free from ponding stormwater, and provide all pumps, drainage pipes and other equipment necessary for dewatering operations.

As necessary, dig suitable temporary sumps/pits outside the line of foundations to receive dewatering pumps.

If water enters concrete foundation excavations, the water shall be pumped out, and any soft materials not suitable for receiving concrete shall be removed and replaced with clean compacted hardfill or site concrete to the required levels.

Comply with the conditions of the Resource Consent/Building Consent related to stormwater and sediment control during construction, and employ suitable methods for minimising the runoff of sediment laden water from the site in accordance with accepted practices and guidelines. Refer to Requirements - Stormwater & Sediment Control.

Do not permit any flooding of property, footpaths or roadways as a result of excavation operations or dewatering measures, including the use of pumping equipment.

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Provide channels, pipes or other approved means for effectively conveying groundwater to the nearest adequate and approved discharge point.

The discharge of groundwater to piped or open drains or channels shall only be permitted when prior approval from the controlling Territorial Authority has been obtained.

2.3.5 Earth Fill

2.3.5.1 Backfilling

The backfilling of earth fill around structures, and where required to bring undercut areas to finished levels and form, shall consist of selected earth fill material, evenly spread and compacted in uniform layers, with the use of suitable plant and equipment to achieve the specified relative compaction.

Do not, under any circumstances, substitute any specified hardfill backfill with earth backfill without prior written instruction from the Contract Administrator.

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3 BRICKWORK

3.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

3.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
3604:2011(NZS)	Timber-framed buildings
4210:2001(NZS)	Masonry construction: Materials and workmanship
4236:2002(SNZHB)	Masonry veneer wall cladding

3.3 Firth Masonry Brick Veneer Cladding

3.3.1 Scope

Supply and lay the selected Firth Masonry Veneer brickwork as brick veneer cladding to the locations, layout and details shown on the drawings, complete with all associated lintels, ties, fixings and accessories for proper installation. All aspects of this work shall be in complete accordance with all Firth Masonry Veneer technical literature and relevant standards under the New Zealand Building Code (call 0800 800 576, or check www.firth.co.nz for the latest editions), BRANZ Appraisal No.967,and as shown on the drawings.

No substitutions are permitted for Firth Masonry Veneer bricks and associated Firth products.

3.3.2 Requirements

3.3.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

3.3.2.2 Substitutions

Firth masonry veneer bricks shall be as specified herein and as indicated on the design drawings. The substitution of Firth masonry veneer bricks for an alternative brand or material is not permitted under any circumstances.

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The substitution of a specified Firth brick style for an alternative Firth brick style by the Contractor shall only be permitted with the Contract Administrator's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate an alternative Firth style to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

3.3.2.3 Quality Assurance

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of the works are carried out to the highest standard.

3.3.2.4 Inspections & Reporting

BCA inspections of the works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Carry out all necessary pre-installation and installation inspections for each area of the works.

Complete all necessary Pre-Installation Checklists, and all necessary Installation Checklists.

Complete all necessary Sign-Off Certificates before handing over completed work.

3.3.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected Firth Masonry Veneer Cladding work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional cost to the Principal.

3.3.3 Firth Masonry Veneer Range

Masonry veneer cladding shall be constructed from Firth Strata Brick® 70 Series concrete bricks. Slimline brick units with a fair face finish, manufactured to AS/NZS 4455.1. Installed as masonry veneer construction, to a stretcher bond pattern, in accordance with NZBC E2/AS1 Section 9.2 and NZS 4210 and Firth technical literature, to the locations and details shown on the drawings.

Product Details:
- Standard Unit Dimensions: 290mm long x 70mm high x 70mm deep.

- Coverage: 39 units p/m² wall face.
- Weight: 2.9kg per unit. 160kg/m² installed weight including 10mm mortar joints.
- Finish: Fairface.
- Edges: Straight.
- Colour Tone: 'Premium White', 'Urban Grey' ‘Serenity”, ‘Antique Blend’, Graphite (South Island only) - *to the colour specified*.

Colour Tone:
Installed Location:

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3.3.4 Co-operation

Co-operate with other trades in the setting out of the works and to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings; including all damp proofing and membranes, wraps, rigid air barriers, flashings, clearances to other building components and elements, and any other related works.

Coordinate with trades to form all necessary concrete slab rebates and wall openings to the required dimensions and locations, and for the locations of pipes, outlets, cables, meter boards and other fittings installed by others, and to install Firth Masonry Veneer Cladding as required.

3.3.5 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall only be carried out by Licensed Building Practitioners - Bricklaying and Blocklaying. Submit evidence on request of experience, relevant qualifications, LBP Licence - Bricklaying & Blocklaying, New Zealand Masonry Trades Association (NZMTA) Member Registration.

Workmanship and materials shall conform to the requirements of NZS 4210 in conjunction with NZS 4230, NZS 3604, NZS 4229 and NZBC E2/AS1. Brick veneer work shall be true to line, level and plumb, and within the tolerances tabled in NZS 4210 and SNZ HB4236.

During the progress of work every care must be taken to prevent moisture penetration of the bricks. No bricklaying shall proceed during wet weather. Upon completion of each day's work, exposed tops of brick veneers shall be protected from inclement weather. Comply with NZS 4210 Cold Weather Construction and Hot Weather Construction requirements.

Take precautions during the erection of the brick walls to avoid mortar splash and surface damage of surrounding finished work. Clean all brick face work as the work proceeds using clean water and sponges. Where scaffold planks are at an upper level, brickwork is to be protected from mortar stains and kept clean.

3.3.6 Delivery & Handling

All pallets of Firth masonry bricks shall be checked by the bricklayer on site for colour, batch number and quality prior to commencing any laying. Reject damaged and/or faulty bricks upon inspection and resolve with Firth before laying proceeds.

Store Firth Masonry Veneer bricks and associated brickwork materials on flat level ground on the delivery pallets. Keep dry and protect from damage and contamination until use.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life.

Should a problem be encountered with any Firth product during use or delivery, immediately contact Firth on 0800 347841. Do not continue to use the product that is not performing to specification or

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expectation. Keep the product in question and where possible, the document batch numbers and/or manufacturing details.

Handle materials and products in accordance with the manufacturer's recommendations and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

3.3.7 Damp-proof Course

Install all brickwork related damp-proof courses in accordance with the requirements of NZBC E2/AS1 and to the details shown on the drawings.

Manufacturer & brand name:
Location:

3.3.8 Mortar

Mortar shall have a minimum compressive strength of 12.5 MPa, and be manufactured from cement, sand, lime (if required), and admixtures, and be accurately measured and mixed in accordance with NZS 4210.
Firth 'Dricon Trade Mortar' may be used in accordance with the manufacturer's requirements.

Mortar shall be mixed in a mechanical power mixer for 4 - 8 minutes, in the proportions specified to achieve a slump of 75mm ± 6mm. No re-tempering of mortar will be allowed after 1½ hours from mixing.
The use of an approved waterproofing and plasticising agent as a substitute for lime is permitted when used in accordance with the manufacturer's instructions only.
Mortar must be mixed by volume and the main contractor advised at the commencement of the contract of the ratio to be used.

3.3.9 Brickwork

Bricks shall be selected and laid from a minimum of three pallets, when practical, to provide a uniform spread of colour over the exposed face.

Keep all bricks covered to avoid saturation. Fully protect the tops of incomplete veneers from rain for a period of 6 hours after laying.
Bricks shall be laid dry, in stretcher bond with ½ bond pattern, true to line, plumb and level, and in accordance with best trade practice and in full accordance with Firth's recommended procedures. All bricks shall be fully bedded in mortar.
Cut bricks to a clean sharp edge using a diamond saw. It should not be necessary for any piece of brick less than 50mm in length to be laid.

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Form a consistent cavity between the structural wall and brick veneer to the dimension shown on the drawings. Keep the cavity clear of mortar droppings and clean mortar from ties as the works progress. Clean off mortar dags and protrusions from the cavity face. Clean-out openings (wash outs) shall be provided along the base every 10th brick and at corners.

Install bricks with the appropriate screw-fixed wall ties to veneer walls as the bricks are laid. Wall tie type, spacing, fixing and installation shall be as defined in NZBC E2/AS1 Tables 18A, 18B, 18C, and NZS 4210 and meet the durability requirements as defined in NZS 3604. Wall ties shall be embedded in the mortar course and fixed to wall framing, or structural concrete, in accordance with the requirements of NZS 4210 and NZBC E2/AS1. Position wall ties along the wall at maximum 600mm centres and maximum 400mm vertically. Alternative spacings shall be as detailed in NZ Standards may be used. Check for specific tying patterns for the specified Firth Masonry Veneer brick. Place additional ties within 200mm of the edge around openings and at the end of unsupported wall panels.

All joints generally shall be 10 mm ±2mm wide. All joints, both horizontal and vertical (perpends), shall be consistent in thickness.

Form weepholes in the bottom course of walls at ground level, intermediate beams and ledges and wherever the cavity is closed at the base such as window and door openings. Weepholes shall be formed wherever the cavity is closed at the base. Weepholes will be kept free of mortar and other restrictions and unless noted otherwise deformed to achieve 1000mm m2 per lineal meter.

Window sills shall be laid at the same slope (15-20 degrees) with an overhang of 30 - 50mm unless detailed otherwise. Sill bricks shall be evenly spaced and of an even thickness and appearance. Provide soldier courses above window and door openings if and where shown on the drawings only.

As the work proceeds, build into brickwork all necessary bolts, metalwork items including steel angle lintel bars and other fittings and fixings shown on the drawings or otherwise required for the work.
Steel angle lintels shall be sized and installed in accordance with NZBC E2/AS1 and as shown on the drawings, and meet the durability requirements as defined in NZS 3604.
Install all necessary flashings to window and door openings, and as required, to the details shown on the drawings and in accordance with NZBC E2/AS1 requirements. Install vermin stop as required.

Movement control joints shall extend through the brick veneer, be a continuous 10mm vertical or finger jointed gap, and formed and weatherproofed to the locations and details shown on the drawings at not more than 6m centres. Confirm the location of all control joints prior to installation of brickwork.
Seismic separation joints shall be formed and weatherproofed to the locations and details shown on the drawings.

3.3.10 Pointing

Mortar joints shall be concave and tooled to a depth not exceeding 6mm after the initial stiffening has occurred.

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3.3.11 Surface Coating

Completed brickwork shall be treated with the specified water-based, penetrating masonry sealer. Applied to properly prepared brickwork in strict accordance with the masonry sealer manufacturer's requirements.

Manufacturer & brand:
Location:

3.3.12 Completion

Check that the brickwork has been installed correctly, true to line, plumb and level, and that all pointing work has been neatly finished.

Leave brickwork clean and free of damage, defects, marks, mortar and other contaminants. Repair any damaged or defective work where required.

Carry out any required surface cleaning of brickwork in strict accordance with Firth requirements.

Leave surrounding surfaces clean and free of contamination. Remove rubbish and excess material from site.

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4 WATERPROOFING

4.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

4.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3740:2010(AS)	Waterproofing of domestic wet areas
4858:2004(AS/NZS)	Wet area membranes

4.3 Mapei Liquid Applied Waterproofing Systems

4.3.1 Scope

Supply and install the specified Waterproofing Systems from Mapei to the locations identified on the drawings, complete with accessories. All aspects of this work shall be in complete accordance with Mapei product technical literature (check www.mapei.co.nz, or call 09 921 1994 for the latest editions), associated Mapei BRANZ Appraisals, other relevant product manufacturers' recommendations, and as shown the drawings.

No substitutions are permitted for the specified Waterproofing Systems from Mapei.

4.3.2 Interior Wet-Area Waterproofing Membrane

Mapei Mapegum WPS. A fast drying flexible liquid membrane for waterproofing.

Where to use:
- For waterproofing indoor floor and wall surfaces that are not subject to rising damp.
- As a flexible, anti-fracture membrane, applied before the installation of ceramic tiles or stone material.
- Mapegum WPS can be used on plasterboard, gypsum or cementitious render, lightweight cement block and marine-plywood.
- Mapegum WPS can be used on cementitious, anhydrite, wooden and magnesite substrates and existing ceramic and natural stone after the application of Eco Prim T primer.

Application examples:
- Waterproofing walls and floors in bathrooms and shower cubicles before laying ceramic tiles, natural stone and mosaic.
- Waterproofing kitchen walls and floors and work tops before laying ceramic tiles and natural stone.

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Technical characteristics:
- Mapegum WPS is a ready-to-use, solvent-free, one-component, grey-coloured paste with a base of synthetic resins in water dispersion.
- Mapegum WPS is resistant to water, limewater (pH > 12), water which contains chlorides and normal household detergents and cleaning products.

Recommendations:
- Do not apply Mapegum WPS if the temperature is lower than +5°C.
- Mapegum WPS must be protected from abrasion caused by pedestrian traffic by installing ceramic tiles or stone material.

Apply Mapegum WPS to properly prepared substrates in strict accordance with the manufacturer's requirements and BRANZ Appraisal No.484.

Installed location:

4.3.3 System Accessories

4.3.3.1 Mapenet 150 - reinforcing mesh

Mapei Mapenet 150. An alkali-resistant fibre glass mesh used to reinforce waterproof protection layers, anti- fracture membranes and cementitious smoothing and levelling layers.

Where to use:
Reinforced strengthening for:
- Mapelastic, Mapelastic Smart used for waterproofing terraces, balconies, swimming pools, baths, shower cubicles, etc. with ceramic tile or stone finishes;
- Stressed areas in waterproofing layers made using Mapelastic Smart;
- Mapelastic Smart when used to form anti-fracture membranes on internal screeds and walls with micro cracks.

Technical characteristics:
- The mesh is made from glass fibres treated with a special primer which makes it resistant to alkalis and improves its bond to all waterproofing and smoothing and levelling products (where its use is recommended).

Application Procedure:
- The glass fibre mesh must be completely embedded in the waterproofing layer or smoothing and levelling compound.

Technical data:
- Colour: blue.
- Weight: 150g/m².
- Mesh size: 4mm x 5mm.
- Resistance to alkalis: yes (according to ETAG 004 guidelines).

Use Mapenet 150 in strict accordance with the manufacturer's requirements.

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4.3.3.2 Mapeband Easy - waterproof joint tape

Mapei Mapeband Easy. A rubber tape sandwiched between two layers of non-woven polypropylene fabric, designed to form elastic joints in waterproofing systems.

Where to use:
- Waterproofing corners between adjacent walls and between walls and floors before applying waterproofing products such as Mapelastic, Monolastic, Mapegum WPS, or products from the Aquaflex Roof range.
- Flexible waterproofing of expansion joints on terraces and balconies, etc. before treating with Mapelastic or Mapelastic Smart;
- Sealing pipes and drains in bathrooms, showers and kitchens in conjunction with Mapeband gaskets;
- Sealing expansion joints in precast panels.
- Joints between Mapeband Easy strips must overlap by at least 5 cm and be bonded with the chosen waterproofing product.

Technical characteristics:
- Mapeband Easy is made from a central core of vapour-proof and waterproof elastic rubber sandwiched between two layers of alkali-resistant, non-woven polypropylene fabric;
- It is elastic and deformable, with a series of holes along the edges to improve wetting with the waterproofing product applied;
- May be coated with the chosen waterproofing product or with the adhesive used to bond floor or wall coverings.

Technical data:
- Tensile strength (EN12311-2, Method B) (N/mm²): >2.
- Ultimate elongation(EN12311-2, Method B): ≥300%.
- Tear resistance (EN 12310-2) (N): ≥100.
- In-service temperature range: from -20°C to +60°C.

Install Mapeband Easy in strict accordance with the manufacturer's requirements.

Installed location:

4.3.3.3 Mapeband SA - waterproof joint tape

Mapei Mapeband SA. A self-adhesive butyl tape with alkali-resistant, non-woven fabric for elastic waterproofing systems.

Where to use:
- Mapeband SA is a self-adhesive butyl rubber tape used to waterproof fillets between horizontal and vertical surfaces on terraces, balconies and in bathrooms and showers.
- Mapeband SA is a complementary product for Mapelastic Smart, Mapegum WPS and Mapelastic AquaDefense waterproofing systems.

Application examples:
- Waterproofing corners and fillets between floors and walls on terraces, balconies and in bathrooms.

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- Sealing different types of material (bitumen membranes, metal, ceramic and cementitious screeds).
- Sealing small, hard-to-reach fillets such as those between window and door fittings, ledges and substrates.

Technical characteristics:
- Mapeband SA is a self-adhesive tape made from butyl rubber with alkali-resistant, non-woven polypropylene fabric bonded on the outer surface that guarantees excellent adhesion for the waterproofing system to be applied over it.
- Mapeband SA adheres to various types of non-absorbent substrates such as aluminium, copper, steel, plastic, bitumen waterproofing membranes, ceramic and to absorbent substrates such as concrete, masonry, aerated concrete, fibre-reinforced cement and render.

Technical data:
- Tape width: 100mm.
- Tape thickness: approx. 2mm.
- Colour: grey.
- Application temperature range: from +5°C to +30°C.
- Service temperature range: from -30°C to +80°C.

Install Mapeband SA in strict accordance with the manufacturer's requirements.

4.3.4 Flexible Sealant

Mapeflex PU40. A one-component, paintable, thixotropic polyurethane sealant with a low modulus of elasticity, designed for sealing expansion and distribution joints in horizontal and vertical surfaces.

Where to use:

- Mapeflex PU40 has been developed for sealing expansion and contraction joints in horizontal and vertical surfaces, including those subject to movement up to 25% of the average width of the joint.
- Suitable for sealing internal and external joints in various substrates such as concrete, wood, metal, and glass.

Application examples:

- Sealing expansion and distribution joints in:
  - Façades on civil and industrial buildings.
  - Pre-fabricated concrete panels.
  - Industrial floors subject to vehicular traffic.
  - Concrete floors for car parks, supermarkets, shopping centres, and warehouses.
  - Concrete walls and general internal and external vertical structures where the use of a thixotropic product is required.
- Sealing cracks and general fillet joints.

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Application data (at +23°C and 50% RH):

- Application temperature range: from +5°C to +35°C.
- Dust dry: 60 minutes.
- Final setting: 3 mm per 24 hours; 4 mm per 48 hours.
- Colour: white and 111 grey (other colours available upon request).
- Shore A hardness (DIN 53505): 30.
- Resistance to UV rays: excellent.
- In-service temperature: from -40°C to +70°C.

Use Mapeflex PU40 in strict accordance with the manufacturer's requirements.

4.3.5 Warranty

4.3.5.1 Product Warranty

MBP (NZ) Limited warranty terms and conditions (updated as of 1st November 2024):

MBP (NZ) Limited provides product warranties for MAPEI and Polyglass products distributed in New Zealand. These warranties apply when products are installed in accordance with the product's Technical Data Sheet (TDS), relevant plans and specifications, and in compliance with the New Zealand Building Code.

As of 1 November 2024, the standard warranty periods have been updated:

- Most products are covered by a **10-year warranty.**
- **MAPEI liquid waterproofing membranes** are eligible for up to a **15-year warranty.**
- **POLYGLASS waterproofing systems** may qualify for up to a **20-year warranty.**

To be eligible for the extended 15- or 20-year warranties, the applicator must hold a valid MBP-issued Trained Applicator Card, obtained through the Mapei Academy program. Applicators can apply for these warranties by completing the online application form available on the MBP (NZ) Limited website.

Please note that applicators are independent contractors and not agents or employees of MBP (NZ) Ltd. Therefore, MBP (NZ) Ltd assumes no responsibility or liability for their workmanship. Warranties do not cover installation, workmanship, or product mixing and preparation, which are the responsibility of the applicator.

Information regarding the application and use of MBP (NZ) Ltd products is provided in good faith, based on Mapei's current knowledge and experience of its products when they are appropriately stored, handled, and applied under recommended conditions as outlined in the product's TDS.

For detailed warranty terms and conditions, please refer to the Product Warranty and Warranty Periods PDFs available on the MBP (NZ) Ltd website.

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4.3.6 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced Mapei Approved Applicators, familiar with the specified products and installation techniques, to fully comply with all Mapei NZ Ltd warranty requirements and in accordance with the manufacturer's installation requirements, relevant Mapei BRANZ Appraisals, and as noted and detailed on the drawings. All work shall be such as to leave a neat, efficient, robust and waterproof installation.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to install Mapei waterproofing products as required.

Application of the specified product(s) shall not be undertaken when the ambient temperature is outside the manufacturer's permissible temperature range. Exterior applications shall not be undertaken during inclement weather. As necessary, protect completed exterior work from rain and from hot dry winds and direct sunlight to aid proper drying and curing.

Protect adjacent finished work and surfaces from damage and contamination during installation. Leave completed surfaces clean, sound, and free of defects and damage.

4.3.7 Storage & Handling

Store Mapei waterproofing materials undercover, away from direct sunlight, on a flat, clean and dry surface. Keep Mapei products dry, out of direct sunlight and protected from damage, moisture and contamination while stored.

Do not use damaged, defective or contaminated products, or products that are beyond their designated shelf life.

Handle Mapei products in accordance with the manufacturer's requirements as set out in the relevant Technical Data Sheet(s) and in a manner that prevents contamination or deterioration of the material or reduces its performance.

Installers shall be familiar with and comply with the manufacturer's Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

4.3.8 Preparation

Requirements of substrates for the application of Mapei Liquid-Applied Waterproofing Membranes:
All substrates to be waterproofed shall be structurally sound, even and smooth, clean, dry, and free from dirt, dust, grease, oil, wax, paint residue, loose plaster and laitance, curing compounds and other materials and contaminants likely to affect the bonding and performance of the specified waterproofing membrane(s).

Carry out all necessary inspections and preparatory work to all substrates in accordance with the product's Technical Data Sheet prior to application.

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Check that the substrate is free of voids and depressions, and is in correct alignment - true to line, level and/or plumb and to the falls indicated on the drawings.

Check that all embedded items are correctly installed, and that all substrate edges are completed as detailed.

Confirm the location of any movement control joints prior to commencement of the works, and ensure that they are appropriately trimmed - do not cover or bridge control joints with waterproof membranes - use only the manufacturer's recommended proprietary bond breaker tapes, flexible waterproofing bands, corners, sleeves and sealants.

Allow floor levelling compounds and mortar screeds to properly cure in accordance with the manufacturer's recommendations before commencing waterproofing.

The commencement of work on each section of waterproofing shall be deemed to indicate full acceptance by the Membrane Applicator that all preparatory works by other trades are appropriate to achieve the required finished results.

Preparation of Insitu Concrete Slabs for Mapei Liquid-Applied Waterproofing Membranes - check all aspects of preparatory works, including but not limited to:
- Check that the slab has been laid to the levels and falls indicated on the drawings.
- Concrete slab surface finishes must be compliant with NZS 3114 'U3 Surface Finish'.
- New concrete must have aged for a minimum of 28 days prior to application of the specified waterproof membrane(s).
- Old concrete must be thoroughly cleaned and washed and allowed to dry prior to application of waterproof membranes.
- Grind off any high spots, and using a proprietary levelling compound repair flush with feathered edges any low spots or damaged areas then grind smooth.
- Lightly grind any surface that is glazed to the extent that may compromise membrane adhesion.
- Leave the surface clean and free of dust and contaminants etc.
- Check that any protruding or exposed bare metal has been treated with a suitable corrosion-inhibiting primer.

Preparation of Compressed Fibre Cement Sheet substrates for Mapei Liquid-Applied Waterproofing Membranes - check all aspects of preparatory works, including but not limited to:
- Check that the fibre cement sheets have been correctly installed in accordance with the manufacturer's requirements, and that all sheet edges are fully supported.
- Check that all fibre cement sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.
- Check junctions with all other substrates and elements, ensuring that all necessary works have been completed as detailed.
- Using a proprietary levelling compound, repair flush with feathered edges any damaged areas of the compressed fibre cement sheet surface.
- Mechanically sand to remove all surface irregularities and contaminants likely to effect adhesion.
- Vacuum clean leaving the surface clean and free of dust and contaminants etc.

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Preparation of Plywood Sheet Substrates for Mapei Liquid-Applied Waterproofing Membranes - check all aspects of preparatory works, including but not limited to:
- Check that the plywood is CD grade (C face up), and is to the specified treatment.
- Check that the plywood sheets have been correctly installed in accordance with the manufacturer's requirements, and that all sheet edges are fully supported.
- Check junctions with all other substrates and elements, ensuring that all necessary works have been completed as detailed.
- Using a proprietary levelling compound, repair flush with feathered edges any damaged areas of the plywood surface.
- Mechanically sand to remove all surface irregularities and contaminants likely to affect adhesion.
- Vacuum clean leaving the surface clean and free of dust and contaminants etc.
- Check that all plywood sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.

Preparation of Fibre Cement Sheet Wet-Area Lining/TileUnderlay for Mapei Liquid-Applied Waterproofing Membranes - check all aspects of preparatory works, including but not limited to:
- Check that the fibre cement sheets have been correctly installed in accordance with the manufacturer's requirements, and that all sheet edges are fully supported.
- Check that all fibre cement sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.
- Check junctions with all other substrates and elements, ensuring that all necessary works have been completed as detailed.
- Check that all apertures, openings, edges and expansion and movement control joints are completed as detailed.

Preparation of Water-Resistant Plasterboard Wet-Area Lining for Mapei Liquid-Applied Waterproofing Membranes - check all aspects of preparatory works, including but not limited to:
- Check that the plasterboard sheets have been correctly installed in accordance with the manufacturer's requirements, and that all sheet edges are fully supported.
- Check that all sheet joints and fastening heads are flush-filled with a suitable stopping compound.
- Check junctions with all other substrates and elements, ensuring that all necessary works have been completed as detailed.
- Check that all apertures, openings, edges and expansion and movement control joints are completed as detailed.

4.3.9 Application

4.3.9.1 Control Joints - liquid-applied membrane

Control joints in the substrate shall be extended through the tiling, and installed and completed to the layout and details shown on the drawings. Do not bridge control joints with underlays, membrane, adhesive or tiles. Confirm the location of all control joints before commencing installation.

4.3.9.2 Mapeband

Mapeband Waterproofing Joint Tape. Apply a uniform layer of Mapegum WPS or Mapelastic Smart waterproofing membrane, at least 1mm thick and sufficiently wider than the Mapeband tape, to the corner junctions and expansion joints to be waterproofed with Mapeband tape. Keep expansion joint

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gaps clean and free of Mapegum WPS.
While the waterproofing membrane is still wet, lay the Mapeband tape into the membrane firmly with a smoothing trowel. The tape must be sufficiently drooped into expansion joints to allow for potential movement.
Apply subsequent coats of Mapegum WPS to form a continuous waterproof membrane over the required area.

Repeat the application process for installing Mapeband pipe seal gaskets.

4.3.9.3 Mapeband PE 120

Mapeband PE 120 Waterproofing Joint Tape. Apply a uniform layer of Mapegum WPS waterproofing membrane, at least 1mm thick and sufficiently wider than the Mapeband PE 120 tape, to the corner junctions and expansion joints to be waterproofed with Mapeband PE 120 tape. Keep expansion joint gaps clean and free of Mapegum WPS.
While the Mapegum WPS membrane is still wet, lay the Mapeband PE 120 tape into the membrane firmly with a smoothing trowel. The tape must be sufficiently drooped into expansion joints to allow for potential movement.
Apply subsequent coats of Mapegum WPS to form a continuous waterproof membrane over the required area.

Repeat the application process for installing Mapeband PE 120 pipe seal gaskets.

4.3.9.4 Mapelastic AquaDefense

- Mapelastic AquaDefense must be applied in two even coats (approx. 0.5 mm per coat) onto properly prepared, clean and dry substrates with a long-haired roller, brush or trowel.

- Wait until the first coat is dry, making sure the product becomes darker with a matt finish, before applying the second coat diagonally to the first (approximately 1 hour at +23°C and 50% relative humidity of the air and with substrates having residual humidity lower than 3%).

- The final thickness of the two coats of Mapelastic AquaDefense must be at least 1.0 mm in order to create a robust, flexible and continuous film.
- If Mapelastic AquaDefense is applied to form an anti-fracture membrane on cracked substrates, embed Mapetex Sel reinforcement in the first coat while it is still fresh. Ensure to eliminate any wrinkles and air bubbles as the Mapetex Sel fabric is laid.
Eliminate pin holes or surface defects by applying a further coat over the local area.

Allow to dry for minimum 24 hours before flood testing and installation of subsequent finishes.

4.3.9.5 Mapegum WPS

Mapegum WPS Liquid-applied Waterproofing Membrane. According to the degree of absorption and texture of the substrate, dilute Mapegum WPS for improved workability in accordance with the technical data sheet.

Apply Mapegum WPS uniformly, by trowel, brush, roller, or spray, onto properly prepared, clean and dry substrates, in at least two even, thin coats (approx. 1mm per coat). While the first layer is still

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wet, embed Mapenet 150 or Mapetex Sel into the first layer and leave to dry before applying further coats crossways. Eliminate pin holes or surface defects by applying a further coat over the local area.

Allow to dry for minimum 24 hours prior to flood testing and installation of subsequent finishes.

4.3.10 Completion

Check that the specified Mapei liquid-applied waterproofing membrane has been installed correctly, with all edges, penetrations, outlets, movement control joints and other detailing correctly finished.
Check the installed membrane for defects, surface damage and punctures - carry out any repairs in accordance with the manufacturer's instructions.
As necessary, flood test the membrane after the manufacturer's recommended time frame - carry out any additional works necessary as a result of the testing.
Ensure that the membrane is adequately protected from damage and contamination until installation of subsequent finishes.

Leave this work complete, watertight and leak-free in accordance with Mapei NZ Ltd requirements. Leave adjacent surfaces and finished work clean and free of contamination. Remove all rubbish from site.

Issue to the Owner a copy of the manufacturer's maintenance requirements and a copy of the Mapei NZ Ltd Product Warranty and the Mapei-approved Applicator's Application Warranty for the completed works.

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5 CARPENTRY

5.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

5.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1491:1996(AS/NZS)	Finger jointed structural timber
1859.1:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 1: Particleboard
1859.2:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 2: Dry process fibreboard
2270:2006(AS/NZS)	Plywood and blockboard for interior use
2271:2004(AS/NZS)	Plywood and blockboard for exterior use
2295:2006(NZS)	Pliable, permeable building underlays
2588:2018(AS|NZS)	Gypsum plasterboard
2589:2017(AS/NZS)	Gypsum linings - Application and finishing
2904:1995(AS/NZS)	Damp-proof courses and flashings
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3601:1973(NZS)	Metric dimensions for timber
3602:2003(NZS)	Timber and wood-based products for use in building
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
3617:1979(NZS)	Specification for profiles of weatherboards, fascia boards, and flooring
3622:2004(NZS)	Verification of timber properties
3631:1988(NZS)	New Zealand timber grading rules
3640:2003(NZS)	Chemical preservation of round and sawn timber
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
AS/NZS 1080.1:2012	Timber - Methods of test - Method 1: Moisture content
AS/NZS 2269.0:2012	Plywood - Structural - Part 0: Specifications
NASH Standard	Residential and Low-rise Steel Framing - Part 1: Design Criteria
NZBC B2/AS1	Durability
NZBC C/AS2-AS6	Protection from Fire

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NZBC G6 Airborne and Impact Sound

5.3 General

This section includes the receiving, stacking and storage of all Carpenter's materials and the fabrication, erection and fixing of all framing, sheathings and finishing timbers, including all work incidental to neatly finishing in other trades and all temporary work and temporary bracing.

The Carpenter shall attend upon all trades, and shall supply and fix all obviously necessary but not specifically mentioned fixings and materials.

5.4 Timber Framing

5.4.1 Scope

Supply and install timber framing to the floors, walls, roofs, and other timber framed elements, as identified and detailed on the drawings. All aspects of this work shall be in accordance with NZS 3604, product manufacturers' recommendations, and as shown on the drawings and the specification.

5.4.2 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be carried out to current best trade practise by experienced and competent tradesmen, familiar with the materials and installation techniques, in accordance with NZS 3604 and as shown on the drawings.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings prior to installing timber framing.
Co-ordinate with other trades to install timber framing as required.

5.4.3 Timber Framing

5.4.3.1 Timber Grade and Quality

Unless otherwise noted or specified on the drawings or specification, all framing timber shall be minimum structural grade SG 8 Radiata pine in accordance with NZS 3622.
Framing timber shall be seasoned or kiln dried, and be straight and true and free from wind, warp and distortion, and in lengths suitable for the members required, and shall have a moisture content of between 12% and 18% before installation.
Do not used damaged, faulty or defective materials.

5.4.3.2 Timber Treatment

All non-durable timber framing shall be appropriately treated against moisture and/or insect decay by treatment plants with recognised quality assurance systems that are administered by the Timber Preservation Council (NZTPC). Treatment of timber and wood-based building products shall be to the requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.

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Carefully manage treated framing during installation to avoid accidental use of timber with a lower performance or durability treatment than that required or specified.

5.4.3.3 Storage & Handling

Check timber framing upon delivery and reject sub-standard or damaged material.
Store timber framing dry under cover, fillet stacked and well clear of the ground, and protect from damage, moisture, and contamination.
Ensure all appropriate personal protection equipment is worn at all times when handling and cutting treated framing.

5.4.3.4 Framing Installation

All timber framing members, including all dwanging, strutting, blocking, bracing etc, shall be sized, setout, fitted and fixed to the requirements of NZS 3604 and as shown on the drawings to accommodate structural loadings, cladding and lining setout and support, and the installation of other building components, fixtures and fittings.

All framing shall be erected without deviation, true to line, level, angle and plumb, and evenly aligned and square, and within the tolerances allowed in NZS 3604 Table 2.1. Framing members accurately cut, lapped, housed, joined, and seated so as to provide full contact over the bearing surfaces.

Temporarily prop, brace, tie, and secure framing members and elements as required until the framing is complete and self supporting. Leave in place for safety purposes as long as required.

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

5.4.3.5 Concrete Separation

Separate timber framing with an approved continuous damp proof course when in direct contact with concrete or masonry. Ensure that the DPC material is compatible with the timber treatment.
Free draining separations to external vertical faces shall be 12mm minimum and as noted on the drawings.

5.4.3.6 Timber Re-treatment

All cut or drilled surfaces of H4 and H5 treated timber framing shall be flood coat re-treated, with a suitable product recommended by the original treatment plant, before installation.

5.4.3.7 Edge Notching and Centre Holes

The notching, checking, and boring of framing members shall be in strict accordance with the requirements of NZS 3604.
Avoided checking and cutting where possible and keep to such dimensions so as not to prejudice the purpose for which the member is used. Keep edge notching to a minimum and where possible use centrally bored holes instead.
Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the lining's fixing reach.

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5.4.3.8 Framing Protection

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

5.4.3.9 Built-up Framing Members

Except for jack studs, bottom plates and top plates, framing members may be substituted with built-up members in accordance with the limitations of NZS 3604 2.4.4.7 with the prior approval of the Architect/Designer only.

5.4.4 Steel Fixings

5.4.4.1 Fastenings and Connectors

Unless otherwise noted or specified, timber framing fastenings and connectors shall be as specified in the relevant fixing schedules of NZS 3604 or have an equivalent capacity as specified therein. Timber framing connectors and fixings shall comply with the product information as required in NZS 3604 2.4.6, and shall be used and installed in accordance with the manufacturer's recommendations. Pre-drill nail holes in split-prone framing as necessary.

5.4.4.2 Durability of Fixings & Fastenings

Unless otherwise noted or specified, the minimum durability of timber framing fixings and fastenings, excluding nails and screws, shall comply with the durability requirements of NZS 3604 Table 4.1.
Galvanised steel fixing components, excluding nails and screws, shall have galvanised coating masses in accordance with NZS 3604 Table 4.2.
Unless noted or specified otherwise, the materials for nails and screws shall be as given in NZS 3604 Table 4.3.
Steel fixings and fastenings in contact with timber treated with copper based timber preservatives (H3.2 or higher) shall be in accordance with NZS 3604 4.4.4.
Stainless steel nails shall be minimum Grade 304 unless otherwise specified or noted.

5.4.4.3 Bolts and Coachscrews

Unless specified or shown otherwise, all bolted and coach screwed connections shall be M12 or M16 in accordance with the relevant fixing requirements given in NZS 3604.
Bolted and coach screwed connections shall have either a 50mm x 3mm square, or a 55mm x 3mm round, washer to each head and nut for M12 and M16 fixings. Washers shall be of the same material and durability as the bolt or coach screw.

5.4.5 Floor Framing

Unless specified or shown otherwise, timber floor joists shall be to the dimensions and spacings given in NZS 3604 Table 7.1.
Floor joists shall be laid on edge true to line and level, have a minimum support bearing of 32mm (except when cantilevered), and so that any crook will straighten under load.
Floor joists shall be jointed over supports (except when cantilevered beyond the support) in accordance with NZS 3604 7.1.1.7.

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Unless specified or shown otherwise, boundary joists shall be continuous 25mm thick x joist depth as lateral support, and fixed to each end of the floor joists in accordance with NZS 3604 Table 7.5.

Boundary joist size:

Unless specified or shown otherwise, solid blocking shall be 45mm thick x joist depth and installed between joist ends at maximum 1.8m centre spacings as lateral edge support, and fixed in accordance with NZS 3604 Table 7.5. Floor joists supported by by a foundation wall shall have solid blocking over a distance of minimum 1.8m at joist ends.

Floor joists with a span of 2.5m or greater and a depth of at least 4 times the joist thickness shall have 45mm thick continuous solid blocking at mid span, fixed in accordance with NZS 3604 Table 7.5.

Loadbearing walls run parallel to the line of joists shall be supported directly over double joists located at no more than 200mm centre-to-centre from a pile row.

Loadbearing walls run at right angles to the line of joists shall be located at no more than 200mm centre-to-centre from a bearer or subfloor loadbearing wall (running parallel to the loadbearing wall).

Non-loadbearing walls, without a bracing element, within 150mm and parallel to a floor joist, shall be supported by minimum 90mm x 45mm solid blocking on-edge at maximum 1.2m centres and at each side of door openings.

Non-loadbearing walls, with a bracing element, parallel to floor joists and not supported by a floor joist, shall be supported by minimum 90mm x 45mm solid blocking on-edge at maximum 1.2m centres and at each side of door openings.

Unless specified or shown otherwise cantilevered floor joists for 2 kPa floors shall to the dimensions and spacings given in NZS 3604 Table 7.2, and shall be continuous over the outermost support as required by NZS 3604 7.1.5.3(a).

Unless specified or shown otherwise cantilevered floor joists for 2 kPa floors shall to the dimensions and spacings given in NZS 3604 Table 7.2, and shall be lapped over the outermost support and fixed to the adjacent joist as required by NZS 3604 7.1.5.3(b).

Unless specified or shown otherwise trimmers shall be fixed to trimming joists by half housing not less than 25mm deep and fixed with 3/100x3.75 nails in accordance with NZS 3604 7.1.6.5(a).

5.4.6 Wall Framing

5.4.6.1 Plates

Top and bottom plates shall be to the dimensions and layout shown on the drawings. Unless specified or shown otherwise, top and bottom plates shall be fixed in accordance with NZS 3604 7.5.12 and Tables 8.18 and 8.19, true to line and level or angle.
Joints in top plates shall be made over a stud or over blocking between studs, and all top plate connections shall be in accordance with NZS 3604 8.7.3. Form all holes and edge notches in top and bottom plates in accordance with NZS 3604 8.7.5.

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5.4.6.2 Studs

Studs shall be to the dimensions and spacings shown on the drawings, and installed true to line and plumb in both directions between top and bottom plates.
Unless noted otherwise, non-load bearing wall studs shall be to the spacings given in NZS 3604 Table 8.4, stud width as shown on the drawings.
Form all holes and edge notches in studs in accordance with NZS 3604 8.5.1.5. Do not notch, check, cut, or bore holes in the middle third of any trimming stud.
Should the need arise, studs shall be straightened in accordance with NZS 3604 8.5.3 with prior approval from the Architect/Designer only.

Unless noted otherwise, studs in loadbearing walls for 3 kPa floor loads shall be in accordance with NZS 3604 Table 14.10.

5.4.6.3 Lintels

Lintels shall be to the dimensions and locations shown on the drawings, and installed true to line and level, and shall be supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud, and secured against uplift in accordance with NZS 3604 8.6.1.8 as required.
The thickness of a lintel may be made from two or more members, where each member is the length of the lintel, in accordance with NZS 3604 2.4.4.7.

5.4.6.4 Sill & Head Trimmers

Unless specified or shown otherwise, sill and head trimmers to openings shall be the same width as the wall stud and to the thickness given in NZS 3604 Table 8.15, and installed at the required opening height true to line and level, and supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud.

5.4.6.5 Dwangs

Dwangs shall be the same width and thickness as the wall stud, and installed at the centres noted on the drawings, and accurately cut and fixed in place true to line and level and flush with stud edges.
Dwangs fixed in accordance with NZS 3604 Table 8.19.

5.4.6.6 Ribbon Boards

Ribbon boards shall be as dimensioned and located on the drawings, and installed on edge and checked 25mm into studs at the required height, true to line and level, and fixed in place in accordance with NZS 3604 Table 8.19.

5.4.7 Roof Framing

5.4.7.1 Purlins

Purlins shall be to the dimensions and spacings shown on the drawings and as required by the cladding material, and fixed to rafters and/or trusses in accordance with NZS 3604 Table 10.10 (purlins on their flat) and/or Table 10.11 (purlins on their edge).
Purlins on their flat shall be continuous over a minimum of two spans.
Provide all necessary blocking and lateral support to purlins laid on edge in accordance with NZS 3604 10.2.1.16.6, and as detailed.
Extend purlins to form gable verges as detailed and in accordance with NZS 3604 10.2.1.15.

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5.4.7.2 Roof Trusses

Roof trusses shall be Specific Engineering Design (SED) in accordance with NZBC B1/VM1 and manufactured by an accredited fabricator, and shall comply with all aspects of NZS 3604 10.2.2. Roof trusses shall be fabricated to meet the specific design requirements of the roof including, but not limited to; roof layout, pitch, and details, in accordance with the drawings and specification.
Roof trusses shall be supported and fixed to the truss fabricator's specifications but shall be no less than that required by NZS 3604 Tables 10.14 and 10.15. Roof trusses shall be braced as shown on the drawings and in accordance with NZS 3604 10.3.

5.4.7.3 Roof Bracing

Roof bracing shall be as shown on the drawings and in accordance with NZS 3604 10.3 and 10.4 as necessary.

5.4.8 Ceiling Framing

Ceiling framing shall be to the dimensions, layout, spacings, and details shown on the drawings, and shall be installed true to line, level and plane, and securely fixed in accordance with NZS 3604 Table 13.3.

Unless specified or shown otherwise, timber ceiling battens shall be to the dimensions and spacings shown on the drawings and in accordance with NZS 3604: Table 13.1, and shall be installed true to line, level and plane, and fixed to the underside of floor joists, rafters, ceiling joists or truss chords in accordance with NZS 3604: Table 13.3.

Ceiling battens shall be of Merchantable grade or better timber complying with NZS 3631.

5.5 Workmanship & Materials

5.5.1 Workmanship

5.5.1.1 Supervision

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner. It is the main contractor's responsibility to ensure that the construction of all structural timber complies in all respects with the drawings and the specification.

All non-restricted building work shall be carried out by or under the direct supervision of competent tradespersons, suitably qualified for the work undertaken, and in accordance with the best and latest trade practice.

5.5.1.2 Timberwork

All timber shall be worked and cut to be true and square and free from wind and warp with all joints matching and mating to a proper contact fit over the full surface of the joint. All connections whether nailed screwed, glued, mortised or dovetailed shall be accurately made and properly executed to provide sound satisfactory connections for the class of work required.

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Timber containing unacceptable defect or distortion shall not be cramped to provide mating at connections but shall be discarded and replaced by true defect-free timber before connections are made. Distribute any acceptable defects in timber so as not to impair the strength or the appearance of the finished work. Do not cut studs across the grain to straighten them.

The checking and cutting away of timbers shall be avoided where possible and shall be limited to such dimensions as will not prejudice the purpose for which the timber is used. Observe NZS 3604 restrictions on holing and checking of timber joists and beams. Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the linings/claddings fixings reach.

Neatly punch exposed nailing to the diameter of the nail head below the surface. Completley remove bruises and tool marks, and replace all split timbers and hammer-marked finishing timbers.

Fit a 3-ply bituminous DPC or a single layer high impact polyethylene DPC at all timber to concrete junctions to provide complete separation. Ensure that the DPC material is compatible with the timber treatment.

Clean out framing voids before fixing sheathings or linings. Ensure framing voids are fully vermin proofed to the exterior. Build in as necessary all required flashings (supplied by others) to windows, doors, roof edges, etc.

5.5.1.3 Wall Underlay

Install a flexible heavyweight building paper or breathable/absorbent wall underlay behind all exterior wall claddings, fixed horizontally, with minimum 150mm horizontal laps and minimum 150mm vertical joint laps made over a stud, and kept taut without sagging or bulging.
Fix wall underlay at maximum 300mm centres, with 6mm - 8mm stainless steel staples or 20mm large-head galvanised clouts or galvanised proprietary fixings, fixed through nylon vertical strapping at every stud in exposed locations. Provide additional fasteners fixed through the underlay around framed openings. Cut window and door openings just prior to joinery installation; cut underlay at 45º angle away from each corner and return full framing depth and fasten to inside of frame.
Finish wall underlay at edges as detailed, and return full framing depth into window and door openings. Install all necessary flexible flashing tapes to openings, around pipes, ducts and other services penetrating the underlay, parapet and balustrade junctions, along head flashings and inter-storey flashings when installed, as required to seal the underlay, in accordance with wall underlay manufacturer's requirements and as shown on the drawings.
For drained cavity construction to framed walls without a rigid wall underlay and where the studs are at greater than 450mm centres, restrain the underlay with nylon strapping to prevent the underlay from bulging into the cavity space.
Any damaged underlay shall be made good by lapping in a new section.
Do not leave wall underlays exposed before covering with wall cladding for more than the manufacturer's recommended duration.

5.5.1.4 Roof Underlay

Install heavyweight building paper or breathable/absorbent roof underlay behind roof cladding as detailed, with minimum 150mm side and end laps, lapped such that any water will be shed to the

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outside of the underlay, and sufficiently tensioned in a manner that prevents sagging or ponding.
R1 class roof underlays shall be fully supported on nylon straps or non-corrosive netting/mesh; R2 class self-supporting underlays shall be laid to maximum 1200mm span between adjacent supports.
Run roof underlay horizontally or vertically up the roof slope on roof pitches above 10° pitch, and horizontally on roof pitches 10° or less.
Fix roof underlay at maximum 300mm centres to purlins, with 6mm - 8mm stainless steel staples or 20mm large-head galvanised clouts or proprietary underlay fixings.
For tiled roofs, lay the roof underlay over the anti-ponding board and no-corrosive support netting/mesh, and fix at maximum 300mm centres to the rafters/trusses before the tile battens are installed.
Finish roof underlay along roof edges and junctions, valley gutters, and at the ridge as shown on the drawings. Carefully cut underlay at roof openings at 45º angle away from each corner and lap-tape closed to framed up-stands, ducts and other services penetrating the underlay in accordance with the underlay manufacturer's requirements and as detailed. Roof underlay must be separated from chimneys and flues in accordance with the requirements of the NZBC C1-C6 Acceptable Solutions.
Any damaged underlay shall be made good by lapping in a new section.
Do not leave roof underlays exposed before covering with the roof cladding for more than the manufacturer's recommended duration.

5.5.1.5 Window Installation

Prepare window and external door framing openings for joinery installation by neatly cutting the building wrap at 45º into corners, returning turning the wrap through the frame depth and fixing to the inside face.
Over-flash the underlay along the sill with a flexible flashing tape, installed full frame depth and length of the opening, returned minimum 100mm up the jambs, and with minimum 50mm return over the outside edge.
Over-flash the underlay at head/lintel corners with a flexible flashing tape, extending minimum 100mm each way from the corner, full frame depth, and with minimum 50mm return over the outside face.

Install external joinery frames with metal flashings as detailed and/or as required to completely weatherproof all frame-to-cladding junctions.
Unless shown otherwise, head flashings shall be carried minimum 75mm up behind claddings, extended at 15º out over the joinery head or facing board and returned down to cover the joinery or facing board minimum 10mm and finished with a 5mm, 45º 'kick out' drip-edge.
Neatly dress down the head flashings at the ends of the facings - for drained cavity construction, also form up-turned stop-ends in-line with the outside edge of cavity above.
Install metal (as specified) head flashings, fixed over the wall underlay, with the flashing upstand over-flashed minimum 50mm with a flexible flashing tape against the underlay, or with an additional piece of underlay extended over and lapped behind the underlay above, behind the inter-storey flashing or sill flashing above, or to the underside of the eaves.
Unless shown otherwise, sill flashings, where required, shall have a minimum 5º slope, minimum 8mm rear upstand with sealed sloping stop-ends, and be carried down minimum 35mm over the lower cladding and finished with a 5mm, 45º 'kick out' drip-edge.

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Take delivery of window and door joinery. Check substrates for correct profile and alignment and that the joinery is fabricated to the correct wall construction set-out and depth. Set shims or pack as necessary to install joinery exactly true and square. Use appropriate separators between aluminium and other materials, and fix securely with due regard for any anticipated movements and for linings, trim, etc.

Install neat sealant beads as detailed or required.

After joinery installation, install closed cell backing rods as required and expanding foam seal the gap between the opening substrate and joinery liners/reveals (all round, from the inside).

On completion ensure that all sashes and doors neatly fit the openings with regular tolerances to all edges, and that all moving components and hardware are correctly adjusted and operating smoothly, without binding, to the required functionality.

5.5.1.6 Joinery Installation

Take delivery of all scheduled joinery items (doors, cabinets, shelves, etc.) and install in the positions shown, accurately aligned, true to level, plumb and square, and securely fastened as noted and in accordance with best trade practice and with due regard for adjacent linings, finishes and trim, and anticipated movements.

Cabinets scribed and/or recessed packers scribed to adjacent surfaces as detailed or directed. Protect all installed Joinery from damage including surface marking and contamination, dirt and dust, and moisture until completion. Do not use Joinery items for working supports or platforms or for storage of materials or tools and equipments.

On completion ensure that joinery item doors and drawers all neatly fit the openings with regular tolerances to all edges, and that all moving components and hardware are correctly adjusted and operating to the required functionality.

5.5.2 Timber

5.5.2.1 Timber Materials

All timber shall be graded in accordance with NZS 3631 - Structural Grade MSG8 or better for all framing timber - (to meet the requirements of Table 2.3 of NZS 3603 for mechanically graded timber), and Dressing Grade for all finishing timber. Timber that is deemed below standard, in the opinion of the Architect/Designer, shall be removed from the site.

All non-durable timber, including components in manufactured items, shall be appropriately treated against moisture and/or insect decay by treatment plants with recognised quality assurance systems that are administered by the Timber Preservation Council (NZTPC). Treatment of timber and wood-based building products shall be to the requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.
Ensure that similar timbers with different treatment levels are carefully managed during construction to avoid accidental use of an H1 treated item where H3 hazard class treatment is required by the NZS 3602.

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Do not use LOSP (light organic solvent-based preservative) treated timber that has not adequately 'flashed-off'.
Ensure that all cut or drilled surfaces of H4 and H5 hazard class treated timbers are flood coat re-treated, with the product recommended by the original treatment plant, before installation.

All timber shall be seasoned or kiln dried, to the stable moisture content, be straight and true and free from wind, warp and distortion, and in lengths suitable for the members required and the location in the finished construction. All framing timber shall have a moisture content between 12% and 18 % before being installed. If the use of inadequately seasoned timber results in damage or opening joints in the finished building the timber shall be replaced. Fixing of internal linings shall be delayed after closing in until the timber framing has dried back below 20% moisture content and to allow for the maximum settling of substrates.

All kiln dried, dressed and/or finishing timbers shall be stacked under cover on delivery to the site, and all timber shall be full to the nominal sizes shown or specified, subject only to normal cutting and dressing tolerances.
All finishing timber shall have machine marks, stains and roughness removed and shall be sanded smooth.

Ensure that enclosed surfaces and ends of paint-finished exterior finishing timbers are fully primed before fixing. If this trade (Carpentry) carries out the priming it shall be to the specification and standard required of the Painter.

Unless specified otherwise, exposed framing timbers shall be unfinished to the exterior, and be fine bandsawn milled, treated with a minimum of discolouration, handled carefully at all times to avoid surface damage, and delivered free of crayon or pencil or other markings. Hazard class treatment markings shall be on the ends, NOT on the faces.

5.5.2.2 Timber Species

Unless noted or specified on the drawings, in the list below, or elsewhere in this specification all timber used shall be Radiata pine.
Other timbers shall be as follows:
- Douglas Fir (*NZ Oregon, Psuedotsuga menziesii*)
- Jarrah Clears (*Eucalyptus marginata*)
- Kwila Clears (*Merbau*)
- Balau (*Shorea spp*)
- Kwila (*Merbau*)
- Cedar Clears (*Western Red Cedar, Thuja plicata*)
- Rimu - (*NZ Red Pine*)
- Vitex Clears - (*Vitex cofassus*)
- Eucalypt Saligna Clears - *(Sydney Blue Gum*)
- Tasmanian Oak - (*Eucalyptus delegatensis / obliqua / regnans*)

Note: the use of alternate grades and varieties to those specified is subject to approval in each instance.

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5.5.2.3 Timber Cavity Battens

To wall areas as noted install H3.1 treated ex.50mm x 25mm timber battens to form a drained vertical cavity complying with E2/AS1 in all respects. Ensure that flexible wall underlay and flexible flashing tape are completely and correctly installed before fixing battens in place. Fix the battens with 60mm hot-dip galvanised flat head nails at maximum 400mm centres, ensuring that the batten set-out completely fulfils the cladding's fixing requirements. Install 1:12 sloping horizontal cavity spacers where required to suit claddings, keeping the ends 50mm clear of the vertical battens.

5.5.2.4 Other Materials

Materials shall be delivered to site with the packaging and labelling intact, shall be of the same type, finish or colour to maintain continuity, shall be stored, and conditioned if required, in accordance with manufacturer's recommendations, and shall be protected from damage, contamination, and moisture - as appropriate.
Handle all materials in accordance with best practice and the manufacturer's requirements, and in a manner that prevents damage or deterioration to the material. Do not use damaged or defective materials or products, or products that are beyond their designated shelf life.

5.5.3 Laminated Veneer Lumber

Laminated Veneer Lumber (LVL) shall comply with AS/NZS 4357.0. Each piece of structural LVL shall be branded at least once with the manufacturer's logo and a registered brand or marking that clearly identifies the structural properties that apply to the product and its limitations on end use; all in conjunction with associated published literature.

Structural properties identified in the associated published literature shall be:
- details of marking specific to the product
- veneer details
- physical properties including
  - modulus of elasticity
  - bending stress
  - tension stress parallel to grain
  - compression stress perpendicular to grain
  - compression stress parallel to grain
  - shear stress
- joint group
- density
- dimensional tolerances
- adhesives used
- limitations on end use

The storage and handling of LVL shall comply with Appendix A of AS/NZS 4357.0. In particular:
- LVL should be kept dry during storage and transit
- LVL should be stacked on bearers well clear of the ground and arranged so that their supporting surfaces are in the one plane
- Bearers should be spaced sufficiently close so that LVL spanning between them does not deflect excessively under its own weight.
- Bearers or spacers within a stack should be located near direct vertical alignment

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- Care should be taken in lifting and handling LVL in order to avoid mechanical damage
- Wrapping should avoid and prevent entrapment of moisture
- LVL should not be used in high humidity conditions or exposed to the weather.

5.5.4 Proprietary Sheet Bracing Systems

Proprietary sheet bracing systems to walls, ceilings and sub-floor foundations shall be installed in strict accordance with the manufacturer's technical literature and design guides. No materials specified in the manufacturer's technical literature and design guide can be substituted without the written approval from the Architect/Designer.

5.5.5 Proprietary Roof Trusses

Roof trusses shall be of proprietary design, complying with the requirements of NZS 3603, NZS 3604, and AS/NZS 1170, and manufactured by suitably qualified fabricators.

Make allowance for all notching and holing to timber members to accommodate roof bracing etc., in the design of member sections of the roof trusses. Allow for all additional rafters, purlins, fixings and bracing necessary to complete the roof framing system with all accessories and incidental items necessary for proper installation even where not specifically shown on the drawings.
Proprietary roof trusses shall be designed to carry all imposed gravity and lateral loads. Refer to the approved design drawings for truss set-out and specified design loads. Roof trusses are assumed to be generally at 900mm centres spanning clear between walls or roof beams as shown on the drawings. The Main Contractor is responsible for the design of proprietary roof trusses, including their layout and interaction with and dependence on adjoining elements.

Provide all necessary design information and shop drawings for all proprietary roof trusses to be incorporated in the works for review prior to fabrication.
Provide Producer Statements from a Charted Professional Engineer covering the design and construction of the roof trusses. Provide all information required by the Territorial Authority for the purpose of obtaining a Building Consent.

5.5.6 Flooring

5.5.6.1 Particleboard Flooring

20mm high density temporary weatherproofed flooring grade particleboard, installed in accordance with the manufacturer's requirements to the locations shown on the drawings.
Use sheets as large as possible, and set out sheets to approval. Accurately cut sheets to size, with the edges shot as necessary to provide tight butt joins. All handling, observation of requirements to accommodate moisture movement, expansion gaps and off-sets from fixed elements, fixings and adhesives and other aspects of this work shall all be exactly in accordance with the manufacturer's recommendations.
Punch nail fastenings and lightly sand particleboard flooring to an even finish over the entire surface before laying floor coverings or clear finishing, taking care to avoid damage to finished adjacent work - do not over-sand flooring.

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5.5.6.2 Plywood Flooring - T&G Edge

19mm long-span T&G edge CD grade plywood flooring, H3.2 Treated (CCA), installed in accordance with the manufacturer's requirements to the locations shown on the drawings.
Use sheets as large as possible, and set out sheets to approval, laid at right angles to the line of floor joists and with staggered sheet join lines. Accurately cut to size, with the edges shot as necessary to provide tight butt joins at T&G lines, 2mm expansion gaps at square butt joins and with a 5mm backset from exterior floor/ wall lines. Sheets glued and screwed down to joists, including glueing of the T&G joint. All handling, observation of requirements to accommodate moisture movement, fixings and adhesives, and other aspects of this work shall all be exactly in accordance with the manufacturers recommendations.
Lightly sand plywood flooring to an even finish over the full surface before laying floor coverings or clear finishing, taking care to avoid damage to finished adjacent work - do not over-sand the flooring.

5.5.7 Fixings

5.5.7.1 Nails

Comply with the requirements of NZS 3604 Section 2.4.4 and the Nailing Schedules of NZS 3604 as applicable. Unless noted or specified on the drawings or elsewhere in this specification, all nails fixing exterior timbers shall be Grade 304 or 316 stainless steel. Nails that will be covered with plaster or any similar material shall be hot-dipped galvanised, unless noted or specified otherwise.

Finishing brads to all finishing timbers shall be set out neatly and punched to the diameter of the nail below the surface. Bore slightly undersize holes for nailing that could cause splitting of the timber. Power-driven staples are completely unacceptable in finishing timbers.

5.5.7.2 Screws

Screw fastenings shall be of suitable gauge, head type, thread design, and length to provide secure fastening into the substrate material, and be suitable for the assembly/construction of the fixed item/element and the substrate material.
Unless noted or specified otherwise, screws exposed to the exterior shall be Grade 304/316 stainless steel or hot-dipped galvanised, and hot-dipped galvanised or similar corrosion resistant for damp situations.
Self-drilling screws shall be in accordance with AS 3566 for fastener type and corrosion resistance class.
Unless noted or specified otherwise, screws fixing hardware or similar shall be of the same material and finish as the hardware. Except where raised head screws are shown or specified, screws shall be countersunk flush or recessed where stopped/filled.

5.5.7.3 Bolts

Where bolts are used they shall be complete with nuts and washers unless specified otherwise. All bolts, nuts and washers shall at least meet the durability requirements of NZS 3604 Table 4.1. Where a higher durability material is specified on the drawings, the higher durability material shall be used. The diameter of a hole for a bolt shall not be less than the bolt diameter nor exceed it by 1.5mm.

For the following bolt diameters use washer sizes as below unless noted otherwise on the drawings:
- up to M8: 25x 25 x 1.5mm;

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- up to M12: 50 x 50 x 3mm;
- up to M20: 65 x 65 x 5mm;
- up to M20: 75 x 75 x 6mm.

Round washers may be used proving they are of a thickness and area not less than those specified above.

Subfloor framing - unless noted otherwise on the drawings, cast-in holding down bolts for subfloor framing fixed to concrete foundation walls shall be M12 Grade 304 stainless steel, embedded minimum 150mm into concrete, to the spacings required by NZS 3604, and located centrally on the timber.
Bottom plates - unless noted otherwise on the drawings, cast-in holding down bolts for bottom plates fixed to a concrete slab shall be M12 galvanised, embedded minimum 120mm into concrete, to the spacings required by NZS 3604, and located centrally on the timber.
Framing - timber/timber and timber/steel - Unless noted otherwise on the drawings, M16, hexagonal head mild steel and with 50 x 50 x 3mm washers.
Timber/concrete (dry situations) - Unless noted otherwise on the drawings, Ramset Trubolts, T12140 at maximum 900mm centres - for damp or exterior situations use stainless steel Trubolts.
Bolts shall be tightened until the washer just indents the timber surface. Exposed bolts shall be re-tightened just prior to Practical Completion to remove any slack consequent on timber shrinkage.
Allow to countersink bolt heads and nuts as necessary to clear linings.

5.5.7.4 Framing Hardware

Proprietary timber framing hardware and fixings, including multigrips, joist shoes, Z nails, gang nails and similar hardware, may be used where specifically approved, or where required on the drawings or by NZS 3604 schedules, in accordance with the manufacturer's requirements.
Proprietary timber framing structural brackets and ties, including post and bearer brackets, beam supports, angle brackets, tie cleats and similar hardware, shall be as noted on the drawings and installed in accordance with the manufacturer's requirements.
Refer to Metalwork or Structural Steel section of this specification for specific design engineered fabricated steel components that connect structural timber framing.

5.5.7.5 Powder Fastening Systems

Powder powered fasteners are not permitted for fastening structural timber framing unless specifically noted on the drawings. All applications are subject to specific approval.

5.5.7.6 Adhesives

Aliphatic PVA for dry timber applications - all other adhesives for timber jointing are subject to specific approval or as specified. Check surfaces are in appropriate condition to receive adhesive, and that adhesives are used strictly in accordance with the manufacturer's instructions. Clamp adhesive-jointed timber connections and check alignment of members before the adhesive has set.

5.5.8 Flashings

Flashing materials shall be in accordance with the requirements of NZBC E2/AS1 Sections 2.2 Materials, 4.0 Flashings, Table C.1.1.1B: Compatibility of materials in contact , and Table C.1.1.1C: Compatibility of materials subject to run-off, and as noted on the drawings.

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All flashings around windows, doors and other openings and apertures, at internal and external corners, inter-storey junctions, soffit junctions, and at junctions with other building elements and cladding systems, etc., shall all be carefully constructed, fixed and finished to the details shown on the drawings.

5.5.9 Sealants

5.5.9.1 Sealants

For critical joints such as primary water/weatherproofing seals, precast panels primary seals, structural floor slab control joints, structural glazing, immersion or hydrostatic pressure seals, etc., either use the sealant noted on the drawings or obtain a reputable sealant manufacturer's recommendation for the precise situation, and submit the manufacturer's specifications covering all relevant criteria and characteristics of the proposed sealant, primers, joint surfaces preparation, etc. to the Architect/Designer for review and confirmation to proceed.
If so requested, additionally submit a sample of the proposed sealant made up into a demonstration joint, incorporating the same materials, preparation, finish tooling, etc. After confirmation to proceed with the proposed sealant install a sample joint to approval, length approximately 2% of the overall length of the joints required, with a minimum length of two metres; when accepted this joint becomes the quality control sample for all subsequent similar joints.

For less critical joints such as those in covered or protected situations, and bathroom and kitchen ceramics and sanitaryware etc., either use the sealant noted on the drawings or select the sealant from a reputable manufacturer's range for the substrate materials involved, with due regard for the flexibility required, acid or neutral curing, mould resistance, paintability or clear or standard colours, slumping characteristics, temperature range expected, etc. - silicone, polymer or polyurethane sealants are anticipated.
For all simple gap-filling and draught sealing situations, either use the sealant noted on the drawings or select from a reputable manufacturer's range for a paintable acrylic sealant with good adhesion characteristics for the substrates involved - pay particularly care in the sealant selection where bare metal, polycarbonate, polystyrene or similar substrates or where bituminous-based membranes are adjacent or where exposure to solvents is possible.

All joint surfaces preparation and priming and all sealant application work shall be exactly in accordance with the sealant manufacturer's recommendations, and carried out by competent and experienced applicators familiar with the materials and techniques required.
Ensure that the sealant is being used within the manufacturer's stated design parameters, particularly with regard joint design and anticipated cyclic movement.
Check that the joint faces are sound, completely dry, and frost free, clean and free of dirt, rust, oil, grease, laitance, etc., and they are primed to suit the surface porosity - particularly for critical locations.
Insert a polyethylene tape slip layer at the back of the joint or a closed cell polyethylene PEF backer rod where required and to the sealant manufacturer's recommendations. Mask off joint edges where a clean straight finish line is required.
Check the toxicity of the selected sealant and handle it appropriately. Check that the temperature during sealant installation is within the manufacturer's guidelines.
Apply the sealant and tool the filled joint's surface smooth and even, utilising a lubricant as necessary

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and strictly within the manufacturer's guidelines.
Remove any masking tape immediately after tooling, clean up all adjacent surfaces using the recommended cleaning agents as required, and protect the finished joint until the sealant has properly cured.

5.5.10 Exterior Finishing Trim

Fascias and barges ex.150x40mm, painted radiata. All exterior trim handled as for interior trim.

5.5.11 Interior Finishing Trim

All interior finishing trim shall be cut to the exact dimensions and fine sanded smooth, and with lightly sanded arrisses, and all fixed with plated finishing pins. Machine staple fixing is NOT acceptable. Note that even traces of planer marks are unacceptable on architraves. Margins between interior trim and other elements shall be exactly even, and all mitres shall be exact and tight.

No scotia (all square stopped).

No architraves.

Skirtings 90mm x 18mm, square dressed, high moisture resistance MDF.

5.5.12 Fire Stopping

All small services penetrations through fire rated concrete shall be stopped with intumescent foaming sealant for joints up to 10mm, and with intumescent stopping putty where the gap exceeds 10mm.

5.6 Timber Weatherboard Cladding

5.6.1 Scope

Supply and install the selected Timber Weatherboard Cladding type(s) to the locations shown on the drawings, complete with all accessories. All aspects of this work shall be carried out to comply with the requirements of the New Zealand Building Code, relevant Standards, and in accordance with any specific manufacturer's requirements, other relevant product manufacturers' recommendations, and as noted and detailed on the drawings.

5.6.2 Horizontal Weatherboard Profile

Splay Profile Rusticated Weatherboard: ex.150mm x 25mm, machined to NZS 3617 and/or BRANZ Bulletin 411. Manufactured from the selected timber species to the finish specified.

Installed Location:

5.6.3 Vertical Weatherboard Profile

Vertical Shiplap Weatherboard: ex.150mm x 25mm, machined to NZS 3617 and/or BRANZ Bulletin 411. Manufactured from the selected timber species to the finish specified.

Installed Location:

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5.6.4 Timber Species & Face Finish

Splay Profile Rusticated Weatherboard shall be run from H3.1 treated, dressing-grade Pinus Radiata clears. Durability shall be to NZS 3602 Table 2A and NZBC B2/AS1, and materials compatibility through all cladding elements shall comply with E2/AS1 tables 20, 21 and 22.
Handle the weatherboards carefully to avoid damage to edges and faces, store flat and keep packaged until required for installation, and check that the boards moisture content at installation is approx. 14% mid-summer through to 18% midwinter. Ensure that all cut edges and ends are fully primed prior to fixing.

Vertical Shiplap Weatherboard shall be run from face-dressed, dressing heart grade, premium clears Western Red Cedar. Durability shall be to NZS 3602 Table 2A and NZBC B2/AS1, and materials compatibility through all cladding elements shall comply with E2/AS1 tables 20, 21 and 22.
Handle the weatherboards carefully to avoid damage to edges and faces, store flat and keep packaged until required for installation, and check that the boards moisture content at installation is approx. 14% mid-summer through to 18% midwinter.

5.6.5 Weatherboard Finish

Splay Profile Rusticated Weatherboards run from H3.1 treated Pinus Radiata shall be pre-primed to AS/NZS 2311 with a factory-applied oil based primer to all four sides.

Vertical Shiplap Weatherboards run from Western Red Cedar shall be pre-coated with a factory-applied oil stain finish - as specified, clear or coloured.

Oil stain manufacturer & brand:
Colour:

5.6.6 Preparation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to ensure that the weatherboards correctly allow for door and window installation, and for the locations of pipes, outlets, and fittings installed by others.

Horizontal Weatherboards Cavity-Fixed on Timber Framing - check all aspects of preparatory works, including, but not limited to:
- Check that the timber wall framing complies with the approved design drawings, is plumb and in true alignment, has studs at maximum 600mm centres and nogs/dwangs at maximum 800mm centres for horizontal cladding, that any additional framing required for fixing at corners, openings and soffits is correctly in place, and has a maximum moisture content of 20% at the time of weatherboard cladding installation.
- Check that the flexible wall underlay, as specified, has been installed in accordance with the manufacturer's recommendations and NZBC requirements, with all finishing tapes, flashings, etc., at windows, doors, corners and penetrations all correctly incorporated to give a continuous seal, and that all preparatory materials are lapped such that any water will run down to the exterior
- Check that the cavity battens and base vent strip are correctly installed and appropriate for the weatherboard cladding installation.

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- For cavity construction without a rigid wall underlay and where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed against the underlay to prevent bulk insulation from pushing the underlay into the cavity space.
- Check junctions to all other building elements and cladding systems and ensure that all necessary works have been completed that will enable the weatherboards to be installed, and that the work of other trades does not negatively impact on or reduce the minimum clearances required by the NZ Building Code between the cladding and ground, roof and/or deck junctures.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to ensure that the weatherboards correctly allow for door and window installation, and for the locations of pipes, outlets, and fittings installed by others.

Vertical Weatherboards Cavity-Fixed on Timber Framing - check all aspects of preparatory works, including, but not limited to:
- Check that the timber wall framing complies with the approved design drawings, is plumb and in true alignment, has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres for vertical cladding, that any additional framing required for fixing at corners, openings and soffits is correctly in place, and has a maximum moisture content of 20% at the time of weatherboard cladding installation.
- Check that the flexible wall underlay, as specified, has been installed in accordance with the manufacturer's recommendations and NZBC requirements, with all finishing tapes, flashings, etc., at windows, doors, corners and penetrations all correctly incorporated to give a continuous seal, and that all preparatory materials are lapped such that any water will run down to the exterior
- Check that the fluted/castellated horizontal cavity battens and base vent strip are correctly installed and appropriate for the weatherboard cladding installation.
- For cavity construction without a rigid wall underlay and where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed against the underlay to prevent bulk insulation from pushing the underlay into the cavity space.
- Check junctions to all other building elements and cladding systems and ensure that all necessary works have been completed that will enable the weatherboards to be installed, and that the work of other trades does not negatively impact on or reduce the minimum clearances required by the NZ Building Code between the cladding and ground, roof and/or deck junctures.

5.6.7 Fixing

Fix pre-primed Rusticated Weatherboards with Grade 316 stainless steel, annular grooved jolt head nails, length to embed minimum 35mm into the framing, holes pre-drilled 1mm less than the nail gauge where liable to splitting, and the nail at a slight upward slope into the framing.
Install the weatherboards with one nail positioned 10mm above the top of the lower board at each stud, and with a 2mm gap at all butted weatherboard edges. Punch nails 3mm below the board surface, prime nail holes and fill prior to sand and finishing. All soakers and flashings stainless steel.

Fix stained or bare finish Vertical Shiplap Weatherboards with Grade 316 stainless steel, annular grooved flat head nails, length to embed minimum 35mm into the framing, holes pre-drilled 1mm less than the nail gauge where liable to splitting, and the nail at a slight upward slope into the framing.
Install the weatherboards with one nail positioned 10mm clear of the lap (35mm - 40mm from the

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board edge) at each nog/dwang line, and with a 2mm gap at all butted weatherboard edges. Neatly bed the nail head onto the board surface - not into or below the surface. All soakers and flashings stainless steel.

5.6.8 Flashings

Flashing materials shall be in accordance with the requirements of NZBC E2/AS1 Sections 2.2 Materials, 4.0 Flashings, Table 20 - Material Selection, Table 21 - Compatibility of Materials in Contact, and Table 22 - Compatibility of Materials Subject to run-off, and as noted on the drawings.
All flashings around windows, doors and other openings and apertures, at internal and external corners, inter-storey junctions, soffit junctions, and at junctions with other building elements and cladding systems, etc., shall all be carefully constructed, fixed and finished to the details shown on the drawings.

5.6.9 Installation

5.6.9.1 Rusticated Weatherboard - Cavity Fix

Back flash all internal and external corners as detailed.
Carefully set-out Rusticated Weatherboard cladding horizontally over the cavity battens and fix the base weatherboard to the framing, level and true to line along the base line, 50mm minimum or as detailed, below the bottom plate or floor structure. From the base board upwards, install the weatherboards over the cavity battens and fix to the framing, keeping cladding lines consistent, level and true along walls and around corners.
Install full length weatherboards where possible. Where joints are unavoidable, scarf the weatherboards at 45º and fix to solid framing through the overlapping board just clear of scarf join - stagger weatherboard joints to avoid clustering. Where boards are coated, ensure all cut ends and fresh timber is double coated with a suitable sealer/primer.
Finish Rusticated Weatherboards, weatherboard trim, flashings and accessories at internal and external corners, window and door openings, parapets, and at junctions with other building elements and cladding systems exactly to the details shown on the drawings.

5.6.9.2 Vertical Shiplap Weatherboard - Cavity Fix

Back flash all internal and external corners as detailed.
Carefully set-out Vertical Shiplap Weatherboard cladding vertically over the fluted/castelated horizontal cavity battens, to straight plumb lines, and fix to the framing with side laps directed away from prevailing weather and with the base overhang 50mm minimum, or as detailed, below the bottom plate or floor structure. Install full length weatherboards boards where possible. Where joints are unavoidable, scarf the weatherboards at 45º and fix to solid framing through the top overlapping board above the joint (not through the joint). Where boards are coated, ensure all cut ends and fresh timber is double coated with a suitable sealer/primer.
Check for and eliminate any creep and/or spread of shiplap weatherboards during installation.
Finish Standard Vertical Weatherboards, weatherboard trim, flashings and accessories at internal and external corners, window and door openings, parapets, and at junctions with other building elements and cladding systems exactly to the details shown on the drawings.

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5.7 Masons NZ Ltd Wall Underlays, Tapes & Accessories

5.7.1 Scope

Supply and install the specified Membranes, Wraps and Flashing Tape from Masons NZ Ltd to the locations identified on the drawings, complete with all accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with Masons NZ Ltd technical information and installation requirements (check mpb.co.nz, or call 0800 522 533 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Membranes, Wraps and Flashing Tape from Masons NZ Ltd.

5.7.2 Damp-Proof Course (DPC)

Masons DRY-FIX™ DPC. A 0.75mm thick, high-impact, single-layer Polyethylene film, embossed on both sides, complying with AS/NZS 2904. Available in 50, 75, 90, 100, 140, 150, 200, 250 abd300 roll widths. When installing to jambs extend **200mm** up the jamb (refer drawings).

Applications:
- DRY-FIX™ DPC is approved for use as a separation barrier timber and wood-based products and metal from concrete, masonry or brick substrates.
- DRY-FIX™ DPC can be used as a moisture barrier and flashing in masonry veneer construction constructed in accordance with NZBC E2/AS1 and NZS 4229.
- DRY-FIX™ DPC is approved for use as a concealed flashing at jambs and sills of aluminium window and door joinery in masonry veneer walls constructed in accordance with NZBC E2/AS1.

DRY-FIX™ installed as a general Damp-Proof Course:
- Ensure the substrate is flat, smooth and free from sharp projections or ridges likely to puncture the DPC.
- The DPC must fully cover the width of the material in contact with concrete or masonry.
- Where bolts or fixings penetrate the DPC, make a small cut with a sharp knife to minimise damage.

DRY-FIX™ installed as a Flashing:
- Fix to framing members at maximum 300mm centres with small hot-dip galvanised clouts.
- Avoid joins in DRY-FIX™ flashings wherever practicable. Where joins are necessary, provide a minimum 75mm lap.

Install DRY FIX DPC in accordance with the manufacturer's current technical literature and to the locations and details shown on the drawings.

Installed Location:

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5.7.3 Wall Underlay

5.7.3.1 Barricade™ FR Building Wrap

Barricade™ FR Building Wrap. A fire-retardant, water-resistant, absorbent, breathable, synthetic non-woven underlay, manufactured from high-quality synthetic spun-bonded polypropylene with high UV qualities. Nominal weight 100g/m².

Barricade™ FR Building Wrap is CodeMark assured with the NZ Building Code: CodeMark Certificate of Conformity No:CM70072, issued by CertMark International Pty Ltd.

Barricade™ FR Building Wrap can be used with absorbent and non-absorbent direct-fixed wall claddings, and absorbent and non-absorbent wall claddings over a 20mm drained cavity, and masonry veneer cladding over a drained cavity in accordance with E2/AS1 and the CodeMark Certificate of Conformity.

Barricade™ FR Building Wrap can be installed in NZS 3604 Wind Zones up to and including 'Very High' as a standalone flexible underlay over timber or steel wall framing in accordance with the manufacturer's requirements and CodeMark Certificate of Conformity.

Barricade™ FR Building Wrap can be installed in NZS 3604 Wind Zones up to and including 'Extra High' as a flexible underlay over a rigid air barrier in accordance with NZBC E2/AS1 9.1.7.2 to the manufacturer's requirements and CodeMark Certificate of Conformity.

Do not leave Barricade™ FR Building Wrap exposed on walls for more than a total of 60 days before covering.

Installed in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Installed Location:

5.7.3.2 UNI PRO Flexible Air Barrier

UNI PRO Flexible Air Barrier is a non-woven, water resistant, breathable, synthetic flexible air barrier designed to provide temporary weather protection and reduce air infiltration to timber and steel framing prior to the installation of claddings. When installed in accordance with the manufacturer's requirements, it allows continuation of internal works for **up to 150 days exposure**. Nominal weight 230g/m².

UNI PRO Flexible Air Barrier is CodeMark certified: CodeMark Certificate of Conformity No: CM70117 Version 1, issued by Bureau Veritas Australia Pty Ltd.

To achieve the stated performance, UNI PRO Flexible Air Barrier shall be installed as part of a complete system using Masons 40 Below FlashingTape for sealing laps, joins, penetrations and detailing. Installation strictly in accordance with the current UNI PRO Flexible Air Barrier Installation Guide and any compatible proprietary accessories as specified by the manufacturer. Substitution of

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system components shall only be permitted where approved in writing by the manufacturer or project engineer.

UNI PRO Flexible Air Barrier can be used behind absorbent and non-absorbent direct-fixed wall claddings, absorbent and non-absorbent wall claddings over a 18mm drained cavity and masonry veneer cladding over drained cavities. All applications shall be in accordance with E2/AS1, E2/AS4, NASH Building Envelope Solutions, and the relevant CodeMark Certificate requirements and the manufacturer installation requirements.

UNI PRO Flexible Air Barrier can be installed in NZS 3604 Wind Zones up to and including 'Very High' as a flexible air barrier over timber or steel wall framing in accordance with the manufacturer's requirements and CodeMark Certificate of Conformity.

UNI PRO Flexible Air Barrier can be installed in NZS 3604 Wind Zones up to and including 'Extra High' as a flexible air barrier over a rigid wall underlay in accordance with NZBC E2/AS1 9.1.7.2 to the manufacturer's requirements and CodeMark Certificate of Conformity.

UNI PRO Flexible Air Barrier can be installed in NZS3604 Wind Zone 'Extra High' using a specific fixing method. See the current UNI PRO FLEXIBLE AIR BARRIER INSTALLATION GUIDE. N.B. this is an Alternative Solution and falls outside the scope of the Codemark Certificate.

Do not leave UNI PRO Flexible Air Barrier exposed on walls for more than a total of 150 days prior to cladding. Exposure duration shall be tracked from date of installation.

Installed strictly in accordance with the manufacturer's current installation guide, specifications, CodeMark Certificate conditions and good trade practice for weathertight detailing to the locations and details shown on the drawings.

Installed Location:

5.7.4 Window Flashing Tape

5.7.4.1 Hydro™ Flashing Tape

Masons Hydro™ Window Flashing Tape Masons Hydro Window Flashing Tape is a self adhesive, bituminous, flexible, foil-backed faced tape that is extremely strong and will adhere to most surfaces, and is designed to be used in conjunction with Masons Corner Guard and building wraps to seal around windows, doors and joinery openings as a secondary defence against water penetration. Masons Hydro™ Window Flashing Tape is CodeMark assured with the NZ Building Code: CodeMark Certificate of Conformity No:CMA-CM40125, CMNZ70075 Version 4 issued by CertMark Australasia Pty Ltd Bureau Veritas Australia Pty Ltd.

Masons Hydro™ Window Flashing Tape is suitable for use on timber or steel framed buildings in conjunction with a compatible flexible wall underlay or rigid wall underlay, in NZS 3604 Wind Zones up to and including 'Very High' 'Extra High'.

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Masons Hydro™ Window Flashing Tape can be used on the sill and lintel of framed joinery openings, and to seal flashing upstand to a flexible underlay. Masons Hydro may also be used at joinery heads to seal flashing upstands to the wall underlay.

Physical Properties:
- Thickness: 1.0mm
- Minimum installation temperature: +5°C.
- Maximum UV exposure: 60 days. (NOT 30)
- Tape width: Available in 75mm, 100mm,150mm, and 200mm wide rolls x 25m long and 150mm wide x 10m

Masons Hydro™ Window Flashing Tape should not be applied directly or indirectly (over flexible underlay) to timber that has been freshly LOSP treated. Always allow LOSP solvent to fully flash off before covering with underlay and applying Masons Hydro™ Window Flashing Tape.

Install in accordance with the manufacturer's requirements and CodeMark certification, to the locations and details shown on the approved drawings.

Frame Depth:
Installed Location:

5.7.4.2 40 Below™ Flashing Tape

Masons 40 Below™ Flashing Tape. Masons 40 Below 'Ultra Sticky' Flashing Tape is a self adhesive, hot melt, white woven facing, flexible tape that is extremely strong and will adhere to most surfaces. It's designed to be used in conjunction with Masons Corner Guard and building wraps to seal around windows, doors and joinery openings as a secondary defence against water penetration.

Masons 40 Below™ Flashing Tape is CodeMark assured with the NZ Building Code: CodeMark Certificate of Conformity No: CMNZ70075 Version 4, issued by Bureau Veritas Australia Pty Ltd.

Masons 40 Below™ Flashing Tape is suitable for use on timber or steel framed buildings, in conjunction with a compatible flexible wall underlay or rigid wall underlay, in NZS 3604 Wind Zones up to and including ‘Extra High’.

Masons 40 Below™ Flashing Tape can be used on the sill and lintel of framed joinery openings, and to seal flashing upstand to a flexible underlay.

Masons 40 Below™ Flashing Tape may be used to seal junctions and penetrations in selected rigid wall underlays (check with rigid wall underlay supplier for suitability).

Physical Properties:

- Thickness: 0.2mm thick adhesive layer

- Installation Temperature Range: -10ºC to 40ºC +

- Maximum UV Exposure: 6 months. (180 days)

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- Tape Width: Available in 75mm, 100mm, 150mm, and 230mm wide x 20m long rolls.

- Nail & Screw sealability

Masons 40 Below™ Flashing Tape should not be applied directly or indirectly (over flexible underlay) to timber that has been freshly LOSP treated. Always allow LOSP solvent to fully flash off before covering with underlay and applying Masons 40 Below™ Flashing Tape.

Install in accordance with the manufacturer's requirements and CodeMark certification, to the locations and details shown on the approved drawings.

Frame Depth:

Installed Location:

5.7.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades to install the specified membranes, wraps and flashing tape as required.

5.7.6 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements.

All cutting, joining, and fixing techniques shall be exactly as recommended by the manufacturer, and carried out with the use of suitable tools and equipment appropriate for the application. All work shall be such as to leave a neat, efficient, and weathertight installation.

5.7.7 Delivery & Handling

Store underlay rolls on end, undercover, on a flat, clean and dry surface. Keep stored materials dry, out of direct sunlight, and protected from damage and contamination at all times.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the materia.

Do not used damaged or defective materials, or products that are beyond their designated shelf life.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

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Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Best practice guidelines for working on roofs.

5.7.8 Preparation

5.7.8.1 General

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the approved drawings.

Do not commence installation until all necessary preliminary works by others is complete and to the required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.

Supporting timber structures shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content in accordance with the requirements of NZS 3602 at the time of installation.

Supporting lightweight steel framed structures shall comply with NASH 3405, or the NZBC for specific design.

Supporting steel structures shall comply with NZS 3404.

Ensure all substrates are structurally sound, dry, clean and free from contaminants, sharp projections and surface irregularities that may adversely affect the installation or performance of membranes, wraps or flashing tapes.

5.7.8.2 Timber Framing

Masons Building Wraps installed over Timber Framing - check all aspects of preparatory works, including but not limited to:
- Check that timber framing has been completed as shown on the drawings, complies with NZS 3604 or AS/NZS 1170 for specific design for timber framing, and is in accordance with Masons requirements.
- Check that framing is securely fixed, true to line and plane, is plumb and level where required, and is trimmed at edges, openings and penetrations as required.
- Check that timber framing has a maximum moisture content of 20% at the time of installation.
- Check that there are no projections due to structural bracing and bracketry etc.

5.7.9 Installation

5.7.9.1 Barricade™ FR Building Wrap

Install Barricade™ FR Building Wrap in accordance with the manufacturer's requirements, to the locations and details shown on the approved drawings.

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Barricade™ FR Building Wrap shall be installed, printed face out, to the exterior face of the wall framing, run horizontally, starting from the bottom edge and finishing at the top edge, extend the building wrap a minimum of below slab bottom plate or timber floor structure. 3

Lap Barricade™ FR Building Wrap such that any water will be shed to the outside of the underlay. Horizontal side-laps must be no less than 75mm wide; Vertical end-laps must be no less than 150mm wide and made over solid framing.

Fix Barricade™ FR Building Wrap at maximum 300mm centres, with 6-8mm stainless steel staples or 20mm large-head galvanised clouts, self-drilling screws or proprietary underlay fixings. The underlay must be pulled taut over the framing before fixing. Provide additional fasteners in conjunction with Masons WrapStrap™ around framed openings before cutting the underlay at openings.

Carefully cut Barricade™ FR Building Wrap at window and door openings just prior to joinery installation; cut underlay at 45º angle away from each corner and return full framing depth and fasten to inside of frame.

For drained cavity wall construction where studs are spaced more than 450mm apart, install Masons WrapStrap™ 19mm/25mm wide polythene embossed strap - horizontally at 300mm centres, or vertically mid-way between battens/studs - as additional restraint to prevent bulk insulation from pushing the underlay into the cavity space.

Install Masons flexible window flashing tape, as specified, to window and door openings in accordance with Masons requirements.

Barricade™ FR Building Wrap can be added as a second layer over the upstand of head flashings and inter-storey flashings, in lieu of flexible flashing tape, when extended up to and lapped under the nearest underlay lap above.

Install all necessary flexible flashing tapes required to seal the underlay at openings, around pipes, ducts and other services penetrating the underlay, at parapet and balustrade junctions, along head flashings and inter-storey flashings, as shown on the drawings.

Do not leave Barricade™ FR Building Wrap exposed to weather and UV light for more than 60 days after installation - replace with new underlay if 60 days' exposure is exceeded.

5.7.9.2 UNI Plus Flexible Air Barrier

Install UNI Plus Flexible Air Barrier in accordance with the manufacturer's installation instructions, to the locations and details shown on the approved drawings.

UNI Plus Flexible Air Barrier must be installed, printed face out, to the exterior face of the wall framing, run horizontally, starting from the bottom edge and finishing at the top edge, extending 50mm or as detailed below slab bottom plates or framed floor structure, and sufficiently tensioned to prevent sagging or bulging.

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Lap UNI Plus Flexible Air Barrier such that any water will be shed to the outside of the underlay. Horizontal side-laps must be no less than 75mm wide and sealed with Masons 40 Below Flashing Tape. Vertical end-laps must be no less than 150mm wide, made over solid framing and sealed with Masons 40 Below Flashing Tape.

Fix UNI Plus Flexible Air Barrier to timber framing with Masons UNI Fasteners at maximum 600mm centres using a hammer or gun. Fix UNI Plus Flexible Air Barrier to steel framing at maximum 600mm centres with Masons UNI Washers and self-drilling metal screws. The underlay must be pulled taut over the framing before fixing.

Framed openings should be left covered with UNI Flexible Air Barrier until window and door joinery is ready to be installed Carefully cut UNI Plus Flexible Air Barrier at window and door openings just prior to joinery installation; cut underlay at 45º angle away from each corner and return full framing depth and fasten to inside of frame.

For drained cavity wall construction where studs are spaced more than 450mm apart, install Masons WrapStrap™ 19mm/25mm wide polythene embossed strap - horizontally at 300mm centres, or vertically mid-way between battens/studs - as additional restraint to prevent bulk insulation from pushing the underlay into the cavity space.

Install Masons 40 Below Flashing Tape to window and door openings in accordance with Masons requirements.

UNI Plus Flexible Air Barrier can be added as a second layer over the upstand of head flashings and inter-storey flashings, in lieu of flexible flashing tape, when extended up to and lapped under the nearest underlay lap above.

Install all necessary flexible flashing tapes required to seal the underlay at openings, around pipes, ducts and other services penetrating the underlay, at parapet and balustrade junctions, along head flashings and inter-storey flashings, as shown on the drawings.

Do not leave UNI Plus Flexible Air Barrier exposed to weather and UV light for more than 90 days after installation - replace with new underlay if 90 days' exposure is exceeded.

5.7.9.3 UNI Pro Flexible Air Barrier

Install UNI Pro Flexible Air Barrier in accordance with the manufacturer's installation instructions, to the locations and details shown on the approved drawings.

UNI Pro Flexible Air Barrier must be installed, printed face out, to the exterior face of the wall framing, run horizontally, starting from the bottom edge and finishing at the top edge, extending 50mm or as detailed below slab bottom plates or framed floor structure, and sufficiently tensioned to prevent sagging or bulging.

Lap UNI Pro Flexible Air Barrier such that any water will be shed to the outside of the underlay. Horizontal side-laps must be no less than 75mm wide and sealed with Masons 40 Below Flashing

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Tape. Vertical end-laps must be no less than 150mm wide, made over solid framing and sealed with Masons 40 Below Flashing Tape.

Fix UNI Pro Flexible Air Barrier to timber framing with Masons UNI Pro Fasteners at maximum 600mm centres using a hammer or gun. Fix UNI Pro Flexible Air Barrier to steel framing at maximum 600mm centres with Masons UNI Pro Washers and self-drilling metal screws. The underlay must be pulled taut over the framing before fixing.

Framed openings should be left covered with UNI Pro Flexible Air Barrier until window and door joinery is ready to be installed Carefully cut UNI Pro Flexible Air Barrier at window and door openings just prior to joinery installation; cut underlay at 45º angle away from each corner and return full framing depth and fasten to inside of frame.

For drained cavity wall construction where studs are spaced more than 450mm apart, install Masons WrapStrap™ 19mm/25mm wide polythene embossed strap - horizontally at 300mm centres, or vertically mid-way between battens/studs - as additional restraint to prevent bulk insulation from pushing the underlay into the cavity space.

Install Masons 40 Below Flashing Tape to window and door openings in accordance with Masons requirements.

UNI Pro Flexible Air Barrier can be added as a second layer over the upstand of head flashings and inter-storey flashings, in lieu of flexible flashing tape, when extended up to and lapped under the nearest underlay lap above.

Install all necessary flexible flashing tapes required to seal the underlay at openings, around pipes, ducts and other services penetrating the underlay, at parapet and balustrade junctions, along head flashings and inter-storey flashings, as shown on the drawings.

Do not leave UNI Pro Flexible Air Barrier exposed to weather and UV light for more than 90 days after installation - replace with new underlay if 90 days' exposure is exceeded.

5.7.9.4 Hydro™ Window Flashing Tape

Install Masons Hydro™ Window Flashing Tape in accordance with the manufacturer's requirements, to the locations and details shown on the approved drawings.

Window Sills:
- Fit Masons Corner Guard to the bottom corners of the opening, over the underlay. Alternatively, apply triangular pieces of Masons Hydro™ Window Flashing Tape to bottom corners in accordance with Masons instructions.
- Cut Masons Hydro™ Window Flashing Tape to the length of the sill trimmer plus an additional 400mm.
- Apply the tape over the underlay along the sill trimmer, with the back edge flush with the inside edge of the framing, and returned minimum 200mm up both trimming studs.
- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.

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- Press the tape firmly in place over the underlay to ensure a continuous weathertight seal is maintained.

Window & Door Lintels:

- Install Masons Hydro™ Window Flashing Tape to the top corners of framed window and door openings, over the underlay and 200mm along the lintel and 200mm down the trimming stud, with the back edge flush with the inside edge of the framing.
- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.
- Press firmly in place over the underlay to ensure a weathertight seal.
- Apply a 75mm wide x 150mm long strip of Masons Hydro™ Window Flashing Tape at 45° over the taped outside face of each corner.

Avoid joining Masons Hydro™ Window Flashing Tape. Where necessary, form joins with minimum 100mm overlap, keep any required joining to an absolute minimum.

Do not stretch Masons Hydro™ Window Flashing Tape during installation, and ensure adequate adhesion and weathertightness is maintained against the underlay.

Do not leave Masons Hydro™ Window Flashing Tape exposed to weather and UV light for more than 30 days after installation - replace with new window flashing tape if 30 days' exposure is exceeded.

5.7.9.5 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum)

Install Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) in accordance with the manufacturer's requirements, to the locations and details shown on the approved drawings.

Window Sills:

- Fit Masons Corner Guard to the bottom corners of the opening, over the underlay. Alternatively, apply triangular pieces of Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) to bottom corners in accordance with Masons instructions.

- Cut Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) to the length of the sill trimmer plus an additional 400mm.

- Apply the tape over the underlay along the sill trimmer, with the back edge flush with the inside edge of the framing, and returned minimum 200mm up both trimming studs.
- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.
- Press the tape firmly in place over the underlay to ensure a continuous weathertight seal is maintained.

Window & Door Lintels:

- Install Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) to the top corners of framed window and door openings, over the underlay and 200mm along the lintel and 200mm down the trimming stud, with the back edge flush with the inside edge of the framing.

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- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.
- Press firmly in place over the underlay to ensure a weathertight seal.
- Apply a 75mm wide x 150mm long strip of Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) at 45° over the taped outside face of each corner.

Avoid joining Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum. Where necessary, form joins with minimum 100mm overlap, keep any required joining to an absolute minimum.

Do not over-stretch Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum)during installation, and ensure adequate adhesion and weathertightness is maintained against the underlay.

Do not leave Masons 40 Below™ Flashing Tape (Ultra Sticky / Flex / Platinum) exposed to weather and UV light for more than 6 months after installation - replace with new window flashing tape if 6 months' exposure is exceeded.

5.7.10 Completion

Check that all underlays have been installed correctly and are properly supported, and that all underlay edges, joins and ends are correctly finished prior to closing off with claddings - all in accordance with the manufacturer's installation requirements.

Check installed underlays and flashing tapes for defective work and damage before covering - replace and/or repair as necessary to the required standard.

Leave all of this work complete and free of defects, and to the required standard in accordance with the manufacturer's warranty requirements.

Issue to the Owner a copy of the Masons NZ Ltd Product Warranty for all Masons products installed.

5.8 GIB® Plasterboard Linings

5.8.1 Scope

Supply and install GIB® Plasterboard Linings specified herein, as sheet lining materials to the walls, ceilings and other elements identified on the drawings, complete with all accessories required for proper installation, finishing and performance. All aspects of this work shall be in complete accordance with the current GIB® Site Guide and relevant GIB® Systems literature (check www.gib.co.nz, or call 0800 100 442 for the latest editions), and other relevant product manufacturers' recommendations.

No substitutions are permitted for GIB® Plasterboard Linings, GIB® Systems or GIB® System components and accessories.

This specification must be read in conjunction with relevant GIB® Systems specifications - GIB® EzyBrace® Systems, GIB® Fire Rated Systems, GIB® Noise Control Systems, GIB® Aqualine® Wet Area Systems, GIB® X-Block® Systems, GIB® Quietline®, GIB® Intertenancy Barrier System, and GIB® Rondo® Metal Batten Systems - and other specifications sections, as they are interrelated

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5.8.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB® Plasterboard Linings as required, and to ensure that:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- the linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

5.8.3 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation and finishing work of GIB® Plasterboard Linings shall be carried out by qualified and experienced tradespersons, familiar with the specified materials and installation and finishing techniques, in accordance with the GIB® Site Guide and the relevant GIB® product technical literature, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

GIB® Plasterboard Linings shall be jointed and finished to the specified Finish Levels in accordance with AS/NZS 2589 and GIB® Site Guide. Make all necessary arrangements for the quality assessment of plasterboard jointing and finishing Finish Levels prior to commencing decorating.

All cutting, fixing, jointing, finishing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard and free from damage and defects.

Protect surrounding surfaces and areas from jointing compound splashes and sanding dust.

5.8.4 Delivery & Handling

Store GIB® Plasterboard Linings indoors, in neat, flat stacks off the floor, in dry conditions and without any sagging or distortion, in accordance with the GIB® Site Guide. Keep plasterboard linings, compounds and accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life.

Should a problem be encountered with any GIB® product during installation or delivery, immediately contact the GIB® Helpline on 0800 100 442. Do not continue to use the product that is not performing to specification or expectation. Keep samples of the product in question and where possible, document batch numbers and/or manufacturing dates.

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Handle all products and materials in accordance with the manufacturer's requirements and relevant Product Data Sheets and GIB® Site Guide, and in a manner that prevents damage. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall be familiar with and comply with the requirements of the GIB® Site Guide precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice.

5.8.5 Completion

Check that GIB® Plasterboard Linings have been installed in accordance with the GIB® Site Guide and GIB® Systems literature, and are finished to the specified finish levels.

Check for any damage and defective work - repair or replace as necessary to the required standard.

Ensure that inspection and assessment of the plasterboard Finish Level has been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.

Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.

Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.

Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and dust. Remove all associated rubbish and excess material from the site.

Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

Preparation and painting (by others) of GIB® Plasterboard Linings shall be carried out in accordance with AS/NZS 2311 and with the paint manufacturer's recommendations. Refer to separate specification section Painting & Decorating.

Preparation, including application of under-tile waterproofing membranes, and tiling (by others) of GIB® Plasterboard Linings shall be carried out in accordance with AS 3589.1 and the BRANZ Good Practice Guide: Tiling. Refer to separate specification section Tiling.

5.9 Ecoply Plywood Flooring

5.9.1 Scope

Long edge tongue and grooved plywood flooring to the areas shown on the Floor Plan. All aspects of this work shall be in complete accordance with the Ecoply Specification and Installation Guide (Ph 0800 326 759 to confirm date of the most recent edition).

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5.9.2 Location

5.9.2.1 19mm Domestic Internal Dry (1.5kPa floor load)

19mm CD Longspan untreated on joists at 600mm maximum centres to all internal dry areas as detailed on the drawings.

5.9.2.2 19mm Domestic Internal Wet Area (1.5kPa floor load)

19mm CD Longspan H3.2 CCA treated on joists at 600mm maximum centres to all internal wet areas as detailed on the drawings.

5.9.3 Preparation

Check that the subfloor framing complies with NZS 3604, has joists at the specified centres, is trimmed at edges and openings as required for the Ecoply Flooring, is accurate to level, and has a maximum moisture content of 18% at the time of Ecoply Flooring installation.

5.9.4 Workmanship

All Ecoply Flooring installation work shall be carried out by skilled tradesmen experienced in sheet material work. Upon delivery store the Ecoply Flooring on four evenly spaced level bearers, and protect from rain dirt etc. Handle the plywood carefully, and reject any sheets with damaged edges or faces.
For treated ply observe the recommendations within the Material Data Safety Sheet for H3 CCA Ecoply.

5.9.5 Installation

Sheets set out with the face grain at right angles to the joists, in a staggered layout, in accurate alignment, and with all sheets continuous over at least two spans (three joists) (if this is not possible at a floor edge, blocking must support the sheet edges). Allow a 2-3mm expansion gap at the end of each sheet. Fixings at 150mm centres to sheet edges (at least 7mm in from square sheet edges, or 15mm from tongue and groove edges) and at 300mm centres to intermediate joists. Fix with nails or screws, or a combination of mechanical fixings and adhesives, with all fixings in strict accordance with Sections 2.2, 2.3, and 5.2 of the 'Ecoply Specification and Installation Guide', and to suit the exposure zone etc.

5.9.6 Completion

Protect the floor from dirt and moisture to the maximum reasonably possible throughout the balance of the construction programme, and instruct that it be only lightly sanded before final covering/finishing.

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6 CLADDING

6.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

6.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
2295:2006(NZS)	Pliable, permeable building underlays
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0

6.3 Steel & Tube Profiled Metal Cladding

6.3.1 Scope

Supply and install the selected Profiled Metal Cladding from Steel & Tube to the walls identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with Steel & Tube guides and technical manuals, (check www.steelandtube.co.nz, or call 0800 333 247 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Steel & Tube Profiled Metal Cladding.

Design and use the fixings appropriate for the wind zone and topographical classification of this site and building height. Allow for specific loadings at corners and where localised pressure factors apply.

Install cladding material and associated flashings and accessories to form a weathertight and durable system.

6.3.2 Requirements

6.3.2.1 Warranty - Cladding Material

Provide a Cladding Manufacturer/Supplier Material Warranty:
- Minimum 15 Years for Perforation.
- Minimum 10 Years for Coatings.

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- Provide the warranties on the Steel & Tube Standard Warranty Plus Warranty Form.
- Commence the warranty from the date of installation.

Factory Applied Coatings: The warranty is determined by the specified product and the site location and environment - contact Steel & Tube to evaluate the warranty conditions.

6.3.2.2 Warranty - Installation

Provide an Installer's Installation Warranty:
- Minimum 5 Years for Workmanship.
- Warrant this work under normal environmental conditions and use against waterproofing failure.
- Provide the Installation Warranty on the Installer's Standard Warranty Form.
- Commence the warranty from the date of installation.

Include a copy of the Steel & Tube maintenance requirements with the Installation Warranty.

6.3.3 Cladding Profile

6.3.3.1 ST963 (C2)

Steel & Tube ST963 - a medium-rib trapezoidal profile; 46mm deep; 321mm crest pitch; 230mm wide pan; 963mm effective cover.
- Manufactured from the material type, thickness and finish as specified herein.
- Installed as vertically and/or horizontally orientated cladding in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Installed Location:

6.3.4 Cladding Material

6.3.4.1 Colorsteel Altimate® - 0.4mm

Steel & Tube roofing shall be manufactured from COLORSTEEL® Altimate – 0.9mm BMT. A 3-layer organic coating consisting of an anti-corrosive and bonding and pre-treatment layer, an anti-corrosive primer, and a top coat, applied to both sides of the material, to withstand tough environments conforming with AS:NZS1397:2013. 550 MPa minimum yield strength. 150gms/m^2 coating weight. Atmospheric Classification C1-C5M and C5I.

Colour:

6.3.4.2 Colorsteel Maxam - 0.4mm

Steel & Tube roofing shall be manufactured from COLORSTEEL® Maxam - 0.4mm BMT. A 3-layer organic coating consisting of an anti-corrosive and bonding pre-treatment layer, an anti-corrosive primer and a top coat, applied to both sides of the material, to withstand tough environments conforming with AS:NZS1397:2013. 550 MPa minimum yield strength. 150gms/m^2 coating weight. Atmospheric Classifications C1-C5M and C5I.

Colour:

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6.3.5 Components & Accessories

6.3.5.1 Cavity Battens (cavity construction)

Cavity Battens for Profiled Metal Cladding - refer to Cavity Battens clause.

6.3.5.2 Cavity Closure Strip (cavity construction)

Cavity Closure Strip. Exterior-grade PVC, single-piece, 20mm deep cavity closure moulding, punched with 3-5mm holes or slots in accordance with NZBC E2/AS1 Paragraph 9.1.8.3. Installed in accordance with E2/AS1 to the locations and details shown on the drawings.

6.3.5.3 Flexible Underlay

Flexible Underlay. Refer to separate specification section. Fexible underlay shall comply with NZBC Clause E2/AS1, Table 23. Absorbent underlays with a minimum absorbency of 100g/m² shall be used behind direct-fixed metal cladding.

6.3.5.4 Screw Fasteners

Screw Fasteners. Profiled metal cladding screw fasteners shall be appropriate for the cladding material and profile, and the supporting structured being fixed to, and the exposure zone (minimum Class 4 to AS 3566); all in accordance with the Steel & Tube Product Technical Statement and the NZMRM Code of Practice.

Primary fastener placement and frequency shall be strictly in accordance with the Steel & Tube Product Technical Statement according to the specified Wind Design Load. Ensure the fastener layout is balanced with other architectural features.

Use fixing systems that will accommodate due allowance for dynamic local wind pressures on the building and thermal movement in the cladding sheets.

Screw fasteners for pre-painted metal must be pre-painted for an accurate colour match prior to installation.

6.3.5.5 Metal Flashings

Metal Flashings. Metal flashings shall comply with the lap, cover, expansion and compatibility provisions of the NZMRM Code of Practice. Flashings shall be formed to suit the details shown on the approved drawings, and shall include all folded metal sections required to make the specified profiled metal cladding weathertight at:

- the building periphery,
- internal and external corner junctions,
- junctions with other materials,
- intersections with other buildings,
- any wall penetration.

Metal flashings shall be fabricated from ductile grade metal of same material and coating as the cladding material, to maintain durability and compatibility requirements. Flashing materials shall be compatible with the cladding and of no less durability and in compliance with NZBC E2/AS1: Table 20.

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Metal flashings shall be designed for lateral strength by folding, stiffening or ribbing on external edges, and have a maximum un-stiffened width of 300mm.

The minimum thickness for metal flashings shall be:
- Coated steel: 0.55mm,
- Aluminium: 0.9mm,
- Copper: 0.6mm,
- Zinc: 0.7mm,
- Stainless steel: 0.45mm.

Flashing fastenings and fastening frequency shall be in accordance with the NZMRM Code of Practice. Do not fix flashings to timber with a moisture content greater than 18%.

Do not construct flashing joints and flashing junctions in a manner that rely entirely on sealant to maintain weathertightness.

Where a flashing is hidden, or is otherwise difficult to access or replace, it shall have a durability of the life of the building or not less than 50 years.

Where flashings are required but are not detailed, the flashing design shall be to Steel & Tube design recommendations.

6.3.5.6 Profiled Foam Closure Strip

Profiled Foam Closure Strip. Non-bituminous, compressible, closed-cell foam strips, formed to fit the metal roofing profile. Installed in accordance with the NZMRM Code of Practice and Steel & Tube recommendations, and as shown on the approved drawings.

6.3.5.7 Sealant

Sealant. Use only neutral-curing silicone or MS polymer sealant compatible with the specified metal cladding and flashing materials and finishes, and suitable for the required application and use; all in accordance with the sealant manufacturer's instructions and the NZMRM Code of Practice recommendations.

All sealed joints must be mechanically fastened, and excess sealant neatly removed to prevent unnecessary dirt buildup. Sealant shall only be used to seal between two metal surfaces, do not fill holes or gaps with sealant.

6.3.5.8 Proprietary Collar Flashings

Proprietary Collar Flashings. Dektite® or similar approved EPDM or silicone-polymer proprietary flexible collar flashings for weatherproofing wall-penetrating pipes/flues/ducts. Sized to suit the applicable pipe/flue/duct and installed in strict accordance with the manufacturer's requirements and the NZMRM Code of Practice. Use only high-temperature silicone (not EPDM) collar flashings for heated flues and pipes with temperature range between 60°C - 200°C.

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6.3.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works, including membranes, wraps, rigid air barriers and trims, and any other related works are completed to specification and as shown on the drawings.

Coordinate with other trades to ensure that the metal wall cladding installation correctly allows for door and window installation, and that all required services penetrations are correctly handled to maintain full weathertightness, and to install profiled metal cladding as required.

6.3.7 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner or supervised by an Licensed Building Practitioner.

Cladding Installers shall be experienced and competent, familiar with the products being used, and preferably a member of RANZ with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

Install and fix in accordance with the NZMRM CoP and NZBC E2/AS1 requirements where applicable and to Steel & Tube's requirements.
Always maintain isolation of dissimilar materials in accordance with the NZMRM Code of Practice and NZBC E2/AS1. Isolate dissimilar materials (metal and nonmetal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto, galvanised or Zincalume® materials.

6.3.8 Delivery & Handling

Store profiled metal cladding, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the roofing manufacturer. Keep stored materials and accessories dry and protected from damage and contamination at all times.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the material, including surface marking. Do not used damaged or defective materials or products, or products that are beyond their designated shelf life.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

6.3.9 Preparation

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the

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drawings. Inspect the wall framing and supporting structure to ensure that it is constructed to the required tolerances, complete and ready for cladding.

Do not commence installation until all necessary preliminary works by others is complete and to the required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding.

Check all aspects of preparatory works, including but not limited to:
- Check wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames and other penetrations;
- Check claddings are neatly finished off to all sides of openings;
- Check installation of flashings (those required to be installed prior to installation of penetrating elements).

6.3.10 Cavity Battens

Cavity Battens - for Horizontal Profiled Metal Cladding: Ex 50 x 25mm, H3.1 treated Radiata cavity battens.
- Installed vertically over the wall underlay, and directly over studs at maximum spacing to suit the cladding profile, and as shown on the drawings.
- Fix to timber framing with 40 x 2.5mm hot-dipped galvanised flat head nails spaced at maximum 800mm centres.
- Ensure that LOSP solvents in the cavity battens have flashed-off before installing the cladding.
- Install the specified underlay or separation strip over the outside face of timber cavity battens to ensure isolation of materials between the metal cladding and the cavity batten.

6.3.11 Installation

6.3.11.1 Cladding

Install the specified profiled metal cladding in accordance with the Steel & Tube Product Technical Statement and the NZMRM Code of Practice and NZBC E2/AS1, and as shown on the approved drawings.

Prevent contact with, or run-off from, incompatible materials in accordance with the recommendations in the NZMRM Code of Practice.

Protect pre-coated metal cladding and flashing surfaces from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged.

Cut metal cladding and flashings by shear only - do not use abrasive cutting tools. Do not use black lead pencils for marking Zincalume®, Colorsteel® or Colorcote® materials.

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All cladding jointing techniques and sealants shall be in accordance with Steel & Tube recommendations and the NZMRM Code of Practice, and shall be compatible with the cladding material and finish. Joints shall be sealed with an approved sealant or approved closed-cell lap tape.

As shown on the drawings, confirm the cladding layout, the location of any movement control joints; the layout of the cavity battens; and any specific cladding detailing requirements prior to installation.

Set-out the planned cladding layout before fixing commences to ensure true and accurate lines and correct relationship to other design features as shown on the drawings. End laps are not permitted, except where specifically detailed.

Install cladding sheets to the layout and details shown on the drawings, to plumb and level lines, and with side laps away from the main line of sight where possible. Maintain this accurate set-out throughout installation. Check for and eliminate any creep an/or spread of sheets, and make provision to keep fastenings in line.

Keep cladding lines consistent and true along walls and around corners; with side-laps of vertical sheets directed away from the prevailing wind and/or line of sight; to straight, true and accurately aligned lines in both directions - vertical and horizontal.

Use only screw fasteners recommended by the cladding manufacturer, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet. Ensure fastener layout is balanced to other architectural features. Paint colour-matched fixings and accessories before installation.

6.3.11.2 Screw-Fastened Cladding

Screw-Fastened Cladding. Screw-fixed cladding sheets shall be fixed with screw fasteners appropriate for the cladding profile and material, substrate/structure and the environment in accordance with Steel & Tube recommendations (minimum Class 4).

Screw fastening placement and spacings shall be strictly in accordance with Steel & Tube requirements to fully comply with the Wind Zone requirements, support frame spacings, etc. Ensure the fastener layout is balanced to other architectural features.

crew fastenings for pre-painted metal must be pre-painted prior to installation for an accurate colour match.

Use fixing systems that will accommodate due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

6.3.11.3 Clip-Fastened Cladding

Clip-Fastened Cladding. Concealed clip-fastened cladding sheets shall be fixed with fastening clips appropriate for the cladding profile and material, substrate/structure and the environment in accordance with Steel & Tube requirements.

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6.3.11.4 Flashings

Metal flashings generally shall be in accordance with Steel & Tube design recommendations and the NZMRM Code of Practice.

Install flashings to internal and external corner junctions, window/door and other openings, eave and soffit junctions, parapets and at junctions with other cladding systems and building elements as detailed on the drawings and in accordance with Steel & Tube requirements and the NZMRM Code of Practice.

All flashings shall be neatly formed and finished, securely fastened to the structure, weatherproof, and lapped such that any water will run down to the exterior.

For highly visible flashings, plan each flashing joint and/or junction with specific regard to aesthetic requirements.

6.3.11.5 Penetrations

Penetrations in metal cladding that are greater than 150mm in any direction must have support framing installed around the perimeter of the penetration

Penetration flashings shall not rely solely on silicone sealant to achieve weathertightness of the flashing. Flash pipes penetrating the cladding with a proprietary pipe collar flashing.

6.3.11.6 Control Joints

Form vertical movement control joints in the cladding to the locations, layout and details shown on the drawings in accordance with Steel & Tube recommendations. Movement control joints shall be aligned with control joints in the structural framing. Confirm the location of movement control joints prior to installation.

6.3.12 Completion

Check that the profiled metal wall cladding and associated components and flashings have been installed and finished correctly.

Check for defective work, damage and surface marking - replace and/or repair as necessary to the required standard in accordance with Steel & Tube recommendations.

Ensure that the work of other trades does not reduce the cladding-to-ground, deck or roof clearances that are required by the NZ Building Code.

Leave all of this work complete, weathertight, and free of defects, and to the required standard in accordance with the manufacturer's warranty requirements.

Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the Steel & Tube maintenance requirements upon completion of the contract works.

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Isuue to the Owner a copy of the cladding material manufacturer's/supplier's 'Product Warranty' for the installed metal cladding product on the Steel & Tube standard 'Warranty Plus' warranty form.

Issue to the Owner a copy of the installer's 'Installation Warranty' on the installer's Standard Warranty Form.

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7 EXTERNAL WINDOW & DOOR JOINERY

7.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

7.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
1866:1997(AS/NZS)	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
2208:1996(AS/NZS)	Safety glazing materials in buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

7.3 Aluminium Windows & Doors

7.3.1 Scope & Design Performance

7.3.1.1 Wind Performance - Wind Zone - High:

Aluminium Windows & Doors shall comply with the requirements of NZS 4211 for all relevant clauses.

Wind Load - Non-Specific Design Wind Zone Classification:

- Aluminium Window and Door joinery installation is located in a NZS 3604 Wind Zone: H - High; with a maximum pressure of 0.97kPa SLS and 1.36kPa ULS.

7.3.1.2 Thermal Performance - Climate Zone 6:

Aluminium Window & Door joinery installation is located within the boundaries of Climate Region Zone 6 as defined in NZBC - H1/AS1. Unless specified otherwise, the combination of glazing and window/door frame shall have a minimum required R-Value in accordance with this Climate Zone. Refer to drawings and schedules.

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7.3.1.3 Durability Performance - Exposure Zone B - Low:

Aluminium Window and Door joinery installation is located in a NZS 3604 Exposure Zone B: Low - within an inland area with little risk from wind-blown sea-spray salt deposits.

ISO 9223 Category: C2 Low: Characterised by no obvious marine influences. Typically, more than 1000 metres from the exposed coasts or more than 500 metres from industrial emissions.

All aspects of the Aluminium Window and Door joinery, including hardware, shall meet the durability requirements for the given Exposure Zone in accordance with NZBC B2.

7.3.2 Requirements

7.3.2.1 Safety:

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

7.3.2.2 Warranty:

Window & Door Materials & Workmanship Warranty:

- Standard Manufacturers Window and door product warranty periods apply unless noted otherwise in the contract documents
- Commence the warranty from the date of practical completion of the contract works.

7.3.2.3 Shop Drawings:

Prepare and submit to the Main Contractor for verification and approval prior to the commencement of fabrication works, Shop Drawings describing the general arrangement and connection to the building envelope of the specified window & door systems.

These shall include, but not be limited to:

- Design calculations - where required;
- Dimensioned elevations of all joinery elements (typical scale = 1:50; minimum scale = 1:100);
- Complete details of the installation construction, connections and all support systems (typical scale = 1:2; minimum scale = 1:5);
- Sealant types and backing rods, etc;
- Provision for movement, thermal, wind load and/or seismic - where required;
- Coordination requirements/issues with other works and trades - where applicable;
- A schedule of materials, finishes, componentry, fittings, fixings and fastenings - where required.

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7.3.2.4 Samples:

As required, provide samples of the specified windows & doors, including specified fittings, aluminium finish and colour, all as agreed, for verification by the Contract Administrator. Fabrication should not commence until approval has been gained.

7.3.3 Aluminium Windows

7.3.3.1 Aluminium Windows:

Aluminium Windows shall be manufactured to manufacturer's standard details.

Specification:

- Mullions and transoms, with or without external fins, shall be thermally broken, and in accordance with the manufacturer's Span Tables for compliance with the project wind load.
- Sashes shall be box sashes - glass captive, or beaded sash - capable of reglazing without dismantling sashes.
- Thermal breaks are to be provided as indicated on the Window & Door schedule.
- Glass: Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause
- Furniture: Refer to Hardware clause.

Configuration (as indicated on the drawings):

- Casement
- Awning
- Sliding
- Double hung
- Bi-fold

Refer to the Window & Door Schedule drawings for specific requirements of individual elements.

Manufactured and installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.

7.3.4 Aluminium Doors

7.3.4.1 Aluminium Doors:

Aluminium Doors shall be manufactured to standard manufacturer's requirements.

Specifications:

- Frames shall be manufactured, in accordance with the manufacturer's Span Tables, and to suit joinery configurations and opening swings.
- Stiles and rails shall be box sections - glass captive, or beaded - capable of reglazing without dismantling doors.

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- Thermal breaks are to be provided as indicated on the Window & Door schedule.
- Glass: Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause.
- Furniture: Refer to Hardware clause.

Configurations (as indicated on the drawings):

- Hinged Doors (single): Inward opening; outward opening. Left-hand swing LH; Right-hand swing RH. With coupled overlight; with coupled sidelight.
- French Doors (double): Inward opening; outward opening. Single-paired; double-paired (open-out fold-away). With coupled overlight; with coupled sidelight.
- Bifold door - 2-Panel Layback, 3-Panel Layback, 2-/2-Panel Layback. Can be combined with 1-Panel Hinged, 1-Panel Fixed.
- 'S' sliding panel, and 'F' fixed panel: F-S, S-F, F-S-F, F-S/S-F. Moving panels slide inside/behind fixed panels.

Refer to the Window & Door Schedule drawings for specific requirements of individual elements.

Manufactured and installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.

7.3.5 Glazing Platform

7.3.5.1 Standard Double Glazing:

Maximum 22mm thick, air-filled and sealed insulating glass units (IGUs); with 4mm thick clear float glass in accordance with NZS 4223.1 and NZS 4223.3. Double glazed IGUs shall be manufactured and installed in accordance with AS/NZS 4666. Factory-fitted to Aluminium Windows & doors, as identified on the drawings and schedules.

7.3.6 Glass

7.3.6.1 Clear Float Glass:

Clear annealed float glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

Location:

7.3.6.2 Low - E Glass:

Heat-reflective coated surface, annealed float glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

Location:

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7.3.7 Finish

7.3.7.1 Powder Coated Aluminium:

Polyester powder coating in accordance with WANZ Powder Coating Quality Assurance System and AAMA 2603-98 performance is required.

7.3.8 Flashing & Support Bars

7.3.8.1 Aluminium Head Flashing:

Aluminium Head Flashings shall be manufactured from extruded aluminium, suitably sized to suit the claddings and construction types in accordance with NZBC E2/AS1 and as shown on the drawings.

Except where specified otherwise, aluminium head flashings shall be powder coated and colour-matched to the aluminium joinery.

7.3.8.2 Aluminium Sill Support Bar - Cavity Fix:

Extruded mill-finish aluminium sill support bar, with built-in drainage and ventilation, for continuous support to the window or door unit. Sill support bars shall be used and installed in accordance with the requirements of NZBC E2/AS1, and comply with BRANZ Evaluation Method EM6, and be sized to suit the cladding thickness and weight of the window or door.

7.3.8.3 Support Angles:

Support angles shall be manufactured from either extruded aluminium or galvanised mild steel. Support angle sizes, fixing and installation requirements as shown on the drawings.

7.3.9 Hardware

Hardware as selected in the 'Door and Window' schedule is to be installed to Manufacturers requirements. Where not specified hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer shall be used. Factory fit all required and scheduled hardware.

Where specified, all lockable window & door hardware is to be keyed alike. Provide all keys with the joinery and provide to Client as required.

7.3.10 Fabrication

7.3.10.1 Fabrication:

Fabricate Aluminium Windows & Doors in accordance with the approved window schedule, approved workshop drawings and other project documentation.

Unless noted otherwise, the approved window schedule, joinery fabrication shall include the installation of all glazing, hinges, stays, running gear, and other hardware items scheduled on the approved shop drawings.

As necessary, provide protection and temporary bracing required for the general handling of the joinery elements. Ensure that all opening doors and windows are temporarily secured for transportation and general handling.

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7.3.11 Co-operation

7.3.11.1 Co-operation:

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades, as required, on the installation of the Aluminium Windows & Doors to the required layout, details and tolerances.

7.3.12 Workmanship

Aluminium Windows & Doors will be manufacturerd in workshops containing all mechanical equipment appropriate for the work, and by experienced and competent tradesmen who are familiar with the techniques and materials specified.

The manufacturer will co-ordinate with other trades to establish the exact sizes for all frames before fabrication. Frames and sashes will be fabricated true, square, rigid, and 'out of wind', with all joints strongly mechanically fixed, and with mitres tight and fully sealed. Potential thermal, wind and seismic movements will be accommodated within the construction. All cavities will drain to the exterior, and all drilling swarf etc. will be removed during fabrication.

Stays, hinges, running gear and glazing will be installed as scheduled (the Designer will be notified if any scheduled hardware of fixing position appears to be inappropriate for this project).

Hardware will be fixed true to line and position, and adjusted and oiled as required for correct operation.

Glass will be cut true and square, sized to provide correct edge clearances, blocked into place as required, and all units will be delivered either pressure fit, pocket glaze, or beaded/wedged, unless site glazing is required. Glazing gaskets will be compatible with all adjacent materials, and cut 1% over-length to absolutely avoid stretching during installation. Frames will be braced etc. as necessary for transportation to the site.

Flashings as detailed will be supplied. Flashing materials will be compatible with the Aluminium Windows & Doors.

7.3.13 Preparation

7.3.13.1 Preparation:

Prior to installation, carry out all necessary inspections of the supporting structure to ensure all preliminary work is complete. Do not commence installation until all necessary preliminary work by others is complete and to the required standard. The commencement of work on each section of the installation shall be deemed to indicate full acceptance by the Installer that all preliminary work by other trades is complete and to the required standard.

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Supporting structures shall comply with the NZ Building Code, and must be structurally sound and dimensionally stable and in the correct alignment, true to line and level (and grade for sloped balustrades).

Confirm the location of all movement control joints prior to the commencement of the works.

Concrete:
- Supporting reinforced concrete elements shall comply with NZS 3101, or NZS 3604.
- New concrete must have aged for a minimum of 28 days prior to installation.

Concrete Masonry:
- Supporting reinforced concrete masonry elements shall comply with NZS 4229, or NZS 4230 and AS/NZS 1170.

Timber Framing:
- Supporting timber-framed structures shall comply with NZS 3604, or NZS 3603 and AS/NZS 1170.

Structural Steel:
- Supporting steel structures shall comply with NZS 3404.

7.3.14 Delivery and Installation

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and the construction principles that are embodied in the Acceptable Solutions.

Arrange for delivery of the Alumnium Windows & Doors to the site only when a suitable storage situation is available for them, handle the joinery in accordance with the manufacturers requirements, avoid any frame distortion, avoid rubbing damage, avoid contact with concrete, plaster, mud etc. and keep them dry. Retain protective coverings for as long as possible, and remove them at completion.

Experienced and competent tradesmen who are familiar with the techniques and materials specified shall carry out all installation work. Fix in accordance with the manufacturer's instructions. Take utmost care to avoid damage to anodized or powder coated surfaces - correction of any such disfigurement requires written authority - replace any badly damaged items.

Use fixings compatible with the materials involved, as recommended by the windows manufacturer and to comply with the DWP requirements, basically aluminium or Type 316 stainless steel where exposed externally; galvanized to AS/NZS 4680, 610g/m2, may be used where not exposed.

Thoroughly check all preparatory work to openings prior to installation, including underlay, corner seal tapes, adjacent cladding, pre-installed flashings, waterproofing systems etc. as appropriate. Use inert barriers or coatings to prevent contact between dissimilar metals or between aluminium and concrete.

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Install flashings as detailed and supplied by the manufacturer, installed tightly and neatly with absolute minimum tolerances, with head weathering jamb, jamb weathering sill, and sill open (draining) to exterior. Except where the window is recessed all head flashings shall extend 30mm minimum beyond the frame.

Air-seal all frame perimeters to adjacent structure to a depth of 15 - 20mm with expanding foam or appropriate sealant including a PEF rod at head, sill and jambs to retard the spread of sealant.

Weather-seal frame jambs etc. to adjacent surfaces (or to each other) as detailed or as required by the windows manufacturer, to achieve a fully watertight installation. In preparation for sealant the joints shall be clean, dry, and primed if necessary. Insert closed cell polyethylene backer rods or a polyethylene tape slip layer if required. Mask adjacent surfaces if appropriate, install the sealant fully in accordance with the sealant manufacturer's recommendations, and finish to even smooth surfaces.

Remove trade debris progressively, appropriately clean any affected adjacent surfaces, thoroughly clean the Aluminium Windows & Doors, check that all hardware is in full working order, and provide safety indication of the glass for the balance of adjacent works.

7.3.15 Completion

7.3.15.1 Completion:

Check the Aluminium Windows & Doors have been correctly installed in accordance with the manufacturer's requirements to the locations, layout and details shown on the design drawings.

Check the installation for damage and defects, including surface marking. Carry out any necessary repairs in accordance with the manufacturer's requirements to the required standard. Replace Aluminium Window and Door elements where repair is not possible or will not be accepted.

Leave all of this work complete, clean and free from damage and defects, and to the required standard in accordance with the manufacturer's requirements.

Leave surrounding surfaces clean and free of rubbish and debris. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the manufacturer's maintenance requirements and a copy of the manufacturer's Warranty. test

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8 GLAZING

8.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

8.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.0:2002(AS/NZS)	Structural design actions - Part 0: General principles
2208:1996(AS/NZS)	Safety glazing materials in buildings
3604:2011(NZS)	Timber-framed buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4232.2:1988(NZS)	Performance criteria for fire resisting enclosures - Part 2: Fire resisting glazing systems
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

8.3 Non-Structural Glazing

8.3.1 Scope

Supply and install the selected glass products to the windows, doors, curtain wall systems, roofs and canopies, balustrades and barriers, partitions and screens, and other non-structural glazing elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the glass manufacturer's installation requirements and recommendations, other relevant product manufacturers' recommendations, and as shown on the drawings.

8.3.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades for all necessary holes and cut-outs, etc., for glass-mounted hardware, fittings and fixtures, and to install all glass and glazed elements as required.

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8.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen familiar with the products specified and installation techniques, to the manufacturer's requirements and recommendations, and the requirements of the relevant Glazing Standards, and to the layout and details shown on the drawings.
Handle and store glass in accordance with the manufacturer's recommendations.
Provide temporary safety markings to all glass panes as the installation work progresses.
Finish all external glazing wind and watertight.
Do not use damaged, marked or faulty materials.

8.3.4 Glass Type

8.3.4.1 Clear Float Glass

Clear Float Glass. Clear annealed float glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

Manufacturer, brand name & type:

8.3.4.2 Obscure & Patterned Glass

Obscure and Patterned Glass. Surface patterned glass and/or obscure glass, complying with AS/NZS 4667 and in accordance with NZS 4223.1. Installed to the locations identified on the drawings and schedules.

Manufacturer, brand name & type:

8.3.4.3 Toughened Safety Glass

Toughened Safety Glass. Toughened Grade 'A' Safety Glass, complying with AS/NZS 2208 and AS/NZS 4667 and in accordance NZS 4223.1. Installed to the locations identified on the drawings and schedules. All cutting and drilling and other processing requirements must be done prior to toughening.

Manufacturer, brand name & type:

8.3.5 Insulating Glass Units

8.3.5.1 Standard Double Glazing

Standard Double Glazing. Air-filled and sealed insulating glass units (IGUs) complying with NZS 4223.2, with clear float glass complying with NZS 4223.1. Double glazed IGUs shall be manufactured and installed in accordance with AS/NZS 4666. Factory-fitted to the windows and doors identified as 'double glazed' on the drawings and schedules.

8.3.6 Components & Accessories

8.3.6.1 Aluminium Framed Glazing

Provide all necessary glazing components and accessories including glazing tape, setting and distance blocks, sealants, gaskets, etc., to complete aluminium framed glazing as required.

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8.3.7 Installation

8.3.7.1 Aluminium, Double Glazed (IGU's)

Install Insulated Glass Units into aluminium frames in accordance with the glazing manufacturer's recommendations and NZS 4223.1, and as detailed.

8.3.8 Frameless Doors & Screens

Frameless glass doors and screens shall be safety glass in accordance with NZS 4223.3.

Frameless glass doors and screen panels cut to the dimensions shown on the drawings, and factory pre-drilled and cut as required for all necessary fixings, brackets, cleats, hinges, locks, latches, closers and other hardware or fixtures, and edge finished as specified, prior to installation.

Install frameless glass doors and screen panels to the layout and details shown on the drawings and in accordance with any proprietary fixing manufacturer's requirements.

Glass screen panels set straight, true to line and plumb. Panel joints plumb and parallel as detailed.

Fixings, clamps, brackets, and hardware etc. neatly set-out and aligned as detailed.

Note: where relevant, new structural glass barriers shall comply with NZBC B1/AS1 (Amendment 13) and must have an interlinking rail, unless the barrier is laminated safety glass and has features to retain panes of glass or prevent collapse, in the event of breakage. The interlinking rail shall be designed to resist serviceability limit state (SLS) loads, specified in AS/NZS 1170 and B1/VM1, in the event that a glass pane of the barrier breaks.

8.3.9 Completion

Check that all glass has been installed correctly to the required standard and as shown on the drawings. Check for damage and surface marking and replace as necessary. Clean off and remove all temporary safety markings, as programmed and when instructed, and leave glass trade clean.
Remove all rubbish and waste material from site.
Issue to the Owner a copy of the Glass Manufacturer's maintenance requirements and all necessary Manufacturer Warranties.

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9 INSULATION

9.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

9.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

4218:2009(NZS)	Thermal insulation - Housing and small buildings
4220:1982(NZS)	Code of practice for energy conservation in non-residential buildings
4243.1:2007(NZS)	Energy efficiency - Large buildings - Building thermal envelope
4246:2016(NZS)	Energy efficiency - Installing bulk thermal insulation in residential buildings
4859.1:2018(AS|NZS)	Thermal insulation materials for buildings - Part 1: General criteria and technical provisions

9.3 Pink Batts Insulation

9.3.1 Scope

Supply and install Pink® Batts® Insulation, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. No substitutions are permitted for Pink® Batts® Insulation. All aspects of this work shall be in complete accordance with Pink® Batts® technical information and installation requirements and as shown on the drawings:
https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.2 Requirements

9.3.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

9.3.2.2 Warranty - applies to BRANZ Appraised Pink® Batts® Ceiling & Wall products

Pink® Batts® Lifetime Product Warranty:
- 50 Years Warranty for BRANZ Appraised Pink® Batts® ceiling and wall products installed according to the warranty conditions.
- Provide the Pink® Batts® Lifetime Product Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of permanent installation.

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9.3.2.3 Substitutions

Pink® Batts® Insulation shall be as specified herein and as indicated on the approved drawings. The substitution of Pink® Batts® branded products for alternative brands is not permitted under any circumstances.

The substitution of a specified Pink® Batts® product for an alternative Pink® Batts® branded product by the Installer (PinkFit® or other) shall only be permitted with the Contract Administrator's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative Pink® Batts® branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Installer.

9.3.3 Wall Thermal Insulation

9.3.3.1 Pink® Batts® Ultra® R2.8 Wall

Pink® Batts® Ultra® R2.8 Wall - product code 7127128. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-2.8. 90mm thick x 560mm wide x 1140mm long segments.

BRANZ Appraised for use as a thermal insulating material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings according to the conditions and limitations of BRANZ Appraisal No.238. Refer to product data - https://www.pinkbatts.co.nz/assets/Products/April-2022-changes-/Wall-Product-Sheet_April22_1075-RevF.pdf

Pink® Batts® Ultra® R2.8 Wall is licenced with Environmental Choice New Zealand: Thermal Building Insulants Licence No.2504017.

Installed as wall cavity thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.4 Ceiling Thermal Insulation

9.3.4.1 Pink® Batts® Classic R1.8 Ceiling

Pink® Batts® Classic R1.8 Ceiling - product code 7110118. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-1.8. 95mm thick x 432mm wide x 1220mm long segments.

Pink® Batts® ceiling insulation is a lightweight flexible glasswool insulation products designed to:
- thermally insulate ceilings in new homes, be retrofitted into existing homes without insulation, or over existing insulation for better performance;
- fit easily into standard ceiling constructions, or be easily cut to fit non-standard constructions;
- meet the requirements of the New Zealand Building Code for different designs and environments.

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Pink® Batts® Classic R1.8 Ceiling is BRANZ Appraised - refer to BRANZ Appraisal No.238. Refer to Product data sheet - https://www.pinkbatts.co.nz/assets/Uploads/Downloads/Roof-and-RTA-Data-Sheet-February-2023.pdf

Installed as ceiling thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.4.2 Pink® Batts® Classic R3.6 Ceiling

Pink® Batts® Classic R3.6 Ceiling - product code 7110136.

Glasswool insulation manufactured from over 80% recycled New Zealand glass.

Product is BRANZ Appraised, and supported by an EPD and Eco Choice certification.

180mm thick x 432mm wide x 1220mm long segments.

Installed as ceiling thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.4.3 Pink® Batts® Superbatts® R5.0 Ceiling

Pink® Batts® Superbatts® R5.0 Ceiling - product code 7113150.

Glasswool insulation manufactured from over 80% recycled New Zealand glass.

Product is BRANZ Appraised, and supported by an EPD and Eco Choice certification.

225mm thick x 460mm wide x 1220mm long segments.

Installed as ceiling thermal insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.4.4 Pink® Batts® Superbatts® R7.0 Ceiling

Pink® Batts® Superbatts® R7.0 Ceiling - product code 7113170.

Glasswool insulation manufactured from over 80% recycled New Zealand glass.

Product is BRANZ Appraised, and supported by an EPD and Eco Choice certification.

275mm thick x 460mm wide x 1220mm long segments.

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9.3.5 Acoustic Insulation

9.3.5.1 Wall - Pink® Batts® Silencer® 100mm

Pink® Batts® Silencer® 100mm - product code 7317001. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. STC 43 (*with 10mm GIB® Standard plasterboard each side*), R-value R-2.4 (estimate only). 100mm thick x 560mm wide x 1140mm long segments. Suits 90mm thick framed internal walls.

Pink® Batts® Silencer® wall insulation is designed for use in internal walls only where both acoustic and thermal properties are desired. Do not use Pink® Batts® Silencer® insulation for external wall applications.

Refer to product data - https://www.pinkbatts.co.nz/assets/Acoustic-Silencer-Product-Sheet-FEB20-RevD.pdf

Installed as internal wall cavity acoustic insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.5.2 Floor - Pink® Batts® Silencer® Midfloor

Pink® Batts® Silencer® Midfloor - product code 7310051. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. IIC Rating 43 (*construction: 200 x 50mm floor joist @450mm crs, 20mm particle board flooring, 10mm GIB standard plasterboard ceiling lining fixed to ceiling battens @ 400mm crs)*. R-value R-3.6 (estimate only). 150mm thick x 432mm wide x 1140mm long segments.

Pink® Batts® Silencer® Midfloor insulation is specifically designed to reduce noise transmission between floors.

Refer to product data - https://www.pinkbatts.co.nz/assets/Acoustic-Silencer-Product-Sheet-FEB20-RevD.pdf

Installed as inter-storey floor acoustic insulation to the locations shown on the drawings in accordance with the manufacturer's requirements.

Installed Location:

9.3.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with trades to install Pink® Batts® Insulation as required.

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9.3.7 Workmanship

All installation work shall be carried out by registered PinkFit® installers; the preferred Pink® Batts® installers, or by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:
https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.8 Delivery & Handling

Store the Pink® Batts® Insulation materials undercover, in a weatherproof environment, off the floor, on a flat, even surface in accordance with the manufacturer's requirements. Keep materials dry and protected from damage, moisture and contamination at all times.

For best practice, refer to Pink Batts Product and Installation Guides.
Further assistance contact 0800 746 522

Store the Pink® Batts® Insulation materials undercover, in a weatherproof environment, off the floor, on a flat, even surface in accordance with the manufacturer's requirements. Keep materials dry and protected from damage, moisture and contamination at all times.

Conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Workplace and facilities requirements

9.3.9 Installation

9.3.9.1 General

Install Pink® Batts® Insulation in accordance with NZS 4246.
All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:
https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.9.2 Pink® Batts® Wall

Install Pink® Batts® Wall Insulation in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

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9.3.9.3 Pink® Batts® Ceiling - General Suspended Ceiling

Install Pink® Batts® Ceiling Insulation in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.9.4 Pink® Batts® Ceiling - Truss/Framed Roof

Install Pink® Batts® Ceiling Insulation in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.9.5 Pink® Batts® Silencer® Wall

Install Pink® Batts® Silencer® Wall in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.9.6 Pink® Batts® Silencer® Midfloor

Install Pink® Batts® Silencer® Midfloor in accordance with NZS 4246.

All installation work shall be carried out by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements. For more information on best practice Pink® Batts® installation refer to:

https://www.pinkbatts.co.nz/resources/downloads/product-data-sheets

9.3.10 Completion

Check that all specified Pink® Batts® Insulation products have been installed correctly in accordance with the manufacturer's requirements.

Check for damage and defects - replace damaged and defective insulation as necessary to the required standard.

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Ensure the installed insulation will be adequately protected for durability and performance in accordance with the manufacturer's warranty requirements.

Leave all of this work complete, and in the condition required for proper performance, including for the installation of subsequent linings, in accordance with the manufacturer's warranty requirements.

Leave adjacent surfaces and finished work clean and free of damage. Remove all associated rubbish and waste material from site.

Issue to the Owner a copy of the Pink® Batts® Lifetime Product Warranty for all Pink® Batts® Insulation products installed.

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10 ROOFING

10.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

10.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
2295:2006(NZS)	Pliable, permeable building underlays
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4201.2:1994(AS/NZS)	Pliable building membranes and underlays - Methods of test - Resistance to wet delamination
4389:2015(AS/NZS)	Roof safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NASH 3405	An alternative solution for steel framed buildings
NZBC B2/AS1	Durability
NZBC F2	Hazardous Building Materials
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0

10.3 Rainwater Goods

10.3.1 Prefinished Steel Rainwater Goods

Standard 'half round' (or equal) profile longrun prefinished steel spouting as for the roofing with flanged downpipe droppers siliconed into the gutter to take 65mm dia. PVC downpipes. Standard external spouting brackets at approximately 600mm centres.

The downpipes shall drop directly into the stormwater drains - ensure the drains are accurately positioned.

(Any offsets and bends required in a downpipe shall be verified with the Architect/Designer before fabrication - ugly items fabricated in contravention of this must be replaced). Close off joints between downpipes and stormwater pipes with a upvc transition piece. Fix bird proof plastic 'wire' balloons to the top inlet of all downpipes.

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10.4 Steel & Tube Profiled Metal Roofing

10.4.1 Scope

Supply and install the specified Profiled Metal Roofing from Steel & Tube to the roofs identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with Steel & Tube technical literature (check www.steelandtube.co.nz, or email roofing@steelandTube.co.nz or call 0800 333 247 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Steel & Tube Profiled Metal Roofing.

Steel & Tube - profiled Metal Roofing can be designed as an external wall cladding for resedential, commercial & industrial buildings where the application is within the performance criteria's shown within the 'Steel & Tube Product Technical Statement'.

Extent of wrork:

The following is a list and/or general description of the extent of the Steel & Tube - Profiled Metal Roofing works, which are more specifically defined in the contract documents, required for the completion of the contract works:

10.4.2 Requirements

10.4.2.1 Warranty - Roofing Material

Provide a material manufacturer/supplier warranty in accordance with published supplier’s guidance on materials, environments and building types:
- Minimum 15 Years for Perforation.
- Minimum 10 Years for Coatings.
- Provide the warranties on the Steel & Tube Standard Warranty Plus Warranty Form.
- Commence the warranty from the date of installation.

Factory Applied Coatings: The warranty is determined by the specified product and the site location and environment - contact Steel & Tube to evaluate the warranty conditions.

10.4.2.2 Warranty - Installation

Provide an Installer's Installation Warranty:
- Minimum 5 Years for Workmanship.
- Warrant this work under normal environmental conditions and use against waterproofing failure.
- Provide the Installation Warranty on the Installer's Standard Warranty Form.
- Commence the warranty from the date of installation.

Include a copy of the Steel & Tube maintenance requirements with the Installation Warranty.

10.4.2.3 Design Wind Pressure - Medium Wind Zone

Design Wind Pressure - Non-Specific Design Wind Zone Classification:
- NZS 3604 Wind Zone: M = Medium.

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- Wind Speed: <37m/s.
- Ultimate Limit State: 0.82kPa.

Refer to the relevant Steel & Tube Product Technical Statement for wind load design parameters.

10.4.3 Roofing Profile

10.4.3.1 ST963 (C2)

Steel & Tube ST963 - a medium-rib trapezoidal profile; 46mm deep; 321mm crest pitch; 230mm wide pan; 963mm effective cover.
- Manufactured from the material type, thickness and finish as specified herein.
- The minimum roof pitch for ST963 is 3° (approx 1:20).
- Sheets shall be continuous from ridge to gutter; where a step is designed into the roof, sheets shall be continuous from ridge to step and step to gutter.
- Sheet ends must be stop-ended under flashings
- Installed in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Installed Location:

10.4.4 Roofing Material

10.4.4.1 Colorsteel Altimate® - 0.9mm

Steel & Tube roofing shall be manufactured from COLORSTEEL® Altimate – 0.9mm BMT. A 3-layer organic coating consisting of an anti-corrosive and bonding and pre-treatment layer, an anti-corrosive primer, and a top coat, applied to both sides of the material, to withstand tough environments conforming with AS:NZS1397:2013. 550 MPa minimum yield strength. 150gms/m^2 coating weight. Atmospheric Classification C1-C5M and C5I.

Colour:

10.4.4.2 Colorsteel Maxam - 0.4mm

Steel & Tube roofing shall be manufactured from COLORSTEEL® Maxam - 0.4mm BMT. A 3-layer organic coating consisting of an anti-corrosive and bonding pre-treatment layer, an anti-corrosive primer and a top coat, applied to both sides of the material, to withstand tough environments conforming with AS:NZS1397:2013. 550 MPa minimum yield strength. 150gms/m^2 coating weight. Atmospheric Classifications C1-C5M and C5I.

Colour:

10.4.5 Components & Accessories

10.4.5.1 Polypropylene Strap Underlay Support

Polypropylene Strap Underlay Support. 19mm wide x 0.4mm thick polypropylene embossed strap. Installed at right angles to the purlins at maximum 300mm centres, and suitably tensioned to avoid any sagging and to keep the roof underlay in a flat plane.

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10.4.5.2 Galvanised Netting Underlay Support

Galvanised Netting Underlay Support. Woven flat hexagonal roof netting, manufactured from galvanised mild steel wire, with reinforcing wires at 113mm centres. 1.0mm diameter wire with 2 x 1.2mm reinforcing wires twisted together. 380-550 kPa tensile strength. Galvanised in accordance with AS/NZS 4534, Class W10. Use only with steel-based roofing materials. Installed in accordance with the manufacturer's requirements and as shown on the drawings.

10.4.5.3 Roof Safety Mesh - Galvanised Wire

Roof Safety Mesh. 150mm x 300mm x 2mm minimum diameter, galvanised welded mild steel wire mesh, comprising longitudinal and transverse wires, and complying with the requirements of AS/NZS 4389. Galvanised in accordance with AS/NZS 4534, Class W02. Used to prevent persons from falling during and after installation of roofing materials and to support insulation materials

Longitudinal Wires: minimum 500 MPa tensile strength; spaced at 150mm centres.
Transverse Wires: minimum 450 MPa tensile strength; spaced at 300mm centres.
Zinc Coating: minimum 35g/m².

Installed in accordance with the manufacturer's requirements, AS/NZS 4389, and as shown on the drawings. Do not walk or stand on installed roof safety mesh or use it as a working platform.

10.4.5.4 Roofing Fasteners

Roofing Fasteners. Roofing fastener type and durability shall comply with AS 3566 Class 4 or Class 5, as appropriate, and be no less than the durability of the material being fixed.

Fastener type and placement (frequency) shall be appropriate for the environmental conditions, and the specified roofing profile, and material and the supporting structure material; all in accordance with the NZMRM Code of Practice and Steel & Tube manuals and technical literature.

10.4.5.5 Metal Flashings

Metal Flashings. Metal roof flashings shall comply with the lap, cover, expansion and compatibility provisions of the NZMRM Code of Practice. Flashings shall be formed to suit the details shown on the drawings, and shall include all folded metal sections required to make the specified profiled metal roofing weathertight at:
- the building periphery,
- roof and wall junctions,
- changes of direction in the roof,
- intersections with other buildings,
- any wall penetration,
- junctions with other materials.

Metal flashings shall be fabricated from ductile grade metal of same material and coating as the roofing material, to maintain durability and compatibility requirements.
Metal flashings shall be designed for lateral strength by folding, stiffening or ribbing on external edges, and have a maximum un-stiffened width of 300mm.

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The minimum thickness for metal flashings shall be:
- Coated steel: 0.55mm,
- Aluminium: 0.9mm,
- Copper: 0.6mm,
- Zinc: 0.7mm,
- Stainless steel: 0.45mm.

Flashing fastenings and fastening frequency shall be in accordance with the NZMRM Code of Practice. Do not fix flashings to timber with a moisture content greater than 18%.

Do not construct flashing joints and flashing junctions in a manner that rely entirely on sealant to maintain weathertightness.

Where a flashing is hidden, or is otherwise difficult to access or replace, it shall have a durability of the life of the building or not less than 50 years.

10.4.5.6 Profiled Foam Closure Strip

Profiled Foam Closure Strip. Non-bituminous, compressible, closed-cell foam strips, formed to fit the metal roofing profile. Installed in accordance with the NZMRM Code of Practice and Steel & Tube recommendations, and as shown on the approved drawings.

10.4.5.7 Sealant

Sealant. Use only neutral-curing silicone sealant compatible with the specified metal roofing and flashing materials and finishes, and suitable for the required application and use, in accordance with the sealant manufacturer's instructions and the NZMRM Code of Practice recommendations. All sealed joints must be mechanically fastened, and excess sealant neatly removed to prevent unnecessary dirt buildup. Sealant shall only be used to seal between two metal surfaces, do not fill holes or gaps with sealant.

10.4.5.8 Proprietary Collar Flashings

Proprietary Collar Flashings. Dektite® or similar approved EPDM or silicone-polymer proprietary flexible collar flashings for weatherproofing roof-penetrating pipes/flues/ducts. Sized to suit the applicable pipe/flue/duct and installed in strict accordance with the manufacturer's requirements and the NZMRM Code of Practice. Use only high-temperature silicone (not EPDM) collar flashings for heated flues and pipes with temperature range between 60°C - 200°C.

10.4.5.9 Clip Fixings

10 gauge x 50mm long Grade 304 stainless steel timber screws, two per connection, or as shown on drawings.

Location:

10.4.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

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Co-operate with other trades to ensure that framed roof members and/or roof substrates are in accordance with the drawings and design documentation.

Coordinate to ensure that all roof members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc., are correctly installed.
Coordinate with the rainwater system installer, and generally with other trades as required, to install Steel & Tube roofing systems.

Ensure that each section of roof is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

10.4.7 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner or supervised by an Licensed Building Practitioner.

Roof Installers shall be experienced and competent, familiar with the products being used, and preferably a member of RANZ with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

Install and fix in accordance with the NZMRM CoP and NZBC E2/AS1 requirements where applicable and to Steel & Tube's requirements.
Always maintain isolation of dissimilar materials in accordance with the NZMRM Code of Practice and NZBC E2/AS1. Isolate dissimilar materials (metal and nonmetal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto, galvanised or Zincalume® materials.

10.4.8 Delivery & Handling

Store profiled metal roofing, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the roofing manufacturer. Keep stored materials and accessories dry and protected from damage and distortion and contamination at all times.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the material, including surface marking. Do not used damaged or defective materials or products, or products that are beyond their designated shelf life.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Best practice guidelines for working on roofs and the General risk and workplace management - part 1.

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For all work undertaken on the roof, installers shall always wear soft, clean footwear with a light-coloured sole. Do not walk on translucent/natural lighting sheet roofing.

10.4.9 Installation

10.4.9.1 Roofing Underlay

Install roofing underlay in accordance with the underlay manufacturer's requirements with minimum 150mm side and end laps, and lapped such that any water will be shed to the outside of the underlay.

Non self-supporting underlay must be supported by hexagonal wire mesh, safety mesh or alternative support, as specified and/or as shown on the approved drawings, in accordance with the roofing underlay manufacturer's recommendations.

Underlay shall be installed in a manner so that it is sufficiently tensioned without sagging, overhangs fascia boards 20mm - 25mm, and finished along roof edges, ridges, valley gutters, roof/wall junctions and at penetrations to the details shown on the drawings.

Underlayment for fully-supported roofing shall be in accordance with NZMRM Code of Practice Sections 4.3.11: Separation, 11.4.2: Substrate, and 11.5.1: Ventilation.

Separate roof underlay from chimneys and flues in accordance with the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 7.5.9.

10.4.9.2 Roofing

Install profiled metal roofing in accordance with the NZMRM Code of Practice and as shown on the drawings, and to fully comply with all warranty requirements. As shown on the drawings, confirm any specific roofing detailing requirements prior to installation.

Accurately set-out roofing sheets exactly square to the building axis and with sheets lapped away from the prevailing wind; maintain this accurate set-out throughout installation. Check for and eliminate any creep and/or spread of sheets during installation.

Cut metal roofing and flashings by shear only – do not use abrasive cutting tools on or near the roof. Do not use black lead pencils for marking pre-finished roofing and flashings.

Prevent contact with, or run-off from, incompatible materials in accordance with the recommendations in the NZMRM Code of Practice. Observe the cladding material manufacturer’s recommendations where flues discharge above roofs, and for the installation of solar heating panels. Protect the coated surface from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged (including flashings).

Screw-fixed sheets shall be fixed with fasteners appropriate for the roofing profile and material, substrate/structure and the environment in accordance with Steel & Tube manuals and technical literatuire and the NZMRM Code of Practice recommendations (minimum Class 4).
Screw fastening placement and spacings shall be strictly in accordance with Steel & Tube requirements and the NZMRM Code of Practice, to fully comply with the Wind Zone requirements,

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purlins spacings, etc.
Screw fastenings for pre-painted roofing must be pre-painted prior to installation for an accurate colour match.
Use fixing systems that will accommodate thermal expansion for long lengths and/or dark colours.

Clip-fastened sheets shall be fixed with concealed proprietary fastening clips appropriate for the roofing profile and material, substrate/structure and the environment in accordance with the roofing manufacturer's requirements.

All roofing jointing techniques and sealants shall be in accordance with the roofing manufacturer's recommendations and the NZMRM Code of Practice, and shall be compatible with the roofing material and finish. Joints shall be sealed with an approved neutral-cure sealant or approved closed-cell lap tape.

Ridges, hips, barges and flashings generally, shall be in accordance with Steel & Tube's recommendations and Design Solutions, and the NZMRM Code of Practice.

10.4.9.3 Penetrations

Penetrations in the roofing that are greater than 150mm in any direction must have support framing installed around the perimeter of the penetration. Penetration flashings shall not rely solely on silicone sealant to achieve weathertightness of the flashing.
Flash pipes penetrating the roofing with a proprietary pipe collar flashing.

10.4.9.4 Flashings

Install flashings to roof edges, ridges, roof/wall junctions, parapets and roof penetrations as detailed on the drawings and in accordance with the Steel & Tube manuals and technical literature and the NZMRM Code of Practice.
All flashings shall be neatly formed and finished, securely fastened to the structure, weatherproof and have falls set to avoid water ponding.
For highly visible flashings, plan each flashing joint and/or junction with specific regard to aesthetic requirements.

10.4.9.5 Cleaning

Completely clean off all drill and other swarf and pop-rivet shanks as the work proceeds (at least daily), and keep them and other rubbish out of the spoutings.
Remove trade debris from the roof and from the site progressively, and on completion leave the roof and rainwater system completely clean.

10.4.10 Completion

Check that the profiled metal roofing and associated components have been installed and finished correctly, and fully tested for weathertightness.

Check roofing for defective work, damage, surface marking, and leaks - replace and/or repair as necessary to the required standard.

Sweep down completed roof, and clean out spouting, gutters and rainwater pipes.

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Leave all of this work complete, weathertight, and free of defects, and to the required standard in accordance with the manufacturer's warranty requirements.

Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the Steel & Tube maintenance requirements upon completion of the contract works.

Isuue to the Owner a copy of the cladding material manufacturer's/supplier's 'Product Warranty' for the installed metal cladding product on the Steel & Tube standard 'Warranty Plus' warranty form.

Issue to the Owner a copy of the installer's 'Installation Warranty' on the installer's Standard Warranty Form.

10.5 Masons NZ Ltd Roof Underlays

10.5.1 Scope

Scope
Masons Roof Underlays are certified for use as a roof underlay and air barrier.
On buildings situated in wind zones up to and including Extra High (as set out in NZS3604) with a minimum roof pitch of 3°,
Under masonry or metal tile and profiled metal roof claddings, in all locations including where it is exposed to view.

Masons Roof Underlay shall be:
Installed in accordance with the manufacturers Roof Underlay Installation Instructions, Version 4.0 May 25.
Installed vertically or horizontally with or without support for roof pitches greater than 10°, run horizontally with or without support or run vertically with support for roof pitches less than 10°, provided that support is provided where the span is greater than 1200mm, and protected from direct sunlight within 21 days of installation.

10.5.2 Masons Roofing Underlay

VHP Strong Roof Underlay is a premium roofing underlay. It is fire retardant, high performance and highly breathable.
VHP Strong underlay is a medium weight tri-laminate sheet consisting of a white non-woven top layer with black printing, a white non-woven back layer and a dark grey synthetic membrane centre layer. Both sides of the underlay sheet have an embossed pattern. The roll is 1.25m, 1.45m, 3.0m or 0.5m wide and is labelled VHP Strong Roof Underlay.

Masons Roof Underlays are certified for use as a roof underlay and air barrier:
a) on buildings situated in wind zones up to and including Extra High (as set out in NZS3604) with a minimum roof pitch of 3°,

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b) under masonry or metal tile and profiled metal roof cladding,
c) in all locations where it is covered by an internal lining
Masons Roof Underlay shall be:
a) installed in accordance with Masons Roof Underlay Installation Instructions version 4 found under the heading 'Scope' above.
b) installed run vertically or horizontally with or without support for roof pitches greater than 10°, run horizontally with or without support or run vertically with support for roof pitches less than 10°, provided that support is provided where the span is greater than 1200mm, and
c) protected from sunlight within 21 days of installation
The installation of roof underlay must be considered as part of the overlaying cladding system, not in isolation.

Further details regarding the use of the product can be found in Masons Roof Underlay

10.5.3 Accessories

A premium self adhesive flashing tape. Used for sealing synthetic underlay joints against air and water penetration in accordance with the underlay manufacturer's requirements. Advanced poly-acrylic adhesive for an aggressive & dependable performance in temperatures from -10ºC to 40ºC. Comes in rolls **60**, 75, 100, 150 & 230mm wide

Roof Boot Flashings - EPDM
For roof boots fixed directly to the roof cladding where the roof boot fits across the entire pan of the profile the lowest permissible roof pitch is 8° for standard corrugated iron and 10° for low rib trapezoidal profiles. Where the base of a boot doesn't obstruct a pan it can be direct-fixed to the minimum pitch for that profile. Where possible avoid fitting roof boots over a lap. If this cannot be avoided the lap must be fully sealed. *The installer must take actions needed to prevent the possibility of leaks through capillary action*. Directly fitted roof boots should be fitted with their edge's diagonal to the fall of the water. If this is not practical, they may be fitted square at pitches 10° and above.

Roof Boot Flashings - Silicon
For roof boots fixed directly to the roof cladding where the roof boot fits across the entire pan of the profile the lowest permissible roof pitch is 8° for standard corrugated iron and 10° for low rib trapezoidal profiles. Where the base of a boot doesn't obstruct a pan it can be direct-fixed to the minimum pitch for that profile. Where possible avoid fitting roof boots over a lap. If this cannot be avoided the lap must be fully sealed. *The installer must take actions needed to prevent the possibility of leaks through capillary action*. Directly fitted roof boots should be fitted with their edge's diagonal to the fall of the water. If this is not practical, they may be fitted square at pitches 10° and above.

Roof Underlay Support - Polypropylene Strap. 25mm wide x 0.4mm thick high-strength polypropylene woven and coated strap. Installed at right angles to roof purlins, at maximum 300mm centres, and suitably tensioned to avoid any sagging and to keep the roof underlay on a flat plane.

Safety Mesh - Stainless Steel Wire
Roof Safety Mesh. 150mm x 300mm x 2mm minimum diameter, welded stainless steel wire mesh, comprising longitudinal and transverse wires, complying with the requirements of AS/NZS 4389. Used

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to prevent persons from falling during and after installation of roofing materials and to support insulation materials
Longitudinal Wires: minimum 500 MPa tensile strength; spaced at 150mm centres.
Transverse Wires: minimum 450 MPa tensile strength; spaced at 300mm centres.
Installed in accordance with AS/NZS 4389 and the manufacturer's requirements. Do not walk or stand on installed roof safety mesh or use it as a working platform.

10.5.4 Requirements

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

Masons Product Warranty:
- 15 Years Warranty - for all Masons NZ Ltd warranted products installed, according to the warranty conditions.
- Provide the Masons NZ Ltd Product Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of permanent installation.

Substitutions
Masons NZ Ltd products shall be as specified herein and as indicated on the approved drawings. The substitution of Masons NZ Ltd branded products for alternative brands is not permitted under any circumstances.
Substitutions of Masons NZ Ltd brands.
The substitution of a specified Masons NZ Ltd product for an alternative Masons branded product by the Contractor shall only be permitted with the Contract Administrator's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative Masons branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

10.5.5 Installation

VHP Roof Underlays Residential Long-Run Metal Roofing / Vertical Or Horizontal Installation Method - Timber Construction
Masons NZ Ltd recommends that underlay be laid horizontally. However, it may be laid vertically where roof pitches are 10° or greater. Horizontal underlay must be laid from the bottom up, so the upper layers overlap the lower layers. E2/AS1 requires 150mm minimum laps in all situations.
NOTE: All cladding to be fixed per profiled metal cladding manufacturers recommendations.
-Fix underlay using stainless steel 8-12mm staples or 20mm flat head clouts or appropriate proprietary fastenings at 300mm maximum centres.
-Between 3° and 5° pitched roofs suitable safety mesh 300mm x 150m or similar or hexagonal netting 50mm or 75mm, and/or Masons NZ Ltd Insulation Strapping or Wrap Strap. Fix horizontally at 300mm centres.
If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice 4.3.8 and 4.3.9), use Masons NZ Ltd 40Below Platinum Flashing Tape.
-Masons NZ Ltd Roof Underlay may be unwound to the full length from the gutter to the ridge.

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However, when ventilation at the ridge is required, the underlay should be finished at the ridge purlin to allow free air movement.
-Masons Roof Underlay must be free of rips and holes fit tightly and be lap taped around all penetrations, (except flue penetrations) to assist with drainage and moisture.
- **Maximum drape 25mm into gutter**
-Flue penetrations must have a minimum distance of 50mm from the underlay See NZ Metal Roof and Wall Cladding Code of Practice 4.3.8.

Masons VHP Roof Underlay Support Required

Roof Pitch	Span	Horizontally Installed	Vertically Installed
>= 10˚	> 1200mm	Yes	Yes
>= 10˚	<= 1200mm	No	No
< 10˚ (Min 3˚)	> 1200mm	Yes	Yes
< 10˚ (Min 3˚)	<= 1200mm	Yes	Yes

10.5.6 Completion

Check that all underlays have been installed correctly and are properly supported, and that all underlay edges, joins and ends are correctly finished prior to closing off with claddings - all in accordance with Masons NZ Ltd installation requirements.
Check installed membranes and underlays for defective work and damage - replace and/or repair as necessary to the required standard.
Leave all of this work complete, and free of defects, and to the required standard in accordance with the manufacturer's warranty requirements.
Issue to the Owner a copy of the Masons NZ Ltd maintenance requirements and the Masons product warranties for the installed products.

10.6 Nuralite Membrane Roofing

10.6.1 Scope

Supply and install the selected Nuralite Membrane Roofing System as a waterproof membrane roofing to the locations shown on the drawings, complete with all accessories. All aspects of this work shall be in strict accordance with Nuralite Waterproofing Ltd (Nuralite) technical guidelines, installation specifications and details, (check www.nuralite.co.nz, or call 0800 68725483 for the latest editions),CodeMark Certificate of Conformity No:CM70032 , BRANZ Appraisal No.547 (2019), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Nuralite Membrane Roofing.

10.6.2 Rainwater Run-off

10.6.2.1 Rainwater Run-off can be Used as Potable Water

The rainwater run-off from the Nuralite Membrane Roof can be collected, stored and used as potable water.

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10.6.3 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced Nuralite Authorised Applicators, familiar with the specified products and installation techniques, to fully comply with all Nuralite warranty requirements, in accordance with the manufacturer's installation requirements and as noted and detailed on the drawings.

All membrane cutting, laying and jointing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient, robust and watertight installation.

Use only Nuralite-approved primers and adhesives compatible with the specified membranes and substrates, and the membrane's application/use.

Protect adjacent finished work and surfaces from damage and contamination during installation. Leave completed surfaces clean, sound, and free of defects and damage.

10.6.4 Delivery & Handling

Take delivery of materials undamaged. Reject any item found to be defective or damaged and contact the supplier for replacement.

Store materials and accessories undercover, off the ground, on a flat surface, and out of direct sunlight, with membrane rolls stacked on ends. Keep stored materials and accessories dry and protected from damage, contamination, and freezing conditions at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life.

Handle the specified materials and products in accordance with the manufacturer's recommendations and in a manner that prevents damage and surface marking.

Installers shall be familiar with and comply with the manufacturer's Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Best practice guidelines for working on roofs and the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

10.6.5 Substrate

10.6.5.1 Timber Substrate - Plywood, Strandboard and CLT

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the drawings.
Do not commence installation until all necessary preliminary works by others is complete and to the

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required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.
Supporting timber structures shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design.

Plywood as a substrate:

Plywood materials shall comply with AS/NZS 2269, and be minimum 17mm thick for roofs or 21mm thick for decks, CD grade (C face up), H3.2 CCA treated, and installed and fixed exactly to the plywood manufacturer's requirements according to Nuralite recommendations. LOSP treated plywood must NOT be used.
Plywood must be fixed using a suitable glue adhesive and with countersunk screw heads, 10g Grade 316 stainless steel screws at maximum 150mm centres along edges and maximum 200mm centres in the body of the sheets. Ensure the plywood grain is across the line of supports below.
Plywood Substrates - check all aspects of preparatory works, including but not limited to:
- Check that sheets have been laid with staggered joints (stretcher bond) to falls, with joints flush, edges arrised, upstands filleted, with no bumps or hollows, and are smooth, clean, dry and free of debris.
- Check that the plywood sheets are rigid, and fully supported on all edges, on deck framing members spaced both ways at maximum 600mm centres (unless detailed otherwise.
- Check that the plywood substrate is smooth, clean, dry and free of debris.
- Check that any built-in falls are at the required slope - minimum 1:80 for decks; and minimum 1:100 for gutters.
H3.2 treated timber edge fillets as required, and 5mm-radius-chamfer external edges at turn-downs.

Strandboard as a substrate:

Ensure that sheets have been stretcher bond laid to falls, are rigid, with joints flush, edges arrised, no lumps or hollows, smooth, clean, dry and free of debris. To be laid length ways across the line of supports below. Strandboard sheets supported at 400mm centred rafters and nogs for roofs unless detailed otherwise. Minimum finished (constructed) falls to be 1:30 for roofs and 1:100 for gutters. Strandboard is for use on roof decks and gutters, and not to be used on balcony decks.
Strandboard substrates are best fixed with stainless steel counter-sunk screws, glued down and joints tight butted. The design and construction of the substrate and movement and control joints is specific to each building so must be considered by the building designer. Generally, 16.3mm Strandboard is required for roofs, decks are covered under BRANZ-CM-1006 Rev1. Rafters and nogs at 400 centres with all edges supported. Screws to be 150mm spaces around edges and 200mm spaces across the sheets. A 5mm clearance must be left between sheets and any element protruding through the roof such as vent pipes. Greater clearances than this may be required around flues and chimneys.

Cross Laminated Timber as a substrate:

To be fixed as per the manufacturer’s instructions. Laid to falls, are rigid, with joints flush, edges arrised, no lumps or hollows, smooth, clean, dry and free of debris. Minimum finished (constructed) falls to be 1:80 for roofs and 1:100 for gutters. Design fall recommended of 1 in 40 for roofs to provide for deflection and construction tolerance.

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Plywood and the timber substructure to have a maximum moisture content of 20% when the membrane is installed. Install 20 x 20mm H3.2 treated timber edge fillets as required, and 5mm-radius-chamfer external edges at turn-downs.

10.6.6 Finish Membrane

10.6.6.1 Nuraply 3PM (double layer system) - Timber Substrate

Nuraply 3PM - as a component of the Nuraply 3PM Membrane Roofing System (*double layer system*) on a Timber Substrate. A 4mm thick reinforced fibre asphalt, flexible waterproof capping membrane with a pre-finished coloured mineral chip surface. Fabricated from modified bitumen (APP) reinforced with non-woven polyester. Available in Charcoal, Slate, White, Red or Green colour.

The Nuraply 3PM Roofing Membrane System is CodeMark assured with the NZ Building Code: CodeMark Certificate of Conformity No:CM70032, issued by Bureau Veritas Australia Pty Ltd.

Installed as a capping membrane over a Nuraply 3PB-SA base-layer in accordance with Nuralite requirements, CodeMark Certificate of Conformity No:CM70032, BRANZ Appraisal No.547 (2019), and as shown on the drawings.

Where specified, a thin coating of Nuraglaze shall be applied as a surface dressing to enhance the system's appearance and to bind any over-chipping of the mineral chip finish.

Colour (delete as appropriate): Charcoal / Gloss Black / Slate / White / Red
Installed Location:

10.6.7 Installation

10.6.7.1 Nuraply 3PM Membrane Roofing System - over Timber Substrates

Install Nuraply 3PM Membrane System, including all surface priming, membrane application, jointing, flashing and sealing, etc., and all Nuralite supplied fillets and metal edge trims, roof vents and gutter outlets, in strict accordance with Nuralite installation requirements (link) and details, and as shown on the drawings.

Unroll the Nuraply membranes on to the substrate and allow it to relax for at least 30 minutes prior to installation.
Lay the first NURAPLY 3PB-SA layer into NURAFLUX NO.10 or NURAFLUX QD or WB primer to NURALITE Waterproofing Limited requirements, with joints to be welded a minimum of 80mm down the roll edges and 100mm across the roll ends. Lay in order from low points, sumps, through gutters, valleys, eaves, verges main roof and upstands to cover flashings.
Lay the second NURAPLY 3PM layer by heat fusing over the surface of the first layer in the same sequence. Joints in the second layer must not correspond with joints in the first layer. Second layer joints to be welded, a minimum 80mm wide down roll edges and minimum 100mm wide across roll ends, to NURALITE Waterproofing Limited requirements. Roll junctions must be staggered to avoid 4-layer lap-weld build-up of NURAPLY 3PM at corners. Ensure unobstructed drainage flow at outlets. Where shown on contract documents install a second capping layer as a low-volume maintenance

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access pathway. The pathway should be inspected regularly to ensure it is not damages through wear. Should wear be detected the layer should be replaced.
Ensure unobstructed drainage flow at rainwater outlets.
Finish any control joints located on the drawings to Nuralite requirements.
Consult Nuralite regarding any detail where a standard Nuraply detail does not exist.
Protect installed membrane as required, avoid puncturing or damaging the membrane during installation; repair or replace as necessary.
PENETRATIONS
Form mould, weld and flash all upstands, downturns and penetrations to NURALITE Waterproofing Limited details including raised, anti-ponding water deflectors on the upside of penetrations.
MOVEMENT JOINTS
Form and weatherproof movement joints as designed to NURALITE Waterproofing Limited details.
JUNCTIONS
Check that adjoining walls and parapets are prepared ready for the installation of NURAPLY roofing.
Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof.
Required work includes the following:
-Roofing installation neatly finished to all sides of openings and to all wall and parapet junctions.
-Installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).
Recommended practice on parapets is to apply NURAPLY roofing up across the top and down the outside face at least 70mm.
Limited self-checking lap welding techniques. Form and weatherproof movement joints as designed to NURALITE Waterproofing Limited details.
Thoroughly blow or sweep clean the installed Nuraply 3PM membrane to remove over-chipping, allow to dry and apply any selected coating.

10.6.8 Temporary Protection

Keep the working area cordoned off during installation, and protect completed work from construction foot traffic and damage until hand-over, or as directed. Where necessary, provide temporary access boards as protection during subsequent operations, and remove these when no longer required.

10.6.9 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades to install Nuralite Membrane Roofing as required.

10.6.10 Completion

Check that the membrane roofing has been installed correctly, and that all system accessories are correctly installed and finished.

Check for damage, and repair or replace as necessary. Carry out any repairs and remedial work in accordance with Nuralite instructions to the required standard.

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Where possible, flood test all gutters with a minimum 50mm depth of water at the outlet or scuppers for 24 hours. Make good any lack of water tightness when the surface is completely dry. Not all applications can be flood-test checked. All gutters should be checked.

Leave the completed membrane roofing system leak free and watertight, and to the required standard in accordance with Nuralite requirements.

Completely clean the works area, and leave adjacent surfaces and finished work clean and free of damage. Remove all associated rubbish from site.

Complete and sign the project-specific Nuralite Checklist for Project Signoff, and the Nuralite Checklist for Roof Readiness, and the project-specific Nuralite Maintenance Programme.

Issue to the Owner a copy of the Nuralite Maintenance Programme, and a copy of the Nuralite Product Warranty and the Applicator's Installation Warranty for the completed works.

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11 TILING

11.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

11.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2358:1990(AS)	Adhesives - For fixing ceramic tiles
3103:1991(NZS)	Specification for sands for mortars and plasters
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
3661.2:1994(AS/NZS)	Slip resistance of pedestrian surfaces - Part 2: Guide to the reduction of slip hazards
3740:2010(AS)	Waterproofing of domestic wet areas
4586:2004(AS/NZS)	Slip resistance classification of new pedestrian surface materials
4858:2004(AS/NZS)	Wet area membranes
BRANZ Good Practice Guide	Tiling
NZBC B2/AS1	Durability
NZBC D1/AS1	Access Routes
NZBC E3/AS1	Internal Moisture

11.3 Tiling

11.3.1 Scope

Supply, install and finish all Tiling works, complete with all necessary components and accessories required for proper installation and performance, as specified herein and to the locations, layouts and details shown on the approved drawings. All aspects of this work shall be carried out to comply with the New Zealand Building Code and relevant standards, and in accordance with the approved project design documentation, and with any relevant product manufacturers' technical literature.

11.3.2 Requirements

11.3.2.1 Quality Assurance

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of Tiling work are carried out to the highest standard.

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11.3.2.2 Inspection & Acceptance of Tiling Work

Carry out all necessary pre-installation, installation and finishing inspections of Tiling for each area of work in accordance with the requirements of industry best practice recommendations and code of practice guidelines.

Complete all necessary Pre-Installation/Application Checklists prior to installing proprietary under-tile waterproofing systems and heating systems and floor levelling systems, and relevant Installation/Application Checklists.

Complete all necessary Installation/Application Sign-Off Certificates and before undertaking subsequent work or handing over.

11.3.2.3 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected Tiling materials and work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

11.3.2.4 Evidence of Slip Resistance

If requested, provide certified evidence of the slip resistance classification for each floor tile specified.

11.3.2.5 Tile Samples

Submit a clearly identified full-size sample of each tile specified, including colour/pattern, for signed approval by the Architect/Designer - do not proceed until the samples have been approved.

11.3.3 Performance

11.3.3.1 Slip-Resistance Performance of Access Routes

Slip-Resistance Performance of Access Routes. The slip-resistance performance of tiled access routes, ramps and stairs shall comply with the requirements of NZBC D1/VM1 and NZBC D1/AS1.

11.3.3.2 Interior Wet Area Performance

Interior Wet Area Performance. The performance of tiled interior wet areas shall comply with the requirements of NZBC E3/AS1.

11.3.4 Aluminium Trim

11.3.4.1 Aluminium Square-Edge Tile Trim

Aluminium Square-Edge Tile Trim. Square profiled extruded aluminium edge trim for tiling. Sized to suit the thickness of the tiling installation. Finish and colour as specified. Installed to the locations and details shown on the drawings.

Finish & Colour:

11.3.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

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Coordinate with other trades to install tiling as required, and to ensure that:
- appropriate tolerances and clearances allow for adjacent finishes, fixtures and fittings, etc; and
- penetrations for piped and cabled services are correctly located to maintain tile integrity and tiling performance.

11.3.6 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All Tiling work shall be carried out to best trade practice by qualified and experienced tradespersons, familiar with the specified materials and installation and finishing techniques, in accordance with AS 3958.1 and relevant product manufacturers' technical literature, to the layout and details shown on the approved drawings, and to fully comply with all warranty requirements.

Submit evidence of experience on request, e.g. National Certificate in Floor and Wall Tiling, or certified member of Master Plasterers and Tilers Association.

All substrate preparation, tile laying and tiling accessories application and finishing techniques shall be exactly as recommended by the specified product manufacturer. All work shall be such as to leave a neat, efficient and robust installation.

Interior wet-area tiling shall be waterproof and installed over a waterproof membrane as shown on the drawings.
Exterior floor tiling shall be waterproof and weathertight, and where necessary installed over a waterproof membrane as shown on the drawings.

As recommended by the tile manufacturer, use only an approved adhesive that is compatible with the specified tile, its substrate and its application/use.

Where necessary, delay tiling to allow maximum curing and settling and initial creep of the substrates, particularly to load bearing structural elements.

Do not cover or bridge movement control joints with tiles and tile underlay.

Tiling shall not be undertaken when the ambient and surface temperatures are outside the specified product manufacturer's permissible temperature range.

Where necessary, mask off and protect from contamination adjacent surfaces, joinery, fixtures and finished work before commencing.

Exterior tiling shall not be undertaken during inclement weather. As necessary and in accordance with the manufacturer's requirements, protect exterior tiling from rain, hot dry winds and direct sunlight to aid proper drying and curing.

Leave all tiled surfaces clean, sound, and free from blemishes of any kind.

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11.3.7 Delivery & Handling

Upon delivery to site, inspect the tile packs and reject those items that are found to be damaged, defective or contaminated. Contact the supplier for replacement of rejected items at time of delivery to site.

Do not use damaged, defective or contaminated materials, or products that are beyond their designated shelf life.

Store all tiling materials undercover, in a weatherproof environment, off the floor, on a flat, even and level surface in accordance with the manufacturer's requirements. Keep products and materials dry, out of direct sunlight and protected from damage, moisture and contamination at all times.

Handle tiling materials in accordance with the manufacturer's requirements and in a manner that prevents damage to and contamination of the materials and works.

Installers shall be familiar with and comply with all associated product Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

11.3.8 Preparation

11.3.8.1 General

All substrates to be tiled shall be structurally sound, even and smooth, clean, dry, and free from dirt, dust, grease, oil, wax, paint residue, loose plaster and laitance, curing compounds and other materials and contaminants likely to affect the bonding and performance of the specified tile adhesive and grout.

Carry out all necessary moisture readings of substrates. Do not commence installation until the moisture readings for the whole area are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the relevant product manufacturer's recommendations prior to application.

Check that the substrate is free of voids and depressions, and is in correct alignment - true to line, level and/or plumb, and to the falls indicated on the drawings.

Check that all fixtures, fittings and embedded items are correctly installed, and that all substrate edges are completed as detailed.

Confirm the location of any movement control or crack control joints prior to commencement of the works, and ensure that they are appropriately trimmed. Do not cover or bridge movement control joints with tiles, adhesive and grout.

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Allow self-levelling underlayments and mortar screeds to properly cure in accordance with the manufacturer's recommendations before commencing tiling.

Allow new concrete substrates to cure for at least four weeks prior to tiling.

Ensure that the back of each tile is clean and free from dust or other contaminants prior to laying.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the Tiler that all preparatory works by other trades are appropriate to achieve the required finished results.

11.3.8.2 New Particle Board Floor

New Particle Board Floor - check all aspects of preparatory works, including but not limited to:
- Check that the sheets have been installed, jointed and fixed in accordance with the manufacturer's requirements and indicated on the drawings, and that all sheet edges are fully supported.
- Check that the sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.
- Using a proprietary levelling compound, repair flush with smooth, feathered edges any damaged areas in the floor surface.
- Mechanically sand to remove all surface irregularities and contaminants likely to affect adhesion.
- Leave the surface completely clean and free of dust and contaminants, then fully prime the substrate with an appropriate primer in accordance with the particle board manufacturer's recommendations.

11.3.8.3 Plasterboard Wall Lining

Plasterboard Lining - check all aspects of preparatory works, including but not limited to:
- Check that the plasterboard sheets have been installed in accordance with the manufacturer's requirements, are supported on all edges on framing, are securely fastened, and that all joints and junctions have been stopped flush with reinforcing tape embedded in the jointing compound.
- Check junctions with all other substrates and elements, ensuring that all necessary works have been completed as detailed.
- Check that all apertures, openings, edges and expansion and movement control joints are completed as detailed.

11.3.9 Installation

11.3.9.1 Floor Tiles

Floor Tiles. Install floor tiles by direct-stick method to clean, dry and properly prepared substrates in accordance with AS 3958.1 and the adhesive manufacturer's instructions. Accurately set-out and lay tiles to the layout and details shown on the drawings. Confirm the floor tile layout and pattern requirements prior to installation.

As required by the adhesive manufacturer, seal or prime porous substrates or substrates where dusting or powdering exists. The use and application of adhesive shall be exactly to the adhesive manufacturer's instructions.

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All tile cutting, boring and shaping shall be carried out using appropriate tools and equipment and methods suitable for the tile type and in accordance with the tile manufacturer's recommendations. Only install cut tiles that have smooth, uniform cut edges - do not use tiles with jagged or flaked edges.

Mechanically mix powdered adhesive at the recommended ratio with clean potable water to a smooth, lump-free paste in accordance with the manufacturer's requirements. Do not mix more than can be used within the specified open time.

Apply tile adhesive evenly using a suitably notched trowel to properly prepared substrates in accordance with the manufacturer's instruction.
- Do not apply more adhesive than can be covered within the specified open time.
- Do not over spread the adhesive, and avoid surface skinning - particularly when used in unfavourable conditions such as direct sunlight, wind and/or high temperatures.
- Ensue to follow the adhesive manufacturer's recommended setting and curing periods.

Lay floor tiles into adhesive to achieve maximum contact and bonding before skinning occurs. Re-trowel any adhesive that has skinned - do not apply water to skinned adhesive. Where necessary, back-butter tiles with adhesive to ensure maximum contact and bonding - do not spot-fix floor tiles.

Floor tiles shall be laid so that the finished surface and edges are true and even, level and/or to the falls shown on the drawings, and finished flush with adjoining finished work as appropriate or as detailed.

Tile joints shall be to the required layout, uniform, accurately aligned, straight and true to line, and set even and parallel to the specified joint width.

Where indicated on the drawings, return floor tiles along walls, upstands, toe spaces, etc., to the height and details shown on the drawings.

Remove excess adhesive from tile joints as each tile is laid to ensure full depth grouting can be achieved, and leave the tile surface completely clean.

11.3.9.2 Wall Tiles

Wall Tiles: Install wall tiles by direct-stick method to clean, dry and properly prepared substrates in accordance with AS 3958.1 and the adhesive manufacturer's instructions. Accurately set-out and lay tiles to the layout and details shown on the drawings. Confirm the wall tile layout and pattern requirements prior to installation.

As required by the adhesive manufacturer, seal or prime porous substrates or substrates where dusting or powdering exists. The use and application of adhesive shall be exactly to the adhesive manufacturer's instructions.

All tile cutting, boring and shaping shall be carried out using appropriate tools and equipment and methods suitable for the tile type and in accordance with the tile manufacturer's recommendations.

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Only install cut tiles that have smooth, uniform cut edges - do not use tiles with jagged or flaked edges.

Mechanically mix powdered adhesive at the recommended ratio with clean potable water to a smooth, lump-free paste in accordance with the manufacturer's requirements. Do not mix more than can be used within the specified open time.

Apply tile adhesive evenly using a suitably notched trowel to properly prepared substrates in accordance with the manufacturer's instruction.
- Do not apply more adhesive than can be covered within the specified open time.
- Do not over spread the adhesive, and avoid surface skinning - particularly when used in unfavourable conditions such as direct sunlight, wind and/or high temperatures.
- Ensue to follow the adhesive manufacturer's recommended setting and curing periods.

Press wall tiles into adhesive to achieve maximum contact and bonding before skinning occurs. Re-trowel any adhesive that has skinned - do not apply water to skinned adhesive. Where necessary, back-butter tiles with adhesive to ensure maximum contact and bonding - do not spot-fix wall tiles.

Wall tiles shall be installed so that the finished surface and edges are true and even, level, and finished flush with adjoining work as appropriate or as detailed.

Tile joints shall be to the required layout, uniform, accurately aligned, straight and true to line, level and plumb, and set even and parallel to the specified joint width. Use proprietary tile spacers, sized for the specified joint width, to ensure accurate jointing.

Form internal and external wall corner junctions true and plumb and with tile joints continued around corners level and true.

Remove excess adhesive from tile joints as each tile is laid to ensure full depth grouting can be achieved, and leave the tile surface completely clean.

11.3.9.3 Edge Trim

Edge Trim. As required and indicated on the drawings, install all necessary tiling edge trim - including edge cappings, corner mouldings, transition strips, etc., - all neatly finished, accurately aligned and true, to the required layout and as detailed on the drawings.

11.3.9.4 Movement Control Joints

Movement Control Joints. Form movement control joints in tiling to the locations and details shown on the drawings and in accordance with AS 3958.1.

Movement control joints in tiling shall coincide with control joints in the substrate and structure, and at junctions between dissimilar substrates and other surface finish materials in the same plane.

Ensure to carry movement control joints through tiling from the substrate. Do not bridge movement control joints with underlayment, membranes, adhesive or tiles.

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Seal movement control joints after grouting with the specified flexible sealant in accordance with the sealant manufacturer's instructions and as detailed.

Proprietary movement control joints shall be installed in strict accordance with the manufacturer's instructions and to the layout and details shown on the drawings. Finish tiling against proprietary movement control joints as detailed.

11.3.9.5 Grouting

Grouting. Grouting shall be in accordance with the grout manufacturer's requirements and recommendations. Coloured grout shall be to the colour specified.

Prior to grouting, ensure that the tile adhesive has completely set, and that the tile joints are clean, dry and free from excess adhesive and any foreign material. Rake out any excess adhesive from joints to ensure a maximum, uniform grout joint is achieved. Tile spacers must be removed prior to grouting.

Mechanically mix powdered tile grout with clean water at the required ratio to a smooth, lump-free paste in accordance with the manufacturer's requirements. Do not mix more than can be used within the manufacturer's specified open time. Ensue to follow the manufacturer's recommended drying and curing periods.

Apply tile grout evenly with a rubber squeegee or grouting float, ensuring that the tile joints are completely filled and smoothed to a dense, uniform surface. Do not spread more grout than can be cleaned within the specified open time. Remove excess grout immediately. In hot or windy conditions, dampen the joints to prevent the grout from drying out too quickly.

Clean the tiles with a damp sponge when the grout joints have firmed, making sure not to wash-out the joints. Finish grout joints to a smooth, uniform effect and leave grout free of pin holes and blemishes.

Allow grout joints to dry before cleaning with a clean, dry, soft cloth, to completely remove any grout haze and residue from the surface of the tiles.

11.3.9.6 Protection

Protection. Take all necessary measures to protect exterior tiling from the extremes of weather and climate during the fixing and grouting operation and for as long as possible thereafter.

Keep the working area cordoned off during the whole tiling installation. Protect completed tiling from excessive loads, damage and contamination until hand-over or as directed.

Restrict foot traffic from completed floor tiling in accordance with the tile manufacturer's time frames for 'set-to-light-foot-traffic' and 'ready-for-service-use'.

Where necessary, cover completed floor tiling with a heavy-duty temporary floor protection such as Ovaboard, Ram Board, Buffalo Board; laid in accordance with the manufacturer's requirements.

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Protect exterior tiling, immediately after laying and grouting, from rain and moisture for at least 24 hours, and from frost and strong sunlight after laying in accordance with the tile adhesive and grout technical specifications.

11.3.10 Completion

Check that all Tiling work has been correctly installed to the required layout, and that all tile joints, edge-trimming and other detailing is correctly finished, grouted and sealed.

Check all Tiling installations for damage, marks and defects - repair or replace as necessary. Carry out any repairs to the required standard.

Thoroughly clean tiled surfaces in accordance with the manufacturer's recommended procedures and techniques. Lightly buff where appropriate.

Leave this work complete and to the required standard, and in accordance with the associated warranty requirements.

Clean up thoroughly, and leave adjacent surfaces and finished work clean and free of damage and contamination. Remove all associated rubbish from site.

Protect the completed installation from damage, trafficable dirt and grime, and stains as necessary until hand-over as scheduled or directed.

Issue to the Owner a copy of all relevant product manufacturers' maintenance requirements, and a copy of relevant manufacturer Product Warranties and the installer/applicator Installation Warranty for the installed products and completed works.

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12 PLUMBING

12.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

12.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1477:2017(AS|NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1596:2014(AS/NZS)	The storage and handling of LP Gas
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3500.1:2015(AS|NZS)	Plumbing and drainage - Part 1: Water services
3500.1:2018(AS|NZS)	Plumbing and drainage Part 1: Water services
3500.1:2021(AS/NZS)	Plumbing and drainage, Part 1: Water services
3500.2:2015(AS|NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.2:2021 (AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021(AS|NZS)	Plumbing and drainage, Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
3500.3:2021(AS|NZS)	Plumbing and drainage, Part 3: Stormwater drainage
3500.4:2015(AS|NZS)	Plumbing and drainage - Part 4: Heated water services
3500.4:2018(AS|NZS)	Plumbing and drainage Part 4: Heated water services
3500.4:2021(AS|NZS)	Plumbing and drainage, Part 4: Heated water services
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation

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4020:2018(AS|NZS)	Testing of products for use in contact with drinking water
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
4606.1:1989(NZS)	Storage water heaters - General requirements
4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems
4613:1986(NZS)	Domestic solar water heaters
4614:1986(NZS)	Installation of domestic solar water heating systems
4617:1989(NZS)	Tempering (3-port mixing) valves
4692.1:2005(AS/NZS)	Electric water heaters - Energy consumption, performance and general requirements
5601.1:2013(AS|NZS)	Gas installations - Part 1: General installations
7602:1977(NZS)	Specification for polyethylene pipe (Type 5) for cold water services
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
7646:1978(NZS)	Specification for polyethylene pipes and fittings for gas reticulation
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC B2/AS1	Durability
NZBC G11	Gas as an Energy Source
NZBC G12	Water Supplies
NZBC G13/AS1	Sanitary Plumbing

12.3 General

Carry out all works necessary to leave the water, waste, vent and soil systems serving the sanitary fittings and the plumbing hardware shown on the drawings or specified below in correct working order complete with all ancillary systems (safetrays, floor drains, overflows, relief valves, etc.) required, and with all normal incidentals customarily installed by this trade.

Comply with the Building Code, Territorial Authority By-laws and statutory authority Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange for all tests and pay all fees and customary charges in connection with the required works.

12.4 Workmanship

12.4.1 Co-operation

Co-operate with all other trades. Attend upon Concretor, Drainlayer and Carpenter to set out the exact positions of pipe runs before adjacent work is put in hand, and to ensure that all pipes, sleeves, fixings, flashings etc. are correctly incorporated into the structure as construction proceeds.

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12.4.2 Workmanship

All plumbing work shall be carried out by, or under the direct control of, properly qualified tradesmen, and shall be to recognised high standards.

Observe best local trade practice to avoid problems which arise from freezing winter conditions.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

Weatherseal wherever pipes, screws, bolts or other fastenings penetrate an external surface, and particularly roofing; seal with gaskets, flashings (and overflashings if necessary) or mastic as appropriate - any damage that results from failure of such seals will be made good at the Plumber's expense.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Plumber's expense.

12.4.3 Pipework

Joints between pipes of different materials shall always be to the approval of the TA Plumbing Inspector.

Pipework set-out neatly with a minimum number of bends, and more or less parallel to and at right angles to structural elements - avoid diagonal piping.

All internal pipework shall be concealed except where otherwise is either shown or approved. Exposed pipework shall be accurately and neatly run. Arrange all pipework (and particularly traps) in a manner which will allow maximum future accessibility for repairs or maintenance. Arrange for access panels to any primary maintenance positions, and install conveniently located isolating valves for each group of fittings. Wingbacks securely and squarely fixed. Crox unions usually acceptable only at the final connection to fittings. Install white plastic flanges where pipes penetrate linings in visible locations.

Where pipes are covered with nail fixed linings and trim ensure that their positions are marked on the linings to minimise the risk of subsequent nailings penetrating the pipe. Any such damage shall be rectified immediately, with all consequential damage made good.

Set pipework out in straight runs to even gradients. Fix all pipes to the structure sufficiently to fully support and to prevent sagging or vibration. Clips and saddles shall be the same material as the pipe. Exterior pipes on stand-off brackets. Fixings to the exterior or damp locations shall all be hot dip galvanized unless otherwise noted. Sleeves for pipes or drains penetrating concrete or masonry shall be uPVC, 20mm minimum larger internal diameter than the external diameter of the pipe, finished flush with concrete or masonry, and packed and mastic sealed.

Close open ends of the systems during construction to prevent the entry of foreign matter.

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12.4.4 Temperature Movement

All work shall respect in full all probable thermal movements - layouts, fixings and jointings shall be arranged to allow thermal movement without risk of prejudice to watertight conditions, or risk of damage from straining of the pipes which will generate failures.
In particular, observe best local trade practice to avoid problems arising from freezing conditions.

12.4.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

12.4.6 Fire Wall/Ceiling Penetrations

Ensure that where drainage pipe work penetrate through fire rated floor or wall areas that these penetrations are stopped with intumescent foaming sealant for joints up to 10mm, and with intumescent stopping putty where the gap exceeds 10mm. Where required fit approved intumescent type fire collars to pipes located such that the fire rating of the wall or ceiling is maintained.

12.4.7 Testing

All plumbing services shall be completed in stages which will allow for proper testing under normal working pressures prior to the application of insulation, concealment or other enclosure. Testing of piped water services shall be by hydrostatic testing in accordance with AS/NZS 3500.1 and shall not show any leakage when subjected to a hydrostatic pressure of 1500kPa for a period of not less than 30 minutes. All leaks remedied and retested. On completion the whole of the plumbing services to be subjected to full operational tests in the presence of the plumbing inspector, with any defects revealed in these tests properly remedied.

12.4.8 Warranties

Warranty cards and manufacturer's guarantees for all items supplied and installed by this trade shall be correctly filled in and handed over at Practical Completion.

12.5 Systems

12.5.1 Wastes & Vents

All traps sized to AS 3500.2. Wastes and vents all uPVC. Wastes shall be to AS 3500.2 falls as a minimum. Vents shall be generally as indicated, but avoid where permissible in compliance with AS 3500.2, or shall be combined above the flood level of the fittings.

Fit bird proof domes to all vents.

12.5.2 Cold Water System

12.5.2.1 Supply From New Connection to Reticulated Supply

All cold water supply pipework shall be medium/high-density polyethylene (MDPE/HDPE), arranged and fixed so that all joints are in a fully ‘relaxed' condition, without any stress or tension.

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Make complete arrangements for the installation of a new connection to the reticulated supply in the street and the main feed and toby in the position shown. Lay on a 20mm main from the toby along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, protection, backfilling, signal strip etc. to comply with all Supply Authority requirements). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessibly positioned cleanable in-line sediment and dirt filter.
Primary distribution from the water filter shall be in 20mm piping, reducing to 15mm for the final feed to individual items. Install conveniently located isolating valves to turn off each group of fittings, and install a small isolating valve alongside each toilet cistern not integrally fitted with one. (Note that these isolating valves and the hosecocks are not covered by the Plumbing Hardware Prime Cost Sum).

12.5.3 Hot Water System

12.5.3.1 Electric Storage, High Pressure Hot Water Cylinder

Supply the electric storage high pressure hot water cylinder noted on the drawings and install it where shown. Where appropriate install the cylinder on a safetray, with its drain discharging in a visible location.
Install temperature and pressure relief valves, cold water expansion valves, flow control valves, line strainers, pressure limit valves, and non-return/isolating valves as required to leave the hot water system in full design operational order. Install a tempering valve for each cylinder to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 50°C.
Check that the water pressure is suitable for the cylinders operation, and install PRV's if excessive.
Pressure relief discharges shall be copper and to the exterior in approved positions.
Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.
Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the showers temperature and pressure remain as even as possible.
Irrespective of whether a mixing device is installed, the storage water heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.

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13 DRAINAGE

13.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

13.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.0:2003(AS/NZS)	Plumbing and drainage - Glossary of terms
3500.2:2018(AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021 (AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
NZBC G13/AS2	Foul Water Drainage

13.3 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals.

Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

13.4 Drainlaying Elements

13.4.1 Drainlaying

Commence drainlaying at the low end of even fall sections of drains and proceed in a continuous sequence to the fittings connections.

Sumps, gullies, etc. solidly bedded. Lay 110mm uPVC drains to connect gullies, sumps, stacks, and downpipes through to the street edge connections.

Every junction and bend shall be an inspection position. Temporarily seal the open ends of incomplete drains to prevent entry of foreign matter. Make appropriate provision for any anticipated differential settlement. Place signal strip above all drains.

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Ensure that stormwater drains are very accurately positioned so that downpipes can drop directly into them, without offsets.

13.5 Foul Water Drainage

13.5.1 Scope

Supply, install, test and commission new, gravity-flow foul water drains on the site, to the locations, layout and details shown on the drawings, complete with all necessary components and accessories required for satisfactory completion and performance of the foul water drainage system. All aspects of this works shall comply with the requirements of the NZ Building Code, related compliance Standards, Regulations and Acts, and to the requirements of the Territorial Authority, and as specified herein and on the approved drawings and schedules. Ancillary work and/or services not specifically mentioned but necessary to complete the work to specified levels of performance shall be deemed included.

Install foul water drains in natural ground, beneath and external to the building, for the distances indicated on the drawings. Allow for all ventilation requirements, inspection openings, bends, branches, manholes, inspection chambers, overflow gully traps, etc., as required and indicated on the drawings. Unless shown otherwise, the foul water drains shall be connected to the building's sanitary drainage system, and discharge to the foul water network.

The foul water drainage plans are diagrammatic only. Allow for all necessary vents, inspection fittings, cleaning eyes, traps and venting in accordance with AS/NZS 3500.2 and to comply with the New Zealand Building Code, and as required by the Territorial Authority. Refer to the drawings for the dimensioned locations of sanitary waste pipes and outlets.

13.5.2 Requirements

13.5.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

13.5.2.2 Compliance

Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the foul water drainage works.

The Drain Layer shall be deemed to have allowed for all work associated with the safe and orderly execution of the foul water drainage work, including complying with all Territorial Authority requirements, Building Consent, Building Act, Health and Safety requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the work.

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13.5.2.3 Work on Public Property

Excavation and reinstatement of public property shall comply with the requirements of the relevant controlling authorities.

Obtain all necessary approvals and permits from the controlling authorities before commencing work on public property.

Arrange and pay for any excavation and reinstatement inspections of public property required by the controlling authorities.

Before commencing any excavation in or reinstatement work to public footpaths, driveway crossings, roads or other public property, make all necessary enquiries to the relevant controlling authority for their standards for excavation and reinstatement.

Provide at all times, adequate safeguards to the public in respect of temporary fences, signals, signs and lights. Where traffic signs are necessary, these shall be provided and operated in accordance with the Regulatory Authority or NZ Transport Agency (NZTA) guidelines, as applicable, but erected only with the prior written approval of the Regulatory Authority or NZTA and the Contract Administrator.

Where a Traffic Management Plan (TMP) is required, prepare, operate and update this plan as necessary throughout the duration of the works. The TMP shall conform to the requirements of the Regulatory Authority or NZTA, as applicable. Obtain TMP prior-approvals, and maintain the TMP for the entire construction duration.

Remove dirt and contamination deposited on public property to the satisfaction of the controlling authorities.

13.5.2.4 Notifiable Work

Notify WorkSafe NZ of work that is notifiable (particular hazardous work) under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

13.5.2.5 Explosives

The use of explosives is NOT permitted.

13.5.2.6 Inspections

Inspections of foul water drainage works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Obtain and pay all fees for any required inspections which are additional to the Building Consent.

13.5.2.7 Testing

Carry out all necessary testing of the foul water drainage installations, and demonstrate to the Contract Administrator and the controlling Territorial Authority that the installations are watertight

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and comply with the requirements of the New Zealand Building Code, related compliance Standards, and the design documents.

13.5.2.8 Redundant Drains

Where an existing foul water drain or part thereof is no longer required, it shall be disconnected from the service at the junction of the live drain or at the property boundary, and be appropriately sealed-off watertight in accordance with AS/NZS 3500.2. Advise the controlling Territorial Authority of the final sealing treatment.

13.5.2.9 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades as necessary to install foul water drains to the required locations and layouts.

13.5.2.10 Workmanship

Foul water drainage work shall be carried out by qualified and experienced tradespersons, familiar with the required installation requirements, under the direct supervision of a NZ certified Registered Drainlayer, in accordance with AS/NZS 3500.2 in compliance with the New Zealand Building Code, and all local codes and regulatory authority requirements, and the conditions of the Building Consent.

All pipe cutting, jointing, and supporting techniques shall be exactly as recommended by the pipe manufacturer. Pipes, fittings and accessories shall be handled and installed in such a manner that prevents any damage to the component.

All work shall be such as to leave a neat, efficient, robust and watertight installation.

Carry out all necessary inspections and tests during installation to ensure compliance with the design specifications and regulatory requirements. Provide test result sheets to the Contract Administrator to show compliance has been achieved.

Take all necessary measures during installation to protect the foul water drainage system from damage, and to prevent the entry of:
- extraneous water;
- soil, sand, or rock,
- the contents of any septic tank; or
- any other substance, the discharge or which could impede the operation of the foul water drainage network.

Ensure that any installed drain is adequately protected from any damage and excessive loading during the remaining construction period.

Protect adjacent finished work and surfaces from damage and contamination during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Drain Layer's expense.

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Any associated electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

13.5.2.11 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. All rejected foul water drainage materials and work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional expense to the Principal.

13.5.2.12 Delivery & Handling

Store foul water drain pipes and accessories undercover, out of direct sunlight, clear of the ground, on an even surface, and protected from damage and contamination in accordance with the manufacturer's requirements. Keep pipes and accessories out of direct sunlight and protected from damage and contamination at all times.

Where possible, store pre-packed PVC pipes in the original delivery crate.
Store loose PVC pipes on evenly spaced bearers at maximum 1.0m centres, with pipe sockets alternated so the the sockets do not bear on each other, and with side supports if pipes are stacked more than two layers high. When loose PVC pipes are stacked in a pyramid, the maximum stack height shall be 1.0m and the bottom pipes shall be chocked.

Do not used damaged or faulty materials or products, or products that are beyond their designated shelf life. Do not use PVC materials that have been exposed to or stored in direct sunlight longer than the period specified by the manufacturer.

Handle all products and materials in accordance with the manufacturer's requirements, and in a manner that prevents damage or deterioration of the material/product.

Installers shall be familiar with and comply with manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

13.5.2.13 Warranties

On completion and before Practical Completion, provide all relevant manufacturer/supplier warranties in favour of the Principal, covering materials, equipment, proprietary products, etc., supplied and installed.

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13.5.3 Materials

13.5.3.1 General

Supply and deliver to the site all pipes, fittings, precast manholes, granular bedding material and other materials required for incorporation in the drainlaying work. All drainlaying materials shall be fit for purpose and intended use, new, of good quality and free from defects, and as specified herein and on the approved drawings and schedules.

13.5.3.2 Gullies

Gully traps shall be of an approved type and installed in accordance with AS/NZS 3500.2 and the requirements of the Territorial Authority.

Gully traps shall be PVC construction, including dish and lid.

The overflow level of gully dishes shall be set no less than 25mm above paved surfaces, and no less than 100mm above unpaved surfaces.

Provide adequate support to gully riser and dish with compacted bedding or concrete.

Where subject to damage, protect gully traps with a smooth-finished concrete surround, or with 2:1 sand/cement mortar, surrounding the entire gully and separated from the building foundation, in accordance with AS/NZS 3500.2 and as shown on the drawings.

13.5.4 Trench Excavation

13.5.4.1 Clearing of Surfaces

Where trenches are to be excavated in a grassed area, garden or a berm, the topsoil shall be stripped from the area of the excavation and stockpiled separately adjacent to the trench for use in reinstating the surface.

Where trenches are to be excavated in existing concrete or asphalt paved areas, the paving shall be cut to neat, straight lines, parallel to the trench prior to excavation, with a nominal 100mm trimming allowance either side of the excavation width. The excavation shall be carried out with minimal damage to the existing paved surface.

Where trenches are to be excavated in existing segmental paved areas, the pavers shall be removed by hand, cleaned and set aside for later reinstatement.

Subsequent trench backfill shall be adequately compacted to avoid subsidence of reinstated surfaces.

13.5.4.2 Excavation

Locate all existing buried services before commencing excavation work in any area.

Excavations for trenches and pits shall be properly executed and supported in accordance with the requirements of AS/NZS 3500.2.

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Carry out excavation work to comply with all relevant health and safety regulations and guidelines, including the 'Excavation Safety - Good Practice Guidelines' where appropriate.

Unless specified otherwise, the excavation of trenches shall be taken out by open cut to the levels and grades shown or implied on the drawings. Excavate trenches to the depths which will provide for the appropriate type of bedding.

Trench excavations shall be of sufficient width to allow all operations necessary for the jointing of pipes and placing of the specified backfill. The bottom width of the trenches shall at least the combined measurement of the outside diameter of the pipe plus 200mm - with a minimum clearance of 100mm on each side of the drain barrel. The trench width at the top of the pipe shall not exceed the outside diameter of the pipe plus 600mm unless the pipe in the trench is covered with concrete. The trench above the top of the pipe may be cut wider, either by excavating a wider bench or by battering the trench wall.

13.5.4.3 Shoring

Make all necessary provisions for shoring trench walls to comply with all regulations and for health and safety measures.

Trench shoring materials and equipment must be suitable for the purpose for which they are to be used, of sound quality, and adequate in strength for the particular use.

Shoring shall be placed by experienced operators under competent supervision, and shall not be altered, dismantled, or interfered with except on the instruction of the authorised supervisor.

Ensure no voids are left in the backfill when shoring is removed, and the required compaction density of the backfill is achieved.

13.5.4.4 Dewatering

Take all necessary precautions to keep trenches and pits free from water. Provide all necessary pumps, drainage pipes and other equipments required for dewatering. Install all necessary filtering and detention measures required by the Territorial Authority.

If the bottom of the trench is likely to be adversely affected by rain, remove the final 80mm of excavation as a separate operation immediately before placing the bedding material.

13.5.5 Pipe Laying

13.5.5.1 Bedding Pipes

Provide a minimum 75mm thick underlay layer of well compacted bedding material for all pipes. A chase shall be excavated in the bedding to accommodate any jointing socket or fitting in the drain. The pipe embedment material shall be laid and compacted so that the pipe is evenly and continuously supported along its length on either side of the pipe, and with an overlay layer minimum 150mm thick.

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When trench support systems are used, the bedding material shall be placed and compacted in a manner so that no loss of compaction results from removal of the trench side support systems. The trench support shall be removed in such a way as to ensure that the placing and compaction of the bedding material occurs below the trench supports and directly against the undisturbed ground of the trench walls.

After completion of the jointing and inspection of drain pipes, place and compact the bedding surround material around the pipe to the required depth over the pipe. The material shall be carefully placed around and over the pipe using hand tamping and in a manner that ensures the pipe is uniformly supported all round its perimeter and without voids. Take care during placement and compaction to ensure the pipe is not displaced or damaged.

13.5.5.2 Laying Pipes

Install foul water drains in accordance with AS/NZS 3500.2 to the layout, levels and grades shown on the drawings Drain pipes shall be laid to provide maximum falls, in straight lines and at an even grade, without obstruction to flow, and with full allowance for bedding.

Before installing the pipes, check the bore of each pipe is free from foreign matter and that the pipe exterior and the socket have not been damaged in handling or storage. All pipelines shall be kept clean and free of dirt and debris at all times during installation, testing and commissioning.

PVC-U foul water drain pipes shall be properly jointed (rubber ring joint or solvent welded joint) to produce a watertight seal in accordance with the manufacturer's instructions.

Start laying main drains at the point of outfall and insert junctions for branch drains as the work proceeds. Pipes shall be laid with the least number of bends, in the centre of the trench, in straight lines between bends, and to the grades and locations shown on the drawings.

Install all necessary fittings, including vents, inspection openings and access points, bends and junctions, to the locations shown on the drawings and in accordance with the manufacturer's instructions. Where not specified on the drawings or schedules, fittings for inspection openings, bends, junctions, etc., shall be selected from the PVC pipe system range of products and installed in accordance with the manufacturer's instructions.

Other than precautions against damage by displacement or floating pipes, no bedding surround material or backfill shall be placed until the laying of the drain has been inspected by the Territorial Authority.

13.5.5.3 Steep Gradients

Where the gradient of a foul water drain pipe exceeds 1:5 (20%), anchor blocks shall be installed at the bend or junction at the top and bottom of the inclined drain, and at intervals not exceeding 3m. Anchor blocks shall be constructed in accordance with AS/NZS 3500.2: Section 3.4.4.

13.5.5.4 Underground Drains Near & Under Buildings

Protect underground drains near and under buildings against damage in accordance with AS/NZ 3500.2 where the minimum cover specified cannot be provided.

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13.5.5.5 Jointing - Solvent Cement Welded Joints

Solvent welded joints shall only be used for jointing PVC-U pipes and fittings where rubber-ring jointed fittings are not manufactured. Use only cleaner primers and solvent cements specified by the manufacturer for the application and socket type. Only sockets complying with the relevant Standard shall be installed. Do not use cleaner primers or solvent cements if the 'use by' date has expired. The marking of pipes by scoring is not permitted. All joints shall be watertight and prevent the infiltration of groundwater and the intrusion of tree roots.

Solvent welded joints shall be assembled in accordance with the manufacturer's instructions and generally as follows:
- Solvent welding shall only be carried out in dry conditions above 5°C.
- Ensure the components are dry, clean and free of dust, dirt, grease and surface contaminants during all stages of the jointing process.
- Prior to welding, the components shall be assembled dry and checked for position and alignment to ensure accurate re-assembly in the correct position.
- Mark the spigot with a witness mark (pencil, not scored) at a distance equivalent to the internal depth of the socket.
- Dry the spigot end, up to the witness mark, and the socket interior, then clean and degrease with a clean cloth moistened with the pipe or fitting manufacturer’s specified priming fluid.
- Apply an even coating of solvent cement to the internal surface of the socket for the full engagement length, and to the external section of the spigot up to the witness mark.
- Only use the minimum amount of solvent cement in the socket necessary for a fully solvent-welded joint.
- Insert the spigot close to, but not beyond, the witness mark. Do not use excessive force. Firmly restrain the joint for the minimum period recommended by the pipe manufacturer.
- Wipe off excess solvent cement from the outside of the joint, and where possible from the inside.
- Adhere to the manufacturer's specified procedures and time frames for filling and testing pipework.
- Allow all solvent welded joints to fully cure before subjecting pipework to any imposed load or testing.

13.5.5.6 Pipe Cover

Unless specified otherwise on the drawings, the minimum pipe cover (finished surface to top of pipe) shall be:
- where not subject to vehicular loading: 300mm.
- where subject to vehicular loading - not in roadways: 500mm.
- where subject to vehicular loading - in sealed roadways: 500mm.
- where subject to vehicular loading - in unsealed roadways: 500mm.
- pipes in embankment conditions or subject to loading from heavy construction equipment: 750mm.

13.5.5.7 Marking Tape

Install marking tape on top of the pipe embedment zone and centred over the pipe before commencing backfilling.

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13.5.6 Connection

13.5.6.1 Public Network - Street Sewer Connection

Connect to discharge the foul water drainage line directly to the public mains street sewer in accordance with the requirements of the Territorial Authority and as shown on the drawings.

13.5.7 Testing

13.5.7.1 Foul Water Drains

Test the foul water drainage installation, including all drains, connections and system components, for water tightness in accordance with the requirements of the Territorial Authority (TA).

Where required by the Territorial Authority, the testing shall be undertaken in the presence of a representative of the TA. Demonstrate to the Contract Administrator and the Territorial Authority that the installation complies with the requirements of the contract documents, related standards and regulatory bodies. Lodge all certificates of approval with the Contract Administrator.

Unless specified otherwise by the Territorial Authority, the test method shall be the Water Test procedure for non-pressure pipelines as defined in AS/NZS 2302. Where appropriate, the procedures in NZBC E1/VM1 may be used as an alternative. The acceptability of other test methods are be subject to the approval of the Territorial Authority and the Contract Administrator.

Provide all necessary plant, equipment and instruments required for the specified testing procedure. All testing and commissioning shall be undertaken by suitably skilled and experienced technicians.

Pressure testing shall be carried out after the pipes have been laid and the bedding material has been placed over the pipes as specified.

Prior to testing ensure that all pipe junctions and inspection eyes are exposed, and pipelines have been flushed and all residual debris cleaned out.

Foul water manholes shall be tested for watertightness by plugging all pipes and filling with water. After absorption has taken place the water level shall remain constant for thirty minutes.

Test results shall be recorded clearly on properly formatted Test Result sheets, and submitted to the Contract Administrator within 48 hours of completion of testing.

Repair or replace any materials or workmanship found to be defective or faulty during testing, and repeat the test until a satisfactory test result is achieved.

Leave the installation watertight and free of defects, and operating to the required performance standard.

The work shall be deemed incomplete unless all required testing and commissioning has been carried out and has passed the requirements of the testing specification and the Territorial Authority.

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13.5.8 Backfilling

13.5.8.1 Backfilling

Trenches shall be backfilled as soon as possible after the laying, inspecting and testing of the pipeline.

Where required, lay marker tape along the length of the drain, just above the top of the pipe embedment zone, before backfilling.

Trench backfill materials shall be placed over the pipe embedment, and compacted to restore the trench as near as practicable to the normal surrounding ground surface level and reduce the likelihood of subsidence. Backfill material shall be placed in uncompacted layers not exceed 300mm, then mechanically compacted to the required density.

Temporary trench support systems shall be lifted progressively above each layer of backfill to ensure each layer is compacted against undisturbed ground.

Any deficiencies of trench filling exposed by settlement shall be corrected to the required standard.

13.6 Stormwater Drainage

13.6.1 Scope

Supply, install, test and commission new, gravity-flow stormwater drains on the site, to the locations, layout and details shown on the drawings, complete with all necessary components and accessories required for the satisfactory completion and performance of the stormwater system. All aspects of this works shall comply with the requirements of the NZ Building Code, related compliance Standards, Regulations and Acts, and to the requirements of the Territorial Authority, and as specified herein and on the design drawings and schedules. Ancillary work and/or services not specifically mentioned but necessary to complete the installation shall be deemed included.

Install stormwater drains in natural ground, beneath and/or external to the building, for the distances indicated on the drawings. Allow for all inspection openings, bends, branches, manholes, inspection chambers, etc., as required and indicated on the drawings. Unless shown otherwise on the drawings, the stormwater drains shall be connected to the roof and surface stormwater installations, and discharge to the stormwater network.

The stormwater drainage plans are diagrammatic only. Allow for all necessary inspection fittings, cleaning eyes, and traps in accordance with AS/NZS 3500.3 and to comply with the New Zealand Building Code, and as required by the Territorial Authority. Refer to the drawings for the dimensioned locations of roof drainage system rainwater pipes and outlets, and surface drainage outlets, etc.

13.6.2 Requirements

13.6.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes

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of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

13.6.2.2 Compliance

Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the stormwater drainage works.

The Drain Layer shall be deemed to have allowed for all work associated with the safe and orderly execution of the stormwater drainage work, including complying with all Territorial Authority requirements, Building Consent, Building Act, Health and Safety requirements, and all other acts, laws, by-laws and regulations that may affect the execution of the work.

13.6.2.3 Work on Public Property

Excavation and reinstatement of public property shall comply with the requirements of the relevant controlling authorities.

Obtain all necessary approvals and permits from the controlling authorities before commencing work on public property.

Arrange and pay for any excavation and reinstatement inspections of public property required by the controlling authorities.

Before commencing any excavation in or reinstatement work to public footpaths, driveway crossings, roads or other public property, make all necessary enquiries to the relevant controlling authority for their standards for excavation and reinstatement.

Provide at all times, adequate safeguards to the public in respect of temporary fences, signals, signs and lights. Where traffic signs are necessary, these shall be provided and operated in accordance with the Regulatory Authority or NZ Transport Agency (NZTA) guidelines, as applicable, but erected only with the prior written approval of the Regulatory Authority or NZTA and the Contract Administrator.

Where a Traffic Management Plan (TMP) is required, prepare, operate and update this plan as necessary throughout the duration of the works. The TMP shall conform to the requirements of the Regulatory Authority or NZTA, as applicable. Obtain TMP prior-approvals, and maintain the TMP for the entire construction duration.

Remove dirt and contamination deposited on public property to the satisfaction of the controlling authorities.

13.6.2.4 Notifiable Work

Notify WorkSafe NZ of work that is notifiable (particular hazardous work) under the Health and Safety in Employment Regulations 1995, 24 hours before starting the work.

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13.6.2.5 Explosives

The use of explosives is NOT permitted.

13.6.2.6 Inspections

Inspections of stormwater drainage works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Obtain and pay all fees for any required inspections which are additional to the Building Consent.

13.6.2.7 Testing

Carry out all necessary testing of the stormwater drainage installations, and demonstrate to the Contract Administrator and the Territorial Authority that the installations are watertight and comply with the requirements of the New Zealand Building Code, related compliance Standards, and the design documents.

13.6.2.8 CCTV Inspection

Where required by the Territorial Authority and in addition to pressure testing, CCTV acceptance inspection of new drains shall be carried out in accordance with the New Zealand Pipe Inspection Manual.

All defects identified by the CCTV inspection shall be rectified to the required standard, without cost to the Principal, and the relevant section of pipeline tested and/or inspected again.

13.6.2.9 Redundant Drains

Where an existing drain or part thereof is no longer required, it shall be disconnected from the service at the junction of the live drain or at the property boundary, and be appropriately sealed-off watertight in accordance with AS/NZS 3500.3. Advise the controlling Territorial Authority of the final sealing treatment.

13.6.2.10 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades as necessary to install stormwater drains to the required locations and layout.

13.6.2.11 Workmanship

Stormwater drainage work shall be carried out by qualified and experienced tradespersons, familiar with all required installation requirements, under the direct supervision of a NZ certified Registered Drain Layer, in accordance with AS/NZS 3500.3 and to comply with the New Zealand Building Code, and all local codes and regulatory authority requirements, and the conditions of the Building Consent.

All pipe cutting, jointing, and supporting techniques shall be exactly as recommended by the pipe manufacturer. Pipes, fittings and accessories shall be handled and installed in such a manner that prevents any damage to the component.

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All work shall be such as to leave a neat, efficient, robust and watertight installation.

Carry out all necessary inspections and tests during installation to ensure compliance with the design specifications and regulatory requirements. Provide test result sheets to the Contract Administrator to show compliance has been achieved.

Take all necessary precautions during installation to protect the stormwater drainage system from damage, and to prevent the entry of:
- soil, sand, or rock;
- sewage, including the contents of any septic tank, or trade waste; or
- any other substance that could damage or impede the operation of the stormwater drainage network.

Ensure that any installed drain is adequately protected from any damage and excessive loading during the remaining construction period.

Protect adjacent finished work and surfaces from damage and contamination during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Drain Layer's expense.

Any associated electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

13.6.2.12 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. All rejected stormwater drainage materials and work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional expense to the Principal.

13.6.2.13 Delivery & Handling

Store stormwater drain pipes and accessories undercover, out of direct sunlight, clear of the ground, on an even surface, and protected from damage and contamination in accordance with the manufacturer's requirements. Keep pipes and accessories out of direct sunlight and protected from damage and contamination at all times.

Store loose PVC-U pipes on evenly spaced bearers at maximum 1.0m centres, with pipe sockets alternated so the the sockets do not bear on each other, and with side supports if pipes are stacked more than two layers high. When loose PVC-U pipes are stacked in a pyramid, the maximum stack height shall be 1.0m and the bottom pipes shall be chocked.

Do not used damaged or faulty materials or products, or products that are beyond their designated shelf life. Do not use PVC-U materials that have been exposed to or stored in direct sunlight longer than the period specified by the manufacturer.

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Handle all products and materials in accordance with the manufacturer's requirements, and in a manner that prevents damage or deterioration of the material/product.

Installers shall be familiar with and comply with manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, including WorkSafe's General Risk and Workplace Management - Part 1 and Workplace and Facilities Requirements guidance.

13.6.2.14 As-Built Drawings

On completion and before application for Code Compliance Certificate, prepare As-Built Drawings of the stormwater drainage system, that accurately record the new and/or modified stormwater drainage installation.

Information shall include, but not limited to, type, class and size of all pipes, the location, grade and direction of flow of all pipes, the location of all bends, changes in direction, cleaning access positions, manholes, and all dimensions, levels, inverts, etc.

Submit prepared as-built drawings to the Contract Administrator for review. Issue as-built drawings in accordance with the Contract Administrator's instruction, and in the required format.

13.6.2.15 Warranties

On completion and before Practical Completion, provide all relevant manufacturer/supplier warranties in favour of the Principal, covering materials, equipment, proprietary products, etc., supplied and installed.

13.6.3 Materials

13.6.3.1 General

Supply and deliver to the site all pipes, junctions, precast manholes, granular bedding material and other materials required for the satisfactory completion of the stormwater drainage works. All drainlaying materials shall be fit for purpose, new and free from damage and defects.

13.6.3.2 Backfill Material

Except where specified otherwise, backfill material above the pipe embedment layer (150mm above the top of pipe) shall be selected ordinary excavated material that is free from any builder's waste, any organic material, any rocks or hard matter larger than 20mm, and any soil lumps larger than 75mm.

Except where specified otherwise, pipes beneath private roadways and where subject to vehicular traffic - all backfill from the top of the embedment layer (150mm above top of pipe) to the underside of the pavement layer shall be GAP 65 - General All Passing 65mm.

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Mechanically compact backfill material in layers not exceeding 300mm to a relative compaction no less than 95% of the NZ Standard Compaction.

Trenches in public footpaths and roads shall be backfilled in accordance with the requirements of the controlling authority.

13.6.4 Trench Excavation

13.6.4.1 Clearing of Surfaces

Where trenches are to be excavated in a grassed area, garden or a berm, the topsoil shall be stripped from the area of the excavation and stockpiled separately adjacent to the trench for use in reinstating the surface.

Where trenches are to be excavated in existing concrete or asphalt paved areas, the paving shall be cut to neat, straight lines, parallel to the trench prior to excavation, with a nominal 100mm trimming allowance either side of the excavation width. The excavation shall be carried out with minimal damage to the existing paved surface.

Where trenches are to be excavated in existing segmental paved areas, the pavers shall be removed by hand, cleaned and set aside for later reinstatement.

Subsequent trench backfill shall be adequately compacted to avoid subsidence of reinstated surfaces.

13.6.4.2 Excavation

Locate all existing buried services before commencing excavation work in any area.

Excavations for trenches and pits shall be properly executed and supported in accordance with the requirements of AS/NZS 3500.3.

Carry out excavation work to comply with all relevant health and safety regulations and guidelines, including the 'Excavation Safety - Good Practice Guidelines'.

Unless specified otherwise, the excavation of trenches shall be taken out by open cut to the levels and grades shown or implied on the drawings. Excavate trenches to the depths which will provide for the appropriate type of bedding.

Trench excavations shall be of sufficient width to allow all operations necessary for the jointing of pipes and placing of the specified backfill. The bottom width of the trenches shall at least the combined measurement of the outside diameter of the pipe plus 200mm - with a minimum clearance of 100mm on each side of the drain barrel. The trench width at the top of the pipe shall not exceed the outside diameter of the pipe plus 600mm unless the pipe in the trench is covered with concrete. The trench above the top of the pipe may be cut wider, either by excavating a wider bench or by battering the trench wall.

Where a trench has been excavated deeper than required without authorisation, the excess depth shall be filled either with bedding material compacted to achieve a density as near to the original soil density as possible, or with concrete.

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13.6.4.3 Shoring

Make all necessary provisions for shoring trench walls to comply with all regulations and for health and safety measures.

Trench shoring materials and equipment must be suitable for the purpose for which they are to be used, of sound quality, and adequate in strength for the particular use.

Shoring shall be placed by experienced operators under competent supervision, and shall not be altered, dismantled, or interfered with except on the instruction of the authorised supervisor.

Ensure no voids are left in the backfill when shoring is removed, and the required compaction density of the backfill is achieved.

13.6.4.4 Dewatering

Take all necessary precautions to keep trenches and pits free from water. Provide all necessary pumps, drainage pipes and other equipments required for dewatering. Install all necessary filtering and detention measures required by the Territorial Authority.

If the bottom of the trench is likely to be adversely affected by rain, remove the final 80mm of excavation as a separate operation immediately before placing the bedding material.

13.6.5 Pipe Laying

13.6.5.1 Bedding Pipes

Provide a minimum 75mm thick underlay layer of well compacted bedding material for all pipes. A chase shall be excavated in the bedding to accommodate any jointing socket or fitting in the drain. The pipe embedment material shall be laid and compacted so that the pipe is evenly and continuously supported along its length on either side of the pipe, and with an overlay layer minimum 150mm thick.

When trench support systems are used, the bedding material shall be placed and compacted in a manner so that no loss of compaction results from removal of the trench side support systems. The trench support shall be removed in such a way as to ensure that the placing and compaction of the bedding material occurs below the trench supports and directly against the undisturbed ground of the trench walls.

After completion of the jointing and inspection of drain pipes, place and compact the bedding surround material around the pipe to the required depth over the pipe. The material shall be carefully placed around and over the pipe using hand tamping and in a manner that ensures the pipe is uniformly supported all round its perimeter and without voids. Take care during placement and compaction to ensure the pipe is not displaced or damaged.

13.6.5.2 Laying Pipes

Install stormwater drains in accordance with AS/NZS 3500.3 to the layout, levels and grades shown on the drawings. Drain pipes shall be laid to provide maximum falls, in straight lines and at an even grade, without obstruction to flow, and with full allowance for bedding.

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Before installing the pipes, check the bore of each pipe is free from foreign matter and that the pipe exterior and the socket have not been damaged in handling or storage. All pipelines shall be kept clean and free of dirt and debris at all times during installation, testing and commissioning.

PVC-U stormwater drain pipes shall be properly jointed (rubber ring joint or solvent welded joint) to produce a watertight seal in accordance with the manufacturer's instructions.

Start laying main drains at the point of outfall and insert junctions for branch drains as the work proceeds. Pipes shall be laid with the least number of bends, in the centre of the trench, in straight lines between bends, and to the grades and locations shown on the drawings.

Install all necessary fittings, including inspection openings, bends and junctions, to the locations shown on the drawings and in accordance with the manufacturer's instructions. Where not specified on the drawings or schedules, fittings for inspection openings, bends, and junctions shall be selected from the PVC-U pipe system range of products and installed in accordance with the manufacturer's instructions.

Other than precautions against damage by displacement or floating pipes, no bedding surround material or backfill shall be placed until the laying of the drain has been inspected by the Territorial Authority.

13.6.5.3 Steep Gradients

Where the gradient of a stormwater drain pipe exceeds 1:5 (20%), anchor blocks shall be installed at the bend or junction at the top and bottom of the inclined drain, and at intervals not exceeding 3m. Anchor blocks shall be constructed in accordance with AS/NZS 3500.3: Section 7.9.

13.6.5.4 Underground Drains Near & Under Buildings

Protect underground drains near and under buildings against damage in accordance with AS/NZS 3500.3 where the minimum cover specified cannot be provided.

13.6.6 Manholes

13.6.6.1 Manholes

Construct stormwater manholes to the locations, dimensions, levels and details shown on the drawings, and make all necessary connections to the private stormwater drainage system.

Manholes shall be circular precast concrete manholes, constructed to NZS 4404 and the requirements of the Territorial Authority, and to the dimensions and details shown on the drawings.
- Concrete precast manhole risers: manufactured to the requirements of AS/NZS 4058.
- Concrete precast manhole flanged bases and lids: manufactured to NZS 3109, with a surface finish to NZS 3114.
- Manhole covers and cover frames: cast iron or steel construction conforming to AS 3996 and the requirements of the Territorial Authority.

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Connect stormwater drains to concrete precast manholes using purpose-made manhole connectors and pipe stubs/shorts in accordance with the requirements of the Territorial Authority and as shown on the drawings.

13.6.7 Connection

13.6.7.1 Public Network - Street Mains Connection

Connect to discharge the stormwater drainage line directly to the public stormwater mains in accordance with the requirements of the Territorial Authority and as shown on the drawings.

13.6.8 Testing

13.6.8.1 Stormwater Drains

Test the stormwater installation, including all drains, connections and system components, for water tightness in accordance with the requirements of the Territorial Authority (TA).

Where required by the Territorial Authority, the testing shall be undertaken in the presence of the representative of the TA. Demonstrate to the Contract Administrator and the Territorial Authority that the installation complies with the requirements of the contract documents, related standards and regulatory bodies. Lodge all certificates of approval with the Contract Administrator.

Unless specified otherwise by the Territorial Authority, the testing procedure shall be the Water Test procedure as defined in AS/NZS 3500.3: Section 9. Where appropriate, the procedures in NZBC E1/VM1 may be used as an alternative. The acceptability of other test methods are be subject to the approval of the Territorial Authority and the Contract Administrator.

Provide all necessary plant, equipment and instruments required for the specified testing procedure. All testing and commissioning shall be undertaken by suitably skilled and experienced technicians.

Pressure testing shall be carried out after the pipes have been laid and the bedding material has been placed over the pipes as specified.

Prior to testing ensure that all pipe junctions and inspection eyes are exposed, and pipelines have been flushed and all residual debris cleaned out.

Stormwater manholes shall be free of visible faults, or permeable zones, and jointing or penetration repairs shall be to best trade practice and standards.

Test results shall be recorded clearly on properly formatted test result sheets, and submitted to the Contract Administrator within 48 hours of completion of testing.

Repair or replace any materials or workmanship found to be defective or faulty during testing, and repeat the test until a satisfactory test result is achieved.

Leave the installation watertight and free of defects, and operating to the required performance standard.

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The work shall be deemed incomplete unless all required testing and commissioning has been carried out and has passed the requirements of the testing specification and the Territorial Authority.

13.6.9 Backfilling

13.6.9.1 Backfilling

Trenches shall be backfilled as soon as possible after the laying, inspecting and testing of the pipeline.

Where required, lay marker tape along the length of the drain, just above the top of the pipe embedment zone, before backfilling.

Trench backfill materials shall be placed on the pipe embedment, and compacted to restore the trench as near as practicable to the normal surrounding ground surface level and reduce the likelihood of subsidence. Backfill material shall be placed in uncompacted layers not exceed 300mm, then mechanically compacted to the required density.

Temporary trench support systems shall be lifted progressively above each layer of backfill to ensure each layer is compacted against undisturbed ground.

Any deficiencies of trench filling exposed by settlement shall be corrected to the required standard.

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14 ELECTRICAL

14.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

14.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2053.1:2001(AS/NZS)	Conduits and fittings for electrical installations - General requirements
2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:2019(AS|NZS)	Emergency lighting and exit signs for buildings - Part 2: Routine service and maintenance
3000:2018(AS|NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3100:2009(AS/NZS)	Approval and test specification - General requirements for electrical equipment
3112:2011(AS/NZS)	Approval and test specification - Plugs and socket-outlets
4512:2010(NZS)	Fire detection and alarm systems in buildings
4514:2009(NZS)	Interconnected smoke alarms for houses
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60335.2.30:2015(AS|NZS)	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.30:2015(AS|NZS)INCIEC	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.35:2013(AS/NZS)	Household and similar electrical appliances - Safety - Part 2.35: Particular requirements for instantaneous water heaters
60598.2.2:2016(AS|NZS)	Luminaires - Part 2.2: Particular requirements - Recessed luminaires
6104:1981(NZS)	Specification for emergency electricity supply in buildings

14.3 Systems

14.3.1 Earth

Provide a driven main earth suitable for the full installation, close to the meterboard, complying fully with all appropriate regulations and to the complete approval of a certified inspector. Bond all exposed metals, including light fittings and piped services and provide earth conductors for the entire system. Sheathing to any neutral screened cables may be used for earthing.

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14.3.2 Mains

Install a neutral screened 16mm main cable underground (depth, cover/protection, backfilling, signal strip etc. to comply with all relevant regulations) from the grid connection position noted on the Site Plan along the route indicated to the meterboard, positioned where shown on the Floor Plan, and make appropriate arrangements for the grid connection. Install pilot as required. The meterboard shall be metalclad with a meter reading window, recessed maximum depth into the wall and at 2m to the top of the board, with the meters and water heater controllers by the supply company nominated by the Principal. Install all switches and fuses that are necessary. From the meterboard run (route to approval) a neutral screened 16mm main plus controllers etc. to the switchboard.

14.4 Workmanship

14.4.1 General

Supply and install all materials, including all necessary minor and incidental items, for proper completion of all of the electrical services specified or shown on the drawings. The contract will not be deemed to be complete until the Electrician has provided an Electrical Certificate of Compliance (made available to the Contractor in time for the Code Compliance Certificate application).

Obtain all necessary permits and consents, serve all notices and pay all fees in and customary charges connection with the works.

The position of switches, light and power outlets and other fittings, although shown specifically in some instances, are in general only shown diagrammatically. The exact location of each of these items will be as directed on site by the Architect/Designer; the Electrician shall give reasonable notice of when this information is required. Items positioned in contravention of this shall be repositioned if directed, including rewiring if necessary, all at the Electrician's expense.

Unless drawn (on 1:20 wall elevations) or specified otherwise the mounting height to the centreline of the following items above the floor shall be:

-1000mm for lighting switches;
-2000mm for wall mounted lights;
-2100mm for the bayonet of pendant lights;
-300mm for power points, except at benches.

(Notify the Architect/Designer if either the actual fitting or mounting position seem to make the mounting height noted above inappropriate).

Warranty cards and manufacturers guarantees for items supplied and installed by this trade shall be filled in correctly and handed over at Practical Completion. Arrange all circuits to obtain an optimum balance of the system, and check and reconnect where necessary to achieve this on completion. Leave the works clean and tidy and in full operational order.

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14.4.2 Co-operation

Co-operate with all other trades and attend upon the Concretor and Carpenter to set out all required penetrations and to ensure that all wiring and fittings are correctly incorporated as work proceeds. The Carpenter will provide and fix all necessary dwangs and timber supports in locations determined by the Electrician.

14.4.3 Workmanship

All electrical work shall be carried out by, or under the direct control of, registered tradesmen, and shall be to recognized high standards. All work shall be such as to leave a neat, efficient and robust installation. Neatly label switchboards to identify each circuit.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604: 2011 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials shall be only to approval.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Electrician's expense.

14.4.4 Wiring

Joints within cable runs will not normally be accepted. TPS cable shall be adequately supported, and clipped at regular intervals. At terminations all strands of conductors shall be fully secured in a terminal block or clamped under a screw head washer; do not cut away any strands. Wiring which terminates in enclosed fittings and/or where subject to heat liable to cause deterioration, shall be high temperature type, with the tails made off with heat resisting sleeves, to protect the permanent wiring.

Wire lights in 1.5mm 3 core - 7.5 amps loading max per circuit (allow for 100w to all light fittings unless identified otherwise).
Wire power outlets in 2.5mm 3 core - 7 maximum GPO singles or doubles per circuit. Assess power outlets for specific equipment and allow accordingly.

Conceal all wiring except as noted on drawings or below. All wiring cast into concrete shall be run in conduit pipes. All cables shall be stranded (single core is unacceptable).

Wire more or less parallel to and at right angles to the structural elements - avoid any diagonal wiring. Layout of the principal distribution wiring shall be to approval. Position all wires to minimise the risk of damage from subsequent nailing of linings etc.

Generally, do not run TPS horizontally within timber walls except in the area up to 300mm above floor. Wire in the ceiling framing and drop vertically to outlets and switches.

Do not run TPS horizontally within partitions except in the area up to 300mm above floor. Wire in the ceiling void and drop vertically to outlets and switches. Principal wiring in the ceiling void shall be supported on adequate catenaries.

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14.5 Interconnected Smoke Alarms

14.5.1 Scope

Supply, install, and commission Interconnected Smoke Alarms to the locations and layout shown on the drawings, complete with accessories. All aspects of this work shall be in accordance with the smoke alarm manufacturer's product specification and installation requirements, other product manufacturers' recommendations, the electrical specification, and as shown on the drawings.

14.5.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to install Interconnected Smoke Alarms as required.

14.5.3 Workmanship

All work shall be carried out by experienced and competent tradesmen in accordance with the manufacturer's requirements, the electrical specification and drawings, and the related standards, electrical regulations and code requirements.
All work shall be such as to leave a neat, efficient and robust installation.

14.5.4 Power Supply

Interconnected smoke alarms shall be powered from a permanently energised 230 v a.c. mains power supplied from the unswitched side of a commonly used circuit, and shall include either a long-life battery backup or long life (10yr minimum) built-in rechargeable energy storage device.

14.5.5 Installation

Install the interconnected smoke alarms on ceilings, or as shown otherwise, to the layout shown on the drawings in strict accordance with the manufacturer's instructions. Do not install smoke alarms in dead air spaces or obstructions where dead air spaces may be created.

14.5.6 Completion

Check that the smoke alarms have been correctly installed and wired.
Commission smoke alarms to the required operation in accordance with the manufacturer's instructions. Test alarms to ensure that the warning signal is heard in all bedrooms when all doors between the alarm and bedrooms are closed.
Check for faults and damage, repair/replace as necessary.

Issue to the Owner a copy of the manufacturer's testing and maintenance requirements and product warranty.

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15 FIRE PROTECTION

15.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

15.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.0:2002(AS/NZS)	Structural design actions - Part 0: General principles
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
1530.4:2014(AS)	Methods for fire tests on building materials, components and structures - Fire-resistance tests for elements of construction
2588:2018(AS|NZS)	Gypsum plasterboard
2589:2017(AS/NZS)	Gypsum linings - Application and finishing
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
4600:2018(AS|NZS)	Cold-formed steel structures
NZBC C/AS2-AS6	Protection from Fire
NZBC C1-C6	Protection from Fire
NZBC F2	Hazardous Building Materials
NZBC G6	Airborne and Impact Sound

15.3 GIB® Fire Rated Systems

15.3.1 Scope

Supply and install the specified GIB® Fire Rated Systems to the locations identified on the drawings, incorporating GIB® plasterboards and all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB® Fire Rated Systems Specification and Installation Manual and the current GIB® Site Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), BRANZ Appraisal No.289, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB® Fire Rated Systems, GIB® Plasterboard Linings, or GIB® System components and accessories.

This specification section must be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated.

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For the purpose of this specification, the GIB® Fire Rated Systems Specification and Installation Manual (2012) is referred to as the GIB® Fire Rated Systems Manual..

15.3.2 Requirements

15.3.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

15.3.2.2 Warranty

GIB® Product & System Warranty:
- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

15.3.2.3 AWCI Membership

Installation of GIB® Fire Rated Systems shall be carried out by a registered member of the Association of Wall and Ceiling Industries of New Zealand Inc. (AWCI). If not already provided and if requested, submit evidence of AWCI membership and relevant experience.

15.3.2.4 Quality Assurance

Ensure that the installation and finishing of GIB® Fire Rated Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

15.3.2.5 Inspection & Acceptance of GIB® Fire Rated Systems

Carry out all necessary pre-installation, installation and finishing inspections necessary for GIB® Fire Rated Systems for each area of work in accordance with the requirements of the GIB® Fire Rated Systems Manual, GIB® Site Guide, and BRANZ Appraisal No.289.

Complete the GIB® Site Guide Pre-Installation Checklist prior to installing GIB® plasterboard linings.

Complete the GIB® Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

15.3.2.6 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB® Fire Rated System materials and/or work shall be repaired and/or

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replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

15.3.2.7 Producer Statement (other manufacturer's system)

Producer Statement PS1 - where required. Where GIB® plasterboard linings are installed as a component of another manufacturer's proprietary system, the system manufacturer shall furnish a completed Producer Statement PS1 (Design) as confirmation that the specified proprietary system as designed and documented complies with the relevant clauses of the New Zealand Building Code. The PS1 Producer Statement shall not serve as a product warranty or guarantee of compliance.

15.3.2.8 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB® Fire Rated Systems components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB® Fire Rated Systems Manual and GIB® Site Guide: 2.3 - Board Substitution Options. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® plasterboard linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

15.3.3 Performance

15.3.3.1 Fire Resistance of Clad Walls

Where GIB® Fire Rated Systems are clad (exterior) with any of the following materials, the exterior GIB® plasterboard lining may be left unstopped, unless specified or noted otherwise;
- Timber or wood based products;
- Steel - flat or profiled;
- Fibre cement sheet or board;
- Exterior Insulation and Finish Systems (EIFS).

GIB® plasterboard installed on the exterior face of a frame must be protected from exposure to weather during installation and in-service. Exterior claddings over GIB® plasterboard must comply with the current version of NZBC E2/AS1, and be installed over a flexible wall underlay and drained cavity complying with NZBC E2/AS1.

15.3.3.2 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

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15.3.3.3 Bracing Performance - Timber Framing

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber-framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Software according to the specified bracing unit rating, BRANZ Appraisal No.928, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

15.3.3.4 Bracing Performance - Steel Framing

Bracing Performance - GIB EzyBrace® Systems - Steel Framing. To the steel framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the latest GIB Ezybrace® For Light Steel Frame Systems publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

15.3.3.5 Sound Insulation Performance

Sound Insulation Performance - GIB® Noise Control Systems. To the areas noted as 'Sound-rated' on the drawings, additionally comply with all relevant aspects of the GIB® Noise Control Systems (2017) publication according to the specified sound transmission class (STC) rating, BRANZ Appraisal No.394 (2016), and other relevant product manufacturers' recommendations. Refer to separate specification GIB® Noise Control Systems.

15.3.3.6 Wet Areas

Wet Area Plasterboard Linings - GIB Aqualine® Wet Area Systems. To the areas noted as 'Wet Area' on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems (2007) publication, BRANZ Appraisal No.427 (2007), and other relevant product manufacturers' recommendations. Refer to separate specification GIB Aqualine® Wet Area Systems.

15.3.4 Wall Systems - 2-Way FRR

15.3.4.1 GBTL 30 (timber frame, load-bearing, 30/30/30)

GIB® Fire Rated Wall System - GBTL 30. A two-way fire rated, load-bearing timber frame wall system incorporating one layer of 10mm GIB Fyreline® each side. Refer to the GIB® Fire Rated Systems literature.

Installed Location:

15.3.5 Components & Accessories

15.3.5.1 Components & Accessories

GIB® Fire Rated Systems components and accessories, including, but not limited to:
- GIB® Plasterboard Linings;
- GIB® Plasterboard Fasteners;
- GIB® Metal Trims & Paper Faced Trims;
- GIB® Plasterboard Control Joints;
- GIB® Joint and Finishing Compounds;

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- GIB Fire Soundseal® Acoustic Sealant;
- Fire Resistant Sealant.

Refer to the GIB® Fire Rated Systems literature and the GIB® Site Guide for further information.

15.3.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB® Fire Rated Systems to the required set-out and standard, and to ensure:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- GIB® plasterboard linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

15.3.7 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB® Fire Rated Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified materials and installation techniques, in accordance with the manufacturer's installation requirements, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

Carry out all necessary installation inspections in accordance with the GIB® Site Guide, and to fully comply with the manufacturer's warranty requirements as the works progress.

All cutting, jointing, fixing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

Make all necessary provisions to protect adjacent work and surfaces from damage during installation.

On Completion:
- Check that GIB® Fire Rated Systems have been correctly installed and finished in accordance with the requirements of the GIB® Fire Rated Systems Manual and GIB® Site Guide, to the correct set-out, dimensions and details shown on the drawings.
- Check for any damage and defective work - repair or replace as necessary to the required standard.
- Ensure that inspection and assessment of the plasterboard Finish Level have been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.

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- Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.
- Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.
- Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and dust. Remove all associated rubbish and excess material from the site.
- Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

15.3.8 Delivery & Handling

Store all GIB® Fire Rated Systems plasterboard linings and system components indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep stored plasterboard linings and system accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life.

Should a problem be encountered with any GIB® product during installation or delivery, immediately contact the GIB® Helpline on 0800 100 442. Do not continue to use the product that is not performing to specification or expectation. Keep samples of the product in question and where possible, document batch numbers and/or manufacturing dates.

Handle all materials in accordance with the manufacturer's requirements and relevant Product Data Sheets, and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including General risk and workplace management - part 1.

15.3.9 Preparation

15.3.9.1 General

All framing shall be complete and ready for GIB® Fire Rated Systems and associated GIB® plasterboard linings installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel

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framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified.

Concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Supporting steel structures shall comply with NZS 3404.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

15.3.9.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:
- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.

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- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.
- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

15.3.9.3 Work above Ceilings

Check that all building work, mechanical, plumbing, electrical, fire protection and other services installed above the ceiling are completed and independently supported by the building structure - not by the ceiling system.

15.4 Masons NZ Ltd Enviro AAC Intertenancy Wall System

15.4.1 Scope

15.4.1.1 Scope:

Supply and install Masons NZ Ltd - AAC Intertenancy Wall System, as specified herein, to the locations and details shown on the design drawings, complete with all necessary components and accessories required for proper installation and performance. All aspects of this work shall comply with the NZ Building Code, related Masons NZ Ltd Enviro - AAC Intertenancy Wall System technical literature and publications (check http://mpb.co.nz, or email specify@mpb.co.nz, or call 0800 522 533 for the latest editions), and other relevant product manufacturers' recommendations.

Masons NZ Ltd - Enviro AAC Intertenancy Wall System is PASS (Producer Assurance Supplier Statement) assured to comply with the NZ Building Act 2004 subject to specific conditions and limitations – refer to PASS (Producer Assurance Supplier Statement) 19164.

No substitutions are permitted for Masons NZ Ltd Enviro - AAC Intertenancy Wall System.

For the purpose of this specification, Masons NZ Ltd is referred to as 'Masons NZ", and all associated technical literature and publications, including the Product Technical Statement, installation instructions and drawings, are collectively referred to as the 'technical literature'.

Masons NZ Enviro - AAC Intertenancy Wall System is designed for residential and commercial buildings.

Extent of work:

The following is a list and/or general description of the extent of the Masons NZ Enviro - AAC Intertenancy Wall System, which are more specifically defined in the contract documents, required for the completion of the contract works:

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15.4.2 Requirements

15.4.2.1 Safety:

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

15.4.2.2 Warranty:

Masons NZ Ltd - AAC Intertenancy Wall System Warranty is provided in accordance with the warranty terms and conditions.

- 15-year warranty for Masons NZ Ltd Enviro - AAC Intertenancy Wall System materials and installation.
- Provide all information to the requirements of the Masons NZ Ltd standard warranty .
- Commence the warranty from the proven date of purchase or dispatch from 'Masons NZ'.

Include a copy of the manufacturer's maintenance requirements with the warranty.

15.4.2.3 Substitutions:

The Masons NZ Enviro - AAC Intertenancy Wall System shall be as specified herein and on the design drawings. The substitution of the Masons NZ - Enviro AAC Intertenancy Wall System for an alternative brand, system or product is not permitted under any circumstances.

The substitution of a specified Masons NZ Ltd - AAC Intertenancy Wall System or component for an alternative Masons NZ Ltd Enviro - AAC Intertenancy Wall System or component by the Contractor shall only be permitted with the Contract Administrator's written authorisation to ensure the Masons NZ - Enviro AAC Intertenancy Wall System or component satisfies the design, performance and compliance requirements, and the cost of this shall be borne by the Contractor.

15.4.2.4 Producer statement (PS3)

The Masons NZ Ltd Enviro - AAC Intertenancy Wall System installer shall furnish a fully completed PS3 Producer Statement (Construction) at time of application for Code Compliance Certificate. The Producer Statement shall accurately reflect the scope of the installation of the Wall System in accordance with the consented drawings and specifications.

15.4.2.5 Inspections & reporting:

BCA inspections shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Carry out all necessary pre-installation and installation inspections for each area of the works.

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Complete all necessary Pre-Installation Checklists prior to installation, and all necessary Installation Checklists.

Complete all necessary Final Checklists and Installation Sign-Off Certificates before handing over completed work.

15.4.2.6 Quality assurance:

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of the work are carried out to the highest standard.

15.4.2.7 Defective materials & workmanship:

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected.

Rejected Masons NZ Ltd Enviro - AAC Intertenancy Wall System materials and work shall be repaired and/or replaced to the satisfaction of the Contract Administrator without delay and at no additional cost to the Principal.

15.4.3 Enviro - AAC Intertenancy Wall System:

15.4.3.1 Enviro - AAC Intertenancy Wall System:

Masons NZ Enviro - AAC Intertenancy Wall System is a wall system for use as an acoustic and fire rated intertenancy dividing wall.

The system incorporates plasterboard, framing, mineral wool insulation and Mason's AAC panel manufactured from 50mm thick autoclaved aerated concrete panel.

Masons NZ Enviro - AAC Intertenancy Wall System construction:

Construction	Note
Plasterboard lining	Single layer, screw/adhesive fixed to framing
90mm nominal thickness wall framing	Timber or steel stud frame
75mm thick, R2.0, glasswool insulation (9KG/M3)	Installed within the framing cavity
20mm - 25mm separation gap	Between the frame and 50mm AAC Panel
50mm AAC Panel	Non-load bearing application
20mm - 25mm separation gap	Between the frame and 50mm AAC Panel
90mm nominal thickness wall framing	Timber or steel stud frame
75mm thick, R2.0, glasswool insulation (9KG/M3)	Installed within the framing cavity
Plasterboard Lining	Single layer, screw/adhesive fixed to framing

Location – Primarily internal use.

Wall system – Enviro – AAC wall, refer to construction table
Mass – 650 Kg per cubic metre (ambient density) or 495 Kg per cubic metre (dry density)
Fire rating – -/120/120 (timber stud) or -/90/90 (steel stud)
STC rating – 64 db

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Total wall thickness – 300mm (with maximum air gap & timber studs)
Maximum panel height – 10 Metres

Installed as an internal intertenancy wall system in accordance with the manufacturer's requirements and as shown on the drawings.

Location:

15.4.4 System Components & Accessories

15.4.4.1 Mason's Enviro 50mm AAC panel:

Mason's Enviro 50mm Aerated Concrete panel manufactured from cement, sand , lime and water and aerated by the addition of an expanding agent. Soft blocks are moulded with the mixture and then sliced to the required panel size. Once formed each panel is cured with steam pressurised autoclave for 12 hours.

Panel size: 2200mm x 600mm
Panel width: 50mm
Mass: refer to 'Enviro - AAC Intertenancy wall system' - Case Study May 10th 2024
Fire rating: refer to 'Enviro - AAC intertenancy wall system' - IT Wall Brochure

Location:

15.4.4.2 Mason's Enviro AAC adhesive mortar:

Masons NZ Enviro AAC adhesive mortar manufactured to Mason's technical requirements.

Unit Quantity - 25KG

Location:

15.4.4.3 Mason's Enviro Aluminium Angle:

Mason's 75mm x 50mm x 1.2 BMT Aluminium bracket manufactured to Masons NZ technical requirements.

Location:

15.4.4.4 Mason's 'C' Channel:

Mason's 51mm x 35mm x 0.55 BMT Galvanised steel channel manufactured to Masons NZ technical requirements.

Standard Length - 3048mm

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Location:

15.4.4.5 Mason's Fire Seal Void Filler:

Proprietary 1200mm x 600mm x 50mm Mineral Wool pad manufactured to Masons NZ technical requirements.

Location:

15.4.4.6 Mason's Fire & Acoustic Sealer:

Proprietary Firecryl Acylic sealant manufactured to Masons NZ Ltd's technical requirements.

Colour: White (310ml) , Grey (600ml)

Colour:

Location:

15.4.4.7 Mason's 10g Woodscrew Fasteners:

10g x 35mm long Type 17 wafer head galvanised or stainless steel screws manufactured to Masons NZ technical requirements.

Bag Quantity - 100 units

Location:

15.4.4.8 Mason's 10g Self-drilling Screw Fasteners:

10g x 25mm long self-drilling wafer head galvanised or stainless steel screws manufactured to Masons NZ technical requirements.

Bag Quantity - 100 units

Location:

15.4.5 Co-operation

15.4.5.1 Co-operation:

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades, as required, the assembly and installation of the Masons NZ Ltd Enviro - AAC Intertenancy Wall System to the required layout, details, and tolerances.

15.4.6 Workmanship

15.4.6.1 Workmanship:

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

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Installation of the Masons NZ Ltd Enviro - AAC Intertenancy Wall System shall only be carried out by Installers, familiar with the specified products and their installation techniques, in accordance with the manufacturer's requirements and Technical Literature, and within the warranty requirements.

All installation techniques shall be exactly as recommended by Masons NZ Ltd. All work shall be such as to leave a neat, robust and structurally sound installation, to the required standard and free from damage and defects.

Take all reasonable measures during installation to protect the Masons NZ Ltd Enviro - AAC Intertenancy Wall System components from damage.

Make all necessary provisions to protect adjacent finished work and surfaces from damage during installation.

15.4.7 Delivery & Handling

15.4.7.1 Delivery & handling:

Take delivery of materials and accessories undamaged and in good condition. Reject any item found to be defective or damaged and contact the manufacturer/supplier for replacement.

Store components and accessories undercover in a secure and weatherproof space, off the floor, on a flat and level surface in accordance with the manufacturer's requirements. Ensure stored items are protected from damage and contamination and imposed loads until required for installation.

Do not use damaged or defective materials, or products that are beyond their designated shelf life.

Should a problem be encountered with any Masons NZ Ltd Enviro - AAC Intertenancy Wall System item during use or delivery, immediately contact MMasons NZ Ltd on 0800 522 533. Do not continue to use the item that is not performing to specification or expectation. Keep the item in question and where possible, the packaging and/or manufacturer's details.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage and marking and does not reduce its performance.

Installers shall be familiar with, and comply with, the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear as necessary.

Installers shall conform to all relevant WorkSafe http://www.worksafe.govt.nz NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

15.4.8 Preparation

15.4.8.1 Preparation:

Prior to installation, carry out all necessary inspections of the supporting structure to ensure all preliminary work is complete. Do not commence installation until all necessary preliminary work by others is complete and to the required standard. The commencement of work on each section of the

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installation shall be deemed to indicate full acceptance by the Installer that all preliminary work by other trades is complete and to the required standard.

Supporting structures shall comply with the NZ Building Code, and must be structurally sound and dimensionally stable and in the correct alignment, true to line and level.

Confirm the location of all movement control joints prior to the commencement of the works.

Concrete:

- Supporting reinforced concrete elements shall comply with NZS 3101, or NZS 3604.
- New concrete must have aged for a minimum of 28 days prior to installation.

Concrete Masonry:

- Supporting reinforced concrete masonry elements shall comply with NZS 4229, or NZS 4230 and AS/NZS 1170.

Timber Framing:

- Supporting timber-framed structures shall comply with NZS 3604, or NZS 3603 and AS/NZS 1170.

Structural Steel:

- Supporting steel structures shall comply with NZS 3404.

15.4.9 Installation

15.4.9.1 Installation:

Masons Enviro AAC intertenancy wall to be installed in stack bond pattern and be supported between two lines of framing.

One side of the supporting framing is erected first. Enviro aluminium fire brackets are then placed and fixed to the first framing line to the correct pattern. The Enviro AAC panel will be mortared together and fixed to the framing line using Enviro Aluminium fire brackets and screws. Minimum fixing distances from studs or panel edges must be installed as required in the ‘technical literature’. Brackets are to be off set to ensure clear fixing paths. Once the wall is erected and secured to the first framing line, the second line of framing can be installed. The Masons Enviro AAC intertenancy wall will be secured using Enviro fire brackets and screws to the second line of framing.

Horizontal construction joints must be placed every 6m max. typically in the mid floor area, and vertical construction joints every 8m min - 11m max. Construction joints must be filled with a minimum 10mm x 15 mm bead of ‘Soudal Firecryl’ to each side of the panel over PEF rod or alternatively a strip of Mineral wool placed to ensure correct sealant joint size as required by the ‘technical literature’

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Maximum stud height is 3m and the maximum over all framing wall height is 10m. A 1m cantilever or extension above the 3m stud height is allowed where required.

The system requires double studs – 2/90x 45 mm SG8 timber studs at 2.2 m centres or double - 2/76mm x 0.7BMT steel studs to suit the length of the Enviro AAC panels Intermediate framing between the double studs must be provided to suit the requirements of the gypsum board wall linings.

Plan for constructio, joint placement, and studs which are required at intersections with other building elements when detailing or setting out framing as required by the ‘technical literature’

Earthquake movement, joints, and stair wells adjacent to the Enviro AAC Intertenancy wall may require specific design. Refer to 'Masons NZ' for further technical assistance.

Use only the designated screw fixings and Enviro aluminium fire brackets as supplied by 'Masons NZ'. Observe the correct bracket placement. Use four brackets on each side of the panel fixed at a minimum of 50 mm in from the top or bottom of panel edge. Brackets should be offset by 50 mm from each other on opposing sides of the panel as required by the ‘technical literature’.

Penetrations to the Enviro AAC Intertenancy Wall are not allowed.

Small diameter services may be run in the 20 mm air gap between the Enviro AAC panel and the framing. Services MUST NOT touch Enviro fire brackets or bridge the Enviro AAC Panel and framing as this will degrade acoustic separation.Fix small diameter services such as conduits or water pipe with suitable fixings to the framing avoiding brackets. All Services must be installed to the requirements of the ‘technical literature’

Where voids occur when Enviro Intertenancy Wall terminate against roof cladding or at the exterior framing – cladding line, or at intersection with other building elements use non-combustible mineral wool compressed a minimum of 10 % to fill any voids to provide a fire seal as required by the ‘technical literature’.

15.4.10 Completion

15.4.10.1 Completion:

Check the Masons NZ Enviro - AAC Intertenancy Wall System has been correctly installed in accordance with the manufacturer's requirements to the locations, layout and details shown on the design drawings.

Check the installation for damage and defects. Carry out any necessary repairs in accordance with Masons NZ requirements to the required standard. Replace Masons NZ Enviro - AAC Intertenancy Wall System elements where repair is not possible or will not be accepted.

Leave all of this work complete, clean and free from damage and defects, and to the required standard in accordance with the manufacturer's instructions.

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Leave surrounding surfaces clean and free of rubbish and debris. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the manufacturer's maintenance requirements (if any) and a copy of the Masons NZ Warranty.