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Threefold Architecture Ltd.

PROJECT SPECIFICATION

Lot 23 Northlake

Stonehenge Road
Northlake
Wanaka

Issued for Consent

25106

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PROJECT OVERVIEW

Scope

New 3 bedroom, single story home with attached garage. Construction consistes of raft slab, and timber framing, clad with cedar vertical shiplap and kahu.

Address

Site Address	Stonehenge Road
Suburb	Northlake
City	Wanaka
Lot #	23
DP #	TBC

Site Conditions

Wind Zone	VH - Very High Wind Speed
Earthquake Zone	Zone 3
Exposure Zone	Zone B - Low
Snow Loading Zone	Zone N5

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TABLE OF CONTENTS

Preliminaries & General 4
Project Overview - NBC General 4
Establishment & Enabling 7
Siteworks 11
Siteworks 11
Concrete 15
Allied Concrete SuperSlab/Superslab+ Floor System 15
Waterproofing 25
ARDEX Liquid-Applied Waterproofing Membranes 25
Carpentry 30
Workmanship & Materials 31
Timber Framing 36
GIB® Plasterboard Linings 39
Thermakraft Underlay, DPM, DPC & Tapes 47
IBS RigidRAP® 51
Rosenfeld Kidson & Co Cedarscreen Weatherboard Systems 57
Roofing 62
Metalcraft Longrun Roofing 62
Metalcraft Rainwater & Fascia Systems 66
Metalcraft Roofing Wall Cladding 69
Window & Door Joinery 72
APL Residential Aluminium Windows & Doors 72
Insulation 79
Pink Batts Insulation 79
Painting & Decorating 84
General 84
Floor Coverings 86
Carpet & Resilient Floor Coverings 86
Overlay Flooring 88
Tiling 90
Drainlaying 101
Foul Water Drainage 101
Groundwater Drainage 108
Stormwater Drainage 112
Electrical 119
Interconnected Smoke Alarms 119
Workmanship 120
Materials & Control 121
Systems 121
Appendix 122
Branz Appraisal No. 964 122
Codemark Certificate Rev K 122
Super Slab Technical Manual Rev K 122
Super Slab Brochure 122
BRANZ Appraisal No.238 - Pink® Batts® Insulation 122
BRANZ Appraisal No.767 - Pink® Batts® Skillion Roof Insulation 122
CodeMark Product Certificate - Thermakraft Covertek 407 Synthetic Roof and Wall Underlay 122
BRANZ Appraisal No.651 - Thermakraft Covertek 407 Roof and Wall Underlay 122
Covertek 407 Data Sheet 122
Covertek 407 Install Guide 122
Thermathene Black Install Guide 122
Thermathene Black Data Sheet 122
BRANZ Appraisal No.329 - Supercourse 500 Damp-Proof Course & Concealed Flashing 122
Supercourse 500 DPC Data Sheet 122
Supercourse 500 DPC Install Guide 122
Thermakraft White General Purpose Tape Data Sheet and Install Guide 122
Thermakraft Product Warranty Statement 122
Cedarscreen 20mm Vertical Installation Details - Rigid Underlay 122
Cedarscreen 20mm Vertical v5 Oct 2020 122
RK Certificate CM70083 Cedarscreen 20mm Cavity Batten 122
BRANZ Appraisal No.472 - ARDEX Undertile Internal Liquid Membranes 122
BRANZ Appraisal No.928 - GIB EzyBrace Systems 122
BRANZ Appraisal No.427 (2021) - GIB Aqualine Wet Area Systems 122
CodeMark Certificate of Conformity - IBS RigidRAP 122

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1 PRELIMINARIES & GENERAL

1.1 Project Overview - NBC General

1.1.1 Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the NBC (National Building 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. (The National Building Contract will be emailed upon request).

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 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

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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.

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.

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.
The Contractor is to 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.

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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.

1.1.12 Work Shown and Mentioned

1.1.12.1 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

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 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.

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1.1.15 Progress Claims

Progress Claims shall be in writing, shall be in accordance with the requirements of the Construction Contracts Act 2002, and shall include all of the following:
- The overall amount claimed.
- The percentage completion and amount claimed for each Subcontractor. For accurate claim verification please ensure that this breakdown exactly matches the trades costs breakdown agreed-to pre-contract.
- The total Contract Sum Adjustment for any/all Variations authorised prior to the claim.
- Items covered by Monetary Allowances listed separately.
- And, if specifically requested, confirmation that amounts previously claimed on behalf of Subcontractors, certified by the Architect/Designer, and paid by the Principal, have actually been paid to the Subcontractor (apart from normal retentions).

Note that retentions will be held exactly in accordance with the Conditions of Contract.

1.1.16 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).

1.2 Establishment & Enabling

1.2.1 Site Establishment

1.2.1.1 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, in particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry'.

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

1.2.1.2 Site Inspection Assessment

The Contractor (and sub-contractors where appropriate) shall be deemed to have examined and inspected, prior to tender, the site and its surroundings, and to have satisfied themselves as regards to access to the site, the form and nature of the site, all existing services, structures and features on the site, the risk of injury or damage to property, and the nature and extent of the work and materials and methodologies necessary for the execution of the works.

1.2.1.3 Site Boundaries

Establish the accurate location of property boundaries prior to setting out the works.

1.2.1.4 Regulatory Authorities

Comply with all statutory obligations and regulations required by the Regulatory Authority controlling the execution of the works.

The work shall be carried out in strict compliance with the relevant consents and approvals issued by the controlling Territorial Authority (TA). No work shall be undertaken until all necessary consents and approvals have been obtained.

Accept responsibility for notifying the Territorial Authority and arranging for any inspections and testing and commissioning procedures required by them at various stages of construction.

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1.2.1.5 Network Utility Operators

The work shall also be carried out in accordance with all network utility operators having jurisdiction over utilities in or around the site.

Notify the network utility operators of the proposed works, and ascertain and become familiar with any particular requirements and the location of existing services prior to commencing site operations.

Attend on network utility operators as necessary to obtain approvals (in addition to Building Consent approval) for the satisfactory completion of the works.

Accept responsibility for notifying network utility operators and arranging for any inspections and testing and commissioning procedures required by them at various stages of construction.

1.2.1.6 Permitted Work Zone

Confine construction operations within the site boundaries and within the permitted work zone identified on the drawings.

1.2.1.7 Temporary Buildings & Site Amenities

As necessary, make arrangements for the provision of all site services and amenities and facilities required for the works and site staff, including storage sheds, offices, lunch rooms, sanitary facilities and other temporary buildings and facilities required for storage and the management of the works.

These temporary services and amenities shall be for the use of site staff while on site, and as required by the relevant Regulations and Acts, and shall be located in a position within the site boundaries - refer to the Site/Enabling drawings for designated area(s).

Rubbish and contained wastewater from site amenities and facilities shall be removed from the site as appropriate and at least on a weekly frequency.

1.2.1.8 Hoardings, Gantries, Lighting

Provide temporary fencing, hoardings, planked footways, guard rails, gantries and lighting as necessary to protect the public and others, for the proper execution of the works and to meet the requirements of the Regulatory Authority and relevant Regulations and Acts.

1.2.1.9 Project Sign Board

Obtain approval for and provide and erect for public display, a timber-framed printed Project Sign Board measuring ---mm wide x ---mm high.
The project sign board shall include images and graphics to the Architect's/Designer's design, and display the following:
- the Project name; and
- the Principal's name; and
- the Project Consultants' names; and
- the Main Contractor’s name; and
- if requested by the Contractor, the names of their Sub-Contractors.

1.2.1.10 Setting Out

Accept responsibility for the correct and accurate setting out of the works to conform to the drawings, and that specified locations, orientations, depths and levels are strictly adhered to.

As necessary, locate and verify survey marks and datum points and maintain their accurate position.

Establish reference points, datums, profiles or similar clear of excavations and to allow for easy and accurate checking at all stages of construction. Ensure these are not damaged or dislodged during construction operations.

Where required, employ a licensed cadastral surveyor to establish and set out the positions of the foundations, grid lines and floor levels.

Where required, issue to the Building Consenting Authority a copy of the surveyor's certificate (Pegging Certificate or Building Location Certificate) in accordance with the conditions of the Building Consent.

1.2.2 Temporary Works & Services

1.2.2.1 General

Make provision for all temporary works and services required for the satisfactory completion of the contract works.

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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.

1.2.2.2 Site Water

Make all necessary arrangements for the provision and reticulation of clean, fresh potable water required for site amenities and for the construction works.

1.2.2.3 Site Electricity

Make all necessary arrangements for the availability and connection of temporary electrical power required for operating site facilities and amenities, health and safety and security requirements, and plant operation and general construction use in strict accordance with electrical regulations.

Comply with the network utility operators requirements, and be responsible for maintaining and servicing temporary electrical distribution plant and equipment as necessary.

1.2.2.4 Site Perimeter Fencing

Provide and maintain all necessary fencing at the perimeter of the site in accordance with NZBC F5/AS1, prior to commencing the works, in order to prevent unauthorised entry by the public onto the site.

Site fences adjacent to public spaces shall:
- extend at least 2.0m from ground level on the side accessible to the public; and
- have a maximum 100mm gap between bottom of the fence and ground; and
- be constructed of galvanised chainlink netting with maximum 50 x 50mm grid size; and
- have posts spaced apart at maximum 2.5m.

1.2.2.5 Site Cleaning & Waste Management

Accept responsibility for and make all necessary provisions for periodic site cleaning, and for the management and disposal of all construction waste material, recyclable waste, and materials requiring special disposal during the contract period.

The Contractor and their subcontractors shall:
- conform to applicable regulations for disposal and removal of common and hazardous waste; and
- handle and dispose of all hazardous and banned materials in accordance with national and local regulations - such materials include, but are not limited to asbestos, underground storage tanks, polychlorinated biphenyls (PCBs), abandoned chemicals (petrol, pesticides, herbicides, flammable and combustible substances), freon from cooling equipment, lead-based paints, smoke detectors and mercury-containing switches; and
- pay all associated disposal fees.

If a project-specific waste management plan is to be implemented and deployed, ensure that all site personnel, including management and staff, subcontractors and material suppliers, are fully aware of the specific procedures and requirements and have access to or copies of the waste management plan.

The disposal of rubbish and construction waste materials by burning on the site is NOT permitted under any circumstances.

1.2.2.6 Site Security

Accept responsibility for the security of the site, the works, plant and materials during and after working hours, over the period of the contract, and:
- take all reasonable precautions and make provision for the general security of the site, including unauthorised access to the site, to the works and to adjoining properties; and
- safeguard the site, the works, plant and materials from damage and theft.

1.2.2.7 Dust & Noise Control

Take measures to minimise nuisance from dust, noise and other causes affecting adjoining properties and the public.

Dust:
- The effects of dust shall be appropriately managed within the boundary of the site.
- Comply with the conditions of the Resource Consent/Building Consent related to dust control.

Noise:
- Permitted construction noise levels shall be less than the maximum limits required by the Territorial Authority and NZS 6803.
- Comply with the conditions of the Resource Consent/Building Consent related to noise control.
- As required, prepare a site-specific Construction Noise Management Plan.

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1.2.2.8 Stormwater & Sediment Control

Carry out excavation and 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. If at any time the performance of the stormwater and sediment control works, or ongoing review of them, indicates that they need to be extended or modified, the design modification and construction shall be undertaken at no extra cost to the Principal.

1.2.2.9 Concrete & Cement Wash-Water Control

Carry out construction works and operations to ensure that they fully comply with the relevant controlling environmental authority's requirements for concrete and cement wash water control.

Provide suitable protective measures necessary to prevent the runoff of concrete/cement wash-water or slurry from entering drains and waterways, and contaminating existing paved or landscaped areas and adjoining properties (public or private). Such measures shall be maintained and remain in place as necessary for the duration of the works.

1.2.3 Protection of Existing Features

1.2.3.1 Survey Marks

Preserve and maintain in their true position all survey marks other than marks which are required to be covered or removed by the contract works. Accept responsibility to reinstate/replace any survey mark that is disturbed or obliterated by the works.

1.2.3.2 Adjacent Sites

Take all necessary care to prevent damage to adjoining public and private property, such as existing buildings, existing roads, footpaths, fences, site services, trees, landscaping site features, until completion of the works. Any adjoining public or private property damaged by the Contractor’s construction activities, or failure to protect these, shall be reinstated/made good to the required standard.

Accept responsibility for keeping all public thoroughfares clear and free of debris and contamination from the contract works.

1.2.4 Traffic Control, Crossings & Plant

1.2.4.1 Protect Existing Vehicle Crossing

Provide protection to existing vehicle crossings designated for use by construction traffic for the duration of the contract.

Comply with Regulatory Authority requirements for the installation of any temporary protection required for the crossing. Ensure the temporary protection is capable of supporting the heaviest loads to be delivered to the site.

Maintain the crossing to the required standard until it is no longer required for construction traffic. Carry out any required remedial/replacement work to the crossing, as a result of damage caused by the works during the contract period, in accordance with the requirements of the Regulatory Authority.

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2 SITEWORKS

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, in particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry'.

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.

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 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;

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- 3 blows per 100mm at depths greater than twice the footing width.
Depths shall be measured from the underside of the proposed footing.

2.3.2.5 Geotechnical Report

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

2.3.2.6 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.

2.3.2.7 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, 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 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.

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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.

Excavations shall be undertaken in accordance with the 'Excavation Safety - Good Practice Guidelines'.

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 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.

2.3.4.4 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.

2.3.4.5 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.

2.3.4.6 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.

2.3.4.7 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.

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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.

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 Hardfill & Blinding

2.3.5.1 Material

Hardfill material shall be good quality low fines crushed aggregate metal of approved origin, well graded and free of deleterious and organic material, and able to be compacted to a dense uniform layer. Hardfill material with obvious clumps of plastic content will not be accepted.
Except where specified otherwise, the maximum aggregate size shall not exceed 65mm and shall conform to the following:

Test Sieve Aperture	% Passing by Mass
63mm	100%
19mm	30-70%
4.75mm	10-40%
75 micron	10% maximum

2.3.5.2 NZS 3604 Granular Base to Underside of Slab-on-Grade

Granular hardfill base used as a capillary break to the underside of concrete slabs on grade shall consist of granular fill material conforming to NZS 3604: Section 7.5.3, and be systematically placed and compacted in horizontal layers no thicker than 150mm over the entire area beneath the proposed ground slab. Each layer shall be placed and compacted as a separate operation to subsequent layers.

The total thickness of the granular base shall be as indicated on the drawings, and no less than 75mm and no more than 600mm unless specified otherwise.

Compact each layer until the material is tightly bound together and does not visibly deform under the weight of a pressed adult heel. Compaction shall only be carried out with approved, special-purpose compaction equipment appropriate for the application. Compaction equipment shall follow systematic patterns of travel, and make sufficient passes to ensure that the required compaction has been uniformly obtained everywhere for each layer. Care should be taken not to overwork the subgrade or to cause weaving during hardfill compaction.

Blind the basecourse with a uniform layer of clean sand between 5mm and 25mm thick over all areas where a damp-proof membrane (DPM) is to be overlaid. Ensure the sand blinding layer is sufficiently compacted and smoothed before laying the DPM. Do not leave sand blinding exposed to the elements any longer than necessary, and install the DPM immediately or as soon as possible.

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3 CONCRETE

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:

3101.1&2:2006(NZS)	Concrete Structures Standard
3104:2003(NZS)	Specification for concrete production
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
3112.2:1986(NZS)	Methods of test for concrete - Tests relating to the determination of strength of concrete
3114:1987(NZS)	Specification for concrete surface finishes
3121:2015(NZS)	Water and aggregate for concrete
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
3604:2011(NZS)	Timber-framed buildings

3.3 Allied Concrete SuperSlab/Superslab+ Floor System

3.3.1 Scope

3.3.1.1 Scope:

Supply and construct Allied Concrete Superslab/Superslab+ Floor System, as specified herein and to the locations, layout, and details shown on the design drawings, complete with all necessary materials, components, and accessories required for proper construction and performance. All aspects of this work shall be in accordance with the current Allied SuperSlab/SuperSlab+ Technical Manual (check alliedconcrete.co.nz, or call 0800 425 5433 for the latest edition) and BRANZ Appraisal No. 964, other relevant manufacturers' recommendations, and as shown on the design drawings.

The Allied Concrete Superslab/Superslab+ Floor System is CodeMark assured to meet certain provisions of the New Zealand Building Code - refer to CodeMark Certificate of Conformity No.GM-CM30086-Rev K, issued by Global-Mark Pty Ltd. This specification is limited to the scope of conditions and limitations defined by the CodeMark Certificate of Conformity, and does not cover specific engineering design (SED) requirements.

No substitutions are permitted for Allied Concrete Superslab/Superslab+ Floor System.

For the purpose of this specification, Allied Concrete Superslab/Superslab+ Floor System shall be referred to as 'Allied Superslab' or 'Allied Superslab+' and the Allied Concrete Superslab/Superslab+ Technical Manual referred to as the 'technical literature'.
This specification should be read in conjunction with other relevant sections of the specification, in particular Siteworks and the relevant services - i.e., Drainlaying, Plumbing, Electrical, etc.

3.3.1.2 Limitations of Scope:

The Allied Concrete Superslab/Superslab+ Floor System is suitable for use as waffle pod, reinforced concrete, slab-on-ground floors for buildings within the following scope:

- Timber framed buildings, up to two storeys high, within the scope of NZS 3604:2011
- Steel framed buildings, up to two storeys high, within the scope of NASH standard Part Two: 2019 Light steel framed buildings
- with a maximum height of 10m measured from the ground to the apex; and
- supported on "good ground" as defined by NZBC B1 Structure; and minimum ground bearing capacity as detailed in Table 1 of the 'technical literature', for building types B, C & D supported on ground with reduced ultimate bearing capacity of min.200 KPA with all other requirements of 'good ground' and for buildings type A supported on ground with reduced ultimate bearing capacity of min.150 KPA with all other requirements of 'good ground'.
- with a maximum floor length of 30 metres unless detailed with free joints in accordance with the 'technical literature requirements.

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- situated in NZS 3604 Wind Zones up to and including 'Extra High'.
- seismic areas, seismic hazard factor Z is equal to less than 0.45 (Zone 3)

Allied Concrete Superslab/Superslab+ Floor System is not suitable for soils that are expansive or prone to liquefaction or differential settlement.

If any aspects of the building or site fall outside the scope of the Allied Concrete Superslab/Superslab+ Technical Manual, then Specific Engineering Design (SED) is required. Contact Allied Concrete's slab design service, DesignHub, for a quote for an SED or design clarification.

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:

The substitution of the Allied Concrete Superslab/Superslab+ Floor System for an alternative waffle pod, reinforced concrete, slab-on-ground floor system is not permitted under any circumstances.

The substitution by the Contractor of any Allied Concrete Superslab/Superslab+ materials, components or accessories specified herein or on the design drawings 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 any alternative materials, components or accessories to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

3.3.2.3 Ground Conditions:

The Contractor shall be deemed to have examined the site, and considered and interpreted the nature of the ground on which the Allied Concrete Superslab/Superslab+ Floor System is to be constructed.

Any factual or interpretative information of the nature of the ground contained within the contract documents may not present a complete or accurate picture of the whole of the site. Such information is provided to the Contractor in good faith and the owner takes no responsibility for its accuracy.

The Contractor is responsible for drawing their own conclusions and interpretations as to the nature of the ground, and from any information contained in the contract documents.

3.3.2.4 Geotechnical Report:

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

3.3.2.5 Inspections & Records:

All stages of the Allied Concrete Superslab/Superslab+ construction shall be reviewed in accordance with the requirements of NZS 3109: Section 1.3, and the conditions of the Building Consent.

All inspections shall be properly documented by the Contractor. Provide all necessary quality control checklists prior to pouring and in sufficient time for pre-pour inspection.

Give notice and provide reasonable opportunity to inspect the section of work prior to pouring. Give at least 1 working day's notice of intent to place concrete in any area.

Any instructions issued shall be carried out before concrete placing commences. Unless approval is given by the Contract Administrator and/or BCA, no concrete shall be placed in that section of work. Any concrete placed without authorisation may require removal from the works at the Contractor's expense.

3.3.2.6 Tolerances:

Except where specified otherwise herein or on the design drawings, dimensional tolerances of the Allied Concrete Superslab/Superslab+ shall conform to NZS 3109 Table 5.2 - 'Tolerance for insitu construction', and to NZS 3114 for off-the-form and unformed surface tolerances.

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To ensure that elements such as external cladding, aluminium joinery, structural glazing, etc., will properly fit the building, the Contractor shall maintain accurate control of the overall set-out and construction of the Allied Concrete Superslab/Superslab+ Floor System.

3.3.2.7 Quality Assurance:

Ensure that the construction of the Allied Concrete Superslab/Superslab+ Floor System complies in all respects with the design drawings and the specifications.

Prepare and submit to the Contract Administrator details of the quality assurance procedures for concrete work for approval.
The quality assurance procedures shall encompass all aspects of the Allied SuperSlab construction, including, but not limited to:

- concrete quality; and
- formwork quality; and
- construction tolerances; and
- reinforcing steel placement; and
- cast-in items; and
- concrete finishes.

Notify the name of the representative to be responsible for the quality control of the associated concrete work. The nominated representative shall complete and sign a written quality control checklist for each on-site concrete pour. A copy of each completed checklist shall be submitted to the Contract Administrator before pouring commences, and in sufficient time for pre-pour inspections to be carried out. The format and detail of the checklist shall be agreed to prior to the commencement of any concrete work.

3.3.2.8 Control Joints:

Control joints in the Allied Concrete Superslab shall be to the locations and details shown on the design drawings.

Control Joints:

Control joints in the Allied Concrete Superslab/Superslab+ Floor System shall be to the locations and details shown on the design drawings.

Free Joints:

Free joints (not tied) shall be formed in the lab as shown on the drawings only. Free joints shall not be repositioned or eliminated from the positions shown on the drawings without prior approval. Where a free joint is not specified or shown on the drawings, the location and detail of the joint must be approved before work commences.

Isolation Joints:

Isolation joints shall be formed in the slab as shown on the approved drawings only. Isolation joints shall be formed against abutting structures and features that project through, into, or against the concrete, in such a manner as to form a complete separation between the concrete and isolated element, allowing the elements to behave independently of each other. Where an isolation joint is not specified or shown on the drawings, the location and detail of the joint shall be approved before work commences.

3.3.2.9 Underslab Insulation:

Underslab Insulation - as a component of the Allied Concrete Superslab/Superslab+ Floor System - refers to separate specification Insulation.

Supply and install the specified underslab insulation into the construction of the Allied Superslab according to the layout and details shown on the design drawings.

Install underslab insulation over the damp proof membrane (before installing polystyrene pods), with the panels staggered in a stretcher bond pattern, and all panel edges tightly joined without gaps and sealed with a compatible self-adhesive pressure-sensitive tape.

3.3.3 Allied Concrete Superslab Floor System

3.3.3.1 Allied Concrete Superslab Floor System:

The Allied Concrete SuperSlab Floor System is a waffle pod, reinforced concrete, slab-on-ground floor system.

The ground immediately beneath the slab must have a minimum geotechnical ultimate bearing strength of 300 kPa. Where the ground ultimate bearing capacity is less than 300 kPa, specific design engineering (SED) is required.

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The standard Allied Concrete SuperSlab Floor System design (CodeMark conforming) consists of an 85mm thick slab supported by a grid of 100mm wide ribs at 1200 x 1200mm centres. The overall standard depth is 305mm.

Where in-slab heating coils less than Ø25mm are embedded in the slab topping, the concrete topping shall be 110mm thick, and the overall thickness shall be 330mm.

Polystyrene infill panel (pod) options available are 1100mm square x 200mm thick. The pods are arranged such as to form the reinforced waffle slab with a grid of reinforced concrete ribs and perimeter beams.

Perimeter footings are 300mm wide x 305mm high, and reinforced with HD12 Grade 500E steel reinforcing bars top and bottom, and HD12 500E hockey stick-shaped slab-topping tie bars.

Internal ribs are 100mm wide, and reinforced with a single HD12 Grade 500E steel reinforcing bar - refer to Steel Reinforcement clause.
Slab topping reinforcement used is SE62 Ductile Mesh Grade 500E - refer to Steel Reinforcement clause.
Perimeter footings are 300mm wide x 305mm high, and reinforced with HD12 Grade 500E steel reinforcing bars top and bottom, and HD12 500E hockey stick shaped slab-topping tie bars.

Internal ribs are 100mm wide, and reinforced with a single HD12 Grade 500E steel reinforcing bar - refer to Steel Reinforcement clause.

Slab topping reinforcement used is SE62 Ductile Mesh Grade 500E - refer to Steel Reinforcement clause.

3.3.4 Ground Classification

3.3.4.1 Good Ground:

The Allied Concrete Superslab/Superslab+ Floor System shall be constructed on ‘Good Ground’ as determined by NZBC B1 Structure.

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 are 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.

3.3.5 Concrete Mix

Allied Concrete Mix 202CSS - 20MPa. Manufactured in accordance with NZS 3104 from a plant audited by the New Zealand Ready Mixed Concrete Association (NZRMCA) Plant Audit Scheme.

Allied Concrete Mix 202CSS is suitable for Allied SuperSlab’s situated beyond sea spray and corrosive environments.

3.3.6 Polystyrene Pods

Allied Concrete SuperSlab Polystyrene Pods - 1100 x 1100 x 220mm thick. Polystyrene pods shall be installed in accordance with the SuperSlab Technical Manual, directly over the damp proof membrane (DPM), to the required layout and spacings shown on the design drawings, within the perimeter formwork, and with the use of Allied SuperSlab proprietary spacers. Where underslab insulation is specified, the polystyrene pods shall be laid directly over the underslab insulation.

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Typical Spacings - unless specified otherwise on the design drawings:

- Between Pods for Internal Ribs: 100mm.
- Off Perimeter Formwork: 300mm using Allied SuperSlab.
- Off Superslab Warm Edge Insulation (when specified): 300mm.
- Internal Slab Thickenings (when used): 300mm.
- Free Joint (when used): 600mm.

3.3.7 Steel Reinforcement

Steel Mesh:

- SE62 Ductile Mesh (or minimum 2.29kg/m²) Grade 500E welded steel mesh, complying with AS/NZS 4671 and subject to the requirements of NZBC B1/VM1 Paragraph 14.0.
- Machine-welded wire mesh; 500 MPa minimum yield strength; 6.1mm wire diameter; 200 x 200mm wire centres.
- Installed as slab topping reinforcement in accordance with the 'technical literature' and as shown on the design drawings.

Steel Bar:

- Grade 500E to AS/NZS 4671.
- Except where otherwise specified on the design drawings, reinforcing bars shall be HD12.
- Grade 500E reinforcing bar shall be manufactured by Pacific Steel micro-alloy process.
- Alternative manufacturers of Grade 500E reinforcing will only be approved if written evidence is provided, including test certificates, verifying the product.
- Installed as main reinforcement for ribs and edge beams, and sundry bars (hockey stick, tie, corner, etc); all in accordance with the 'technical literature' and as shown on the design drawings.

General Requirements:

- Mill certificates must be provided to the Contract Administrator for all reinforcing steel used.
- All bundles of reinforcing steel supplied to the job shall be clearly marked with numbers relating to the Bending Schedule and related design drawing.
- Ensure that all reinforcing is adequately supported off the ground while stored on-site. Use suitable protective gloves when handling reinforcing steel.
- Reinforcing bars shall be cut, bent, placed, and fixed by suitably trained and experienced personnel, and in accordance with NZS 3109.
- Ensure that all preparatory works and formwork have been completed to the specified requirements prior to placing reinforcing.
- Steel reinforcement shall be installed to the locations and spacings shown on the design drawings, and supported with the use of proprietary bar chairs and spacers to ensure correct placement and cover is achieved.
- All reinforcing bar laps shall be a minimum of 50 x the bar diameter.
- Where Ductile 500E mesh is lapped, the lap length between outer cross bars shall be to the manufacturer's requirements.
- Minimum concrete cover to reinforcement shall be as specified on the design drawings or otherwise as specified in NZS 3109 - the design drawings shall take precedence over those specified in NZS 3109.
- The ends of wire ties shall be turned away from the concrete face to maintain cover.
- Do not tie wire ties to formwork.

3.3.8 Damp Proof Membrane

Damp Proof Membrane (DPM) - 250µm. A 250 micron thick, tear-resistant, polyethylene (polythene) film sheet damp-proof membrane. Installed over a 10-20mm thick sand blinding layer, in accordance with 'technical literature' and as shown on the design drawings.

All joints lapped a minimum of 150mm and continuously sealed with a minimum 50mm wide pressure-sensitive PVC tape. Tape-seal around penetrating pipes and sleeves.

Take all reasonable measures to protect the DPM from damage during construction. Inspect immediately before pouring concrete and repair any perforations or other damage.

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Do not leave the DPM exposed for more than the maximum period recommended by the manufacturer.

3.3.9 Formwork

Formwork shall conform to NZS 3109:Section 5, and comply with the provisions of NZS 3114 according to the specified off-the-form-finish classification.

Formwork shall have sufficient strength to retain and support the wet concrete being placed to the required profiles and tolerances. The formwork surface finish shall be of a suitable quality necessary to produce the specified concrete finish. Any formwork with a deteriorated or damaged surface that does not meet the requirements of the surface finish shall not be used.

Fair-faced concrete formwork shall be constructed so as to provide straight and true angles, and so as to produce cast surfaces within a maximum tolerance of 5mm of the given dimensions, and without visible offsets, bulges, or misalignment of the concrete. Form neat, clean, arrised edges, except where chamfers are indicated on the drawings or required to match existing detail.

Plywood formwork shall be constructed from Formply plywood sheets or C-grade faced standard plywood sheets (according to concrete finish), placed in a regular pattern and tightly butted together to avoid grout loss. The joints shall be sealed to prevent grout loss. Plywood formwork shall not be permitted to stain visually exposed concrete.

The formwork face shall be adequately clean and treated with a general-purpose concrete form release agent in accordance with the manufacturer's requirements. Diesel oil-based products are not permitted. Care shall be taken to ensure that the release agent is kept out of contact with the reinforcement and is compatible with any subsequent paint or finish system applied to the finished concrete.

Erected formwork shall be set and checked for dimensional accuracy and alignment before, during, and after concreting, and any damaged formwork replaced. All debris shall be removed from the formwork immediately before concrete is placed.

Formwork shall be removed without shock or vibration and in such a manner as to prevent damage. Do not permit bars or other tools to lever against the set concrete when removing formwork. Any damage to the concrete occurring during removal shall be repaired to the required standard by an approved method at the Contractor's expense.

3.3.10 Concrete Finishes

3.3.10.1 General:

Unless specified otherwise herein or on the drawings, concrete finishes shall comply with the provisions of NZS 3114 applicable to the surface finish class specified.

Surface finishes not specified in this specification or on the design drawings shall be in accordance with Table 1 or Table 2 of NZS 3114, as appropriate for location and use.

Arrange the pouring to allow adequate time for floating and finishing to the specified finish class.

Floating and any subsequent finishing shall be at the correct time to obtain the quality of compaction and finish required. No finishing work shall be carried out on any area where there is free surface water. The application of dry cement or sand to absorb free water is not permitted.

All trowelling ridges shall be removed while soft, or by subsequent light grinding where appropriate. Slabs not fulfilling the standard of finish required shall be ground smooth or otherwise treated to the satisfaction of the Contract Administrator.

3.3.10.2 Schedule of Concrete Finishes:

Allied Concrete SuperSlab Schedule of Concrete Finishes:

- Slab Surface: U3 Class Finish.
- Unformed Surfaces to take Plaster or Tiles: U2 Class Finish.
- Off-the-Form Surfaces to take Plaster or Tiles: F2 Class Finish.
- Off-the-Form Surfaces Exposed (inside or outside the finished building): F5 Class Finish.

3.3.11 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 installation of all cast-in items and piped and cabled services, including drains, conduits, in-slab heating system cables, etc., associated with the construction of the Allied Concrete SuperSlab/Superslab+ Floor System.

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3.3.12 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 Allied Concrete SuperSlab/Superslab+ Floor System work, including sand blinding, DPM laying, formwork erection, reinforcing placement, and concrete placing and finishing techniques, shall be carried out by experienced and competent tradespersons, familiar with the specified products and construction techniques, under the direct supervision of a LBP, to fully comply with all warranty requirements, in accordance with the 'technical literature' and NZS 3109 and NZS 3114.

All work shall be such as to leave a neat, efficient, robust, and structurally sound installation to the required standard.

3.3.13 Delivery & Handling

Take delivery of materials undamaged. Reject any item found to be defective or damaged, and contact the supplier for replacement.

Store Allied Concrete SuperSlab polystyrene pods, reinforcing steel, and system accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the manufacturer. Keep stored materials and accessories dry and protected from damage and distortion, and contamination at all times.

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

Should a problem be encountered with any Allied Concrete SuperSlab/Superslab+ material or product, immediately contact the supplier. Do not continue to use the material or 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 details.

Handle materials in accordance with the manufacturer's requirements and in such a manner that prevents damage or impedes the material's 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 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.
https://app.smartspec.co.nz/manufacturer/SpecTest/AddNewOptionIssue?optionId=70750&specId=1009

3.3.14 Preparation

3.3.14.1 Piped & Cabled Services:

Except where shown otherwise on the design drawings, piped and cabled services shall be run in ground beneath the Allied Concrete SuperSlab/Superslab+ Floor System and returned vertically up through the slab at the required exit/entry points shown on the design drawings.

All associated services installations, trenching, bedding, backfilling, ducting and sleeving, etc., shall be as specified for the applicable service (Drainlaying, Plumbing, Electrical, etc.), and must comply with the requirements of the New Zealand Building Code and the conditions of the Building Consent.

Piped and cabled services components shall be located in the Allied Concrete SuperSlab/Superslab+ Floor System as shown on the design drawings, and shall not deviate from these.

IMPORTANT: Pipes and services are not permitted to run along or within ribs and footings, or penetrate up through ribs and footings without special detailing. Pipes are permitted to cross perpendicular through a rib or footing if they are located in the middle third depth of the waffle slab and are 50mm in diameter or less.

3.3.14.2 Granular Basecourse to NZS 3604:

Granular hardfill basecourse to the underside of the Allied SuperSlab shall consist of granular fill material, conforming to NZS 3604: Section 7.5.3, and shall be systematically placed and compacted in horizontal layers no thicker than 150mm over the area beneath the slab and extending a minimum 1.0m beyond the slab perimeter. Each layer shall be placed and compacted as a separate operation prior to subsequent layers.

The total thickness of the granular base shall be in relation to the finished slab level indicated on the design drawings, and no less than 75mm and no more than 600mm.

Compact each layer until the material is tightly bound together and does not visibly deform under the weight of a pressed adult heel.

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Compaction shall only be carried out with approved, special-purpose compaction equipment appropriate for the application. Compaction equipment shall follow systematic patterns of travel and make sufficient passes to ensure that the required compaction has been uniformly obtained everywhere for each layer. Care should be taken not to overwork the subgrade or to cause weaving.

3.3.14.3 Sand Blinding:

Blind the finished basecourse or subgrade with a blinding layer of clean sand, 10mm minimum - 20mm maximum thickness, over the slab area and extending 1.0m beyond the slab perimeter. Ensure the sand blinding layer is finished true to level and straight-edge, without deviation. Do not leave sand blinding exposed to the elements any longer than necessary, and install the DPM immediately or as soon as practicable.

3.3.15 Installation of Components

3.3.15.1 Damp Proof Membrane:

Lay the specified damp proof membrane (DPM) over the entire platform and extending at least 200mm beyond the slab perimeter, with joints lapped minimum 150mm and tape-sealed, and any services penetrations tape-sealed. Tape repair any damaged DPM as soon as it occurs - check the DPM for damage during all stages and repair as necessary.

3.3.15.2 Formwork:

Erect perimeter formwork to straight and true to lines, and to the slab dimensions, levels, and details shown on the design drawings. Form all edge rebates, set-downs, block-outs, and sloping falls as dimensioned and detailed.

Where SuperSlab+ is specified, the SuperSlab+ system can act as perimeter formwork in accordance with the 'technical literature'. Make all necessary dimensional allowances for SuperSlab+ during set-out and installation.

3.3.15.3 Polystyrene Pods:

Install the polystyrene pods to the grid pattern, dimensions, and details shown on the design drawings, and in accordance with the 'technical literature' requirements.

Maintain an accurate pod set-out during all stages of installation, ensuring pods are accurately aligned to straight and true lines, and correct dimensions for all perimeter footings and internal ribs. Check for and correct any deviation from the correct lines and dimensions. Secure pods in the correct locations with the use of Allied SuperSlab proprietary spacers.

Ensure 300mm wide perimeter footings and 100mm wide internal ribs are always maintained.

Do not join pods together. Use only single-piece polystyrene pods - do not join polystyrene pieces to form single pods. The maximum pod size must not exceed 1100mm in any direction.

3.3.15.4 Steel Reinforcement:

Steel reinforcement must be as specified and as shown on the design drawings. Reinforcing bars and mesh shall be accurately positioned and firmly secured to the required placement and cover.

Install the reinforcing mesh over the polystyrene pods on mesh chairs to the required concrete cover. Install shrinkage control bars across re-entrant corners only as noted on the drawings.

Reinforcing bars traversing free joints must be debonded and wrapped with Denso Tape 300mm either side of the joint line.

3.3.16 Concreting

3.3.16.1 Handling, Placement & Compacting:

The handling, placement, and compacting of Allied SuperSlab concrete shall conform to NZS 3109 and to the requirements of the 'technical literature'

Concrete shall be transported, handled, placed, and compacted so as to:

- Prevent segregation or loss of materials;
- Produce a monolithic mass between planned joints or the extremities of the floor slab, or both;
- Completely fill the formwork to the intended level, expel entrapped air, and closely surround all reinforcement, tendons, ducts, anchorages, and embedments; and
- Provide the specified finish to the formed surfaces of the floor slab;
- Ensure there is no contamination of the concrete;
- Ensure that the transporting, handling, placing, and compaction of the concrete is complete before setting reactions have passed the point that prevents the concrete from attaining its potential fully cured properties.

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Take all necessary precautions and measures during unfavourable conditions, as required by NZS 3109: Section 7.2, to ensure the quality and finish of the concrete is not compromised or reduced in any manner.

Immersion vibrators shall be used for the compaction of concrete, and shall be moved to new positions as frequently as necessary to ensure uniform vibration of the whole mass and fully compacted concrete. On no account shall immersion vibrators be allowed to come into contact with the face of formwork. Vibrators shall not be used to transport concrete along internal ribs or perimeter footings.

3.3.16.2 Concrete Tests & Non-Compliant Concrete:

The ready-mix concrete supplier shall carry out and evaluate control tests in accordance NZS 3104, and shall pay the costs of such tests.

In addition to the tests required by NZS 3104, allow to take test cylinders on site at random for each pour of concrete, in accordance with NZS 3112.2, Clause 3. Make four standard cylinders for the first 25m³ of concrete placed, or part thereof and test in an approved laboratory. Make four standard cylinders for each subsequent 100m³ of concrete placed, or part thereof and test in an approved laboratory. Test results for breaking one cylinder at 7 days and the remaining three cylinders at 28 days shall be forwarded to the Contract Administrator on completion of the test together with details of where that particular concrete was placed in the structure.

Delivery dockets and other certified records of concrete quality shall be kept on site for inspection.

Failure to conform with the requirements of this specification, or failure to provide or complete the concrete manufacturer's delivery docket could result in ready-mix concrete being subject to rejection at time of delivery.

In accordance with the Contract Administrator's instructions, rejected placed concrete shall be cut out, removed from site and replaced with new concrete.

3.3.16.3 Curing & Protection:

Allied Concrete SuperSlab concrete shall be cured in accordance with NZS 3109: Section 7.8.

The use of concrete curing compounds shall be as agreed with the Contract Administrator (specifically for each occasion before it is used).

Ensure that any agreed concrete curing compound is compatible with subsequent floor coverings or surface treatments, including any sealers, paints, waterproofing membranes, etc.

The formed Allied Concrete SuperSlab shall be protected from damage during subsequent stages of the building contract. Repairs and remedial work to the Allied Concrete SuperSlab shall be carried out to the satisfaction of the Contract Administrator.

3.3.16.4 Remedial Work:

Defects and imperfections in the Allied Concrete SuperSlab concrete shall be removed to the satisfaction of the Contract Administrator. No structural repair of concrete shall be undertaken without specific instruction from the Contract Administrator.

The removal of surface markings from visually exposed concrete shall be carefully carried out with the use of wire brushing, pumice stone, carborundum stone, or washing and scrubbing, such as will remove the marks without scratching, discolouring, or otherwise affecting the surrounding or underlying concrete.

Patching or filling of visually exposed fair-faced concrete and making good broken edges and corners shall be done with coloured sands and cement where necessary to match the colour of the surrounding concrete when dry. Epoxy compounds may be used when necessary, but only with prior approval from the Contract Administrator.

Conditions for the repair of concrete work shall include, but not be limited to:

- No repair of concrete shall be undertaken without prior approval from the Contract Administrator.
- Advise the presence of any defective concrete.
- The repair of concrete shall only be carried out by skilled personnel familiar with the repair techniques and materials required.
- Except when inspection is waived, the repair of concrete shall be carried out in the presence of the Contract Administrator or their representative.
- All filling shall be bonded tightly to the cavity surfaces and shall be sound and free from shrinkage cracks and drumming after the filling has dried and cured.
- The protection of and curing of concrete repairs shall be carried out in accordance with the repair-product manufacturer's requirements.
- If the appearance of the repaired concrete surface lacks uniformity, the Contract Administrator may give direction to apply a bag-rubbed finish to the surface, carried out to the satisfaction of the Contract Administrator.

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3.3.17 Saw Cutting

Saw-cut shrinkage control joints shall be cut into the Allied Concrete SuperSlab within 24 hours after pouring and when the slab is sufficiently hard, and according to the control joint layout, dimensions, and details shown on the design drawings.

Unless specified otherwise on the design drawings, saw cuts shall be 20-25mm deep for the standard 85mm thick topping. For thicker toppings, deeper saw cuts will be required of approximately ¼ of the topping thickness, to the cut depth specified on the design drawings.

Early-entry soft cutting is recommended. Saw cutting shall be carried out without excessive chipping, spalling, or tearing of the concrete. Saw cuts shall be straight and true to line, and within 10mm of correct alignment.

3.3.18 Completion

Check that the Allied Concrete SuperSlab/Superslab+ Floor System has been correctly formed to the required layout, dimensions, levels, alignment, and detailing shown on the design drawings, and that any deviation from these is within the specified tolerances.

Check that all required cast-in items and provisions for services (Drainlaying, Plumbing, Electrical, etc) are correctly located and positioned as shown on the approved drawings.

Check that all concrete surfaces have been finished to the specified finish levels.

Check for any damage and defective work. Carry out any necessary repairs and/or remedial work as specified and/or instructed by the Contract Administrator to the required standard.

Leave all of this work complete and structurally sound, and to the required standard.

Leave the completed Allied Concrete SuperSlab/Superslab+ Floor System and surrounding work areas clean and free of rubbish. Remove all associated rubbish and excess material from site.

Provide all necessary Producer Statements and Warranties.

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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
NZBC E3/AS1	Internal Moisture

4.3 ARDEX Liquid-Applied Waterproofing Membranes

4.3.1 Scope

Supply and install the specified ARDEX Liquid-Applied Waterproofing Membranes to the locations indicated on the drawings, complete with all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the manufacturer's requirements and technical literature (check www.ardex.co.nz, or call 0800 227 339 for the latest editions), other relevant product manufacturers' recommendations, and BRANZ Appraisal No.472 and No. 473, and as shown on the drawings.

No substitutions are permitted for any specified ARDEX Liquid-Applied Waterproofing Membranes, or ARDEX products, or ARDEX system components or accessories.

This specification should be read in conjunction with other relevant specification sections as they may be interrelated.

4.3.2 Requirements

4.3.2.1 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.

4.3.2.2 Warranty

ARDEX NZ Ltd warrant this work under normal use and environmental conditions, against failure of materials and application, according to the warranty conditions.
- 15 Years' Warranty Materials and Workmanship - for all ARDEX Liquid-Applied Waterproofing Membranes.
- Provide the aarranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion.

4.3.2.3 Substitutions

ARDEX Liquid-Applied Waterproofing Membranes shall be as specified herein and as indicated on the approved drawings. The substitution of ARDEX branded products for alternative brands is not permitted under any circumstances.

The substitution of a specified ARDEX waterproofing product for an alternative ARDEX branded product by the Applicator shall only be permitted with the Contract Administrator's 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 ARDEX branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Applicator.

4.3.2.4 Quality Assurance

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of ARDEX Liquid-Applied Waterproofing Membranes work are carried out to the highest standard.

4.3.2.5 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.

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Carry out all necessary pre-installation/application and installation/application inspections for each area of waterproofing work in accordance with the requirements of industry best practice recommendations and guidelines.

Complete all necessary Pre-Installation Checklists prior to installation/application, and all relevant Installation Checklists.

Complete all necessary Installation Sign-Off Certificates before undertaking subsequent work or before handing over completed work.

4.3.2.6 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 ARDEX Liquid-Applied Waterproofing Membranes 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.

Should a problem be encountered with any ARDEX waterproofing product during use or delivery, immediately contact the ARDEX Technical Hotline on 0800 227 339. Do not continue to use the product that is not performing to specification or expectation. Keep the product in question and where possible, the document batch numbers and/or manufacturing dates.

4.3.2.7 Flood Testing

Make all necessary provisions for, and carry out all necessary flood testing of ARDEX waterproofing membranes in accordance with the requirements of the ARDEX Warranty. Carry out any additional works required as a result of the flood testing.

4.3.3 Performance

4.3.3.1 Durability

The durability requirements of ARDEX Liquid-Applied Waterproofing Membranes shall meet the requirements of NZBC B2/AS1: Table 1, according to Building Element, Component, Situation/Function, and Duration.

4.3.3.2 Interior Wet-Area Waterproofing Membranes

Interior Wet-Area Waterproofing Membranes. The performance of interior wet-area waterproofing membranes shall comply with the requirements of NZBC E3/AS1, in accordance with the 'Code of Practice for Internal Wet Area Membranes' prepared by the Waterproofing Association (NZ) Inc.

4.3.4 Interior Undertile Membrane

4.3.4.1 ARDEX WPM 155 Rapid

Interior Undertile Waterproofing Membrane - ARDEX WPM 155 Rapid. A 1-part, read-to-use, fast drying, water-based, polyurethane-acrylic waterproofing membrane, designed for high performance use under-tile waterproofing, and used in conjunction with ARDEX STB Tape. Suitable for commercial and residential use on interior and exterior walls and floors, in wet areas, and on decks, balconies, and other areas that will be tiled or otherwise protected from regular foot traffic.

Features:
- BRANZ Appraised - refer to BRANZ Appraisal No.472.
- Conforms to the requirements of AS/NZS 4858 - meets class 3 classification (high extensibility).
- Designed for tiling applications - fully compatible with ARDEX tiling adhesive systems.

Where to Use:
- On concrete structures; on new and existing concrete.
- On cement/sand screeds and renders.
- On plasterboard wall lining - wet area grade only - interior use only.
- On fibre cement sheet - wet-area grade only; and compressed fibre cement sheet - wet-area grade only.
- On plywood - structural, marine or wet-area grade only - interior use only.

Limitations:
- Do NOT use ARDEX WPM 155 Rapid for continuously immersed waterproofing applications.
- Do NOT use ARDEX WPM 155 Rapid on substrates subject to negative hydrostatic pressure or rising damp, unless treated with ARDEX WPM 300.
- Do NOT allow ARDEX WPM 155 Rapid waterproofing membrane to be left exposed and subject to regular foot traffic.
- All floor areas must have adequate built-in drainage falls prior to the application of ARDEX WPM 155 Rapid waterproofing membrane.

Primer & Sealer:
- Seal damp substrates and set concrete less than 28 days' old using ARDEX WPM 300 in accordance with ARDEX requirements.
- Seal set renders and screeds less than 7 days' old using ARDEX WPM 300 in accordance with ARDEX requirements.
- ARDEX WPM 155 Rapid is suitable to use over ARDEX P9, ARDEX WPM 300, ARDEX WPM 270, ARDEX WPM 265, and ARDEX Miltiprime substrate primers. Prime substrates in accordance with ARDEX requirements.

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Application:
- Seal corner junctions and junctions where movement will occur with ARDEX STB Tape in accordance with ARDEX requirements.
- Treat movement control joints, waste outlets and penetrations in accordance with ARDEX requirements.
- Apply a minimum of two coats of ARDEX WPM 155 Rapid to achieve the required total dry film thickness - Floors, 0.5mm; Walls, 0.5mm - in accordance with ARDEX requirements.

Application Data (at +23° and 50% RH):
- Application Temperature Range: from +10°C to +35°C (surface temperature).
- Recoat Time: 1-2 hours.
- Ready to Tile: 4 hours after application, depending on humidity, surface temperature and porosity of substrate.
- Fully Cured: 3 days after application.
- Flood Test Time: at least 3 days after application, and before tiling commences.
- Colour: Blue/Grey.

Apply ARDEX WPM 155 Rapid undertile waterproofing membrane to properly prepared substrates in strict accordance with the manufacturer's requirements.

Installed Location:

4.3.5 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.

Coordinate with other trades to install ARDEX Liquid-Applied Waterproofing Membrane systems and products as required.

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 preparation and installation work shall be carried out by ARDEX Approved Applicators, familiar with the specified products and installation techniques, to fully comply with all ARDEX NZ Ltd warranty requirements and in accordance with the manufacturer's installation requirements, relevant ARDEX 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.

Use only ARDEX-approved primers compatible with the specified membranes and substrates, and according to the membrane's application/use.

Do not install membranes in wet weather conditions, or when temperatures and humidity are outside the manufacturer's permissible range.

Make all necessary provisions to protect adjacent finished work and surfaces from damage and contamination during installation.

As necessary, protect installed membranes from damage and contamination during subsequent construction activities until permanently covered/enclosed.

4.3.7 Delivery & Handling

Store ARDEX waterproofing products inside, in a weatherproof environment, clear of the floor, on a flat, even and level surface. Keep stored products dry, out of direct sunlight and protected from damage, moisture and contamination.

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

Should a problem be encountered with any ARDEX product, immediately contact the ARDEX Technical Hotline on 0800 227 339. 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 ARDEX waterproofing 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 and does not reduce 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.

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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.

4.3.8 Preparation

4.3.8.1 General

Substrates shall be structurally sound and dimensionally stable, 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 cause damage to the waterproofing membrane or affect its bonding and performance.

Carry out all necessary inspections and preparatory work to all substrates in accordance with the manufacturer's product Technical Data Sheet prior to application of ARDEX surface primers and waterproofing membranes.

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 all movement control joints prior to commencement of the works, and ensure that they are appropriately treated. Do not cover or bridge control joints without the use of the manufacturer's recommended bond breaker tapes, flexible waterproofing bands, corners, sleeves, sealants etc, appropriate for the application and the ARDEX waterproofing membrane.

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 ARDEX Approved Applicator that all preparatory works by other trades are appropriate to achieve the required finished results.

Carry out all necessary substrate priming in accordance with ARDEX requirements.

4.3.8.2 Concrete Slabs

Reinforced Concrete Slabs - check all aspects of preparatory works, including but not limited to:
- 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 ARDEX waterproofing membranes.
- Old or soiled concrete must be thoroughly cleaned and washed and allowed to dry prior to application of waterproof membranes.
- Check the surface for damage and defects - have any surface damage and defects appropriately remedied.
- Check junctions with adjacent substrates and elements, ensuring that all necessary works have been completed as detailed.
- Ensure the substrate is dry and free of all loose material, sharp protrusions, hollows, etc., prior to priming and membrane application.
- Carry out all necessary substrate priming in accordance with ARDEX requirements.

4.3.8.3 Plasterboard Wet-Area Lining

Water-Resistant Plasterboard Wet-Area Lining - 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 have been finished to the required standard.
- Check the surface for damage and defects - have any surface damage and defects appropriately remedied.
- 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.
- Carry out all necessary substrate priming in accordance with ARDEX requirements.

4.3.9 Completion

Check that ARDEX liquid-applied waterproofing membranes have been applied and installed correctly, with all edges, penetrations, outlets, movement control joints and other detailing correctly finished.

Check waterproofing membranes for defects, surface damage and punctures - carry out any repairs in strict accordance with the manufacturer's instructions before permanently covering. Replace damaged membranes when beyond repair.

As necessary, flood test waterproofing membranes in accordance the manufacturer's requirements and time frames - carry out any additional works necessary as a result of the testing.

Ensure waterproofing membranes are adequately protected from damage and contamination until permanently covered or enclosed.

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Leave this work complete, watertight and leak-free, and to the required standard in accordance with ARDEX NZ Ltd requirements.

Clean up thoroughly, and leave adjacent surfaces and finished work clean and free of damage and contamination. Remove all associated rubbish from site.

Issue to the Owner a copy of the manufacturer's maintenance requirements (if applicable), and a copy of the ARDEX NZ Ltd Warranty.

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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:

1170.0:2002(AS/NZS)	Structural design actions - Part 0: General principles
1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
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
4389:2015(AS/NZS)	Roof safety mesh
AS/NZS 1080.1:2012	Timber - Methods of test - Method 1: Moisture content
AS/NZS 1604.2:2012	Specification for preservative treatment - Part 2: Reconstituted wood-based products
AS/NZS 2269.0:2012	Plywood - Structural - Part 0: Specifications
NASH Standard	Residential and Low-rise Steel Framing - Part 1: Design Criteria
NZBC B1/VM1	Structure
NZBC B2/AS1	Durability
NZBC C/AS2-AS6	Protection from Fire
NZBC E2/VM1	External Moisture
NZBC F2	Hazardous Building Materials
NZBC G6	Airborne and Impact Sound
SNZ HB 3604:2011	Timber-framed buildings - Selected extracts from NZS 3604:2011

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.

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5.4 Workmanship & Materials

5.4.1 Workmanship

5.4.1.1 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.

5.4.1.2 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.

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.

5.4.1.3 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 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.

5.4.1.4 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.

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Queenstown Lakes District Council

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.

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.

5.4.1.5 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.

5.4.2 Timber

5.4.2.1 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.
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.

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Queenstown Lakes District Council

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.

5.4.2.2 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.

5.4.2.3 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.

5.4.2.4 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.

5.4.3 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
- Care should be taken in lifting and handling LVL in order to avoid mechanical damage

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- Wrapping should avoid and prevent entrapment of moisture
- LVL should not be used in high humidity conditions or exposed to the weather.

5.4.4 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.

5.4.5 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.

5.4.6 Fixings

5.4.6.1 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.

5.4.6.2 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.

5.4.6.3 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;
- 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

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Queenstown Lakes District Council

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.

5.4.6.4 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.

5.4.6.5 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.

5.4.6.6 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.

5.4.7 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.
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.

5.4.8 Sealants

5.4.8.1 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

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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 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.

5.4.9 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.

5.4.10 Garage Door

Garage door(s) as shown and noted on the drawings, installed complete.

5.4.11 Sundry Items

Supply and install, complete with all normal incidentals, and in total compliance with the item manufacturer's recommendations and instructions and with all of the appropriate preceding clauses:

Wardrobe rails, shelves to wardrobes, linen cupboards, etc., as shown and noted on the drawings.

Carry out all necessary trimming out, etc. flashing and finishing required for installation of the kitchen, bathroom, shower room and laundry air exhaust fans.

Supply and install the free standing, domestic solid fuel woodburner, as specified, to the location and details shown on the drawings, complete with flue, flue-pipe casing, flue-mounted heat shield, ceiling plate and all other necessary incidentals and accessories for proper installation. Installation shall be exactly in accordance with the manufacturer's requirements, AS/NZS 2918, and as shown on the drawings; including flue bracing and support, and with the penetration through the roofing fully flashed and weathertight.

Supply and install the proprietary ceiling access hatch, as specified or scheduled, to the location and details shown on the drawings in accordance with the manufacturer's requirements.

Supply and install proprietary skylights and or daylighting systems, as specified and/or scheduled, to the locations and details shown on the drawings. Installation shall be exactly in accordance with the manufacturer's requirements and as shown on the drawings.
Skylight penetrations in the roof shall be carefully formed, accurately sized and trimmed, with the roof underlay neatly cut, folded and dressed, and the roof cladding fully supported, fixed and correctly flashed around the skylight in accordance with the roof cladding manufacturer's requirements.
Form any required upstand to the dimensions as detailed, and finish and flash the roof cladding and underlay around the upstand to the details shown on the drawings.
Form and trim ceiling openings, and line and finish the skylight void sides to the required opening size and as detailed. Reinstate any roof/ceiling insulation around the installed opening without voids or gaps.

5.5 Timber Framing

5.5.1 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.

5.5.2 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.

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5.5.3 Timber Framing

5.5.3.1 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.

5.5.3.2 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.
Carefully manage treated framing during installation to avoid accidental use of timber with a lower performance or durability treatment than that required or specified.

5.5.3.3 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.

5.5.3.4 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.

5.5.3.5 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.

5.5.3.6 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.

5.5.3.7 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.

5.5.3.8 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.

5.5.3.9 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.

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5.5.4 Steel Fixings

5.5.4.1 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.

5.5.4.2 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.

5.5.4.3 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.

5.5.5 Wall Framing

5.5.5.1 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.

5.5.5.2 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.

5.5.5.3 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.

5.5.5.4 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.

5.5.5.5 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.

5.5.5.6 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.

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Queenstown Lakes District Council

5.5.6 Roof Framing

5.5.6.1 Rafters

All rafters (including hip, valley and jack rafters) shall be to the dimensions, spacings, pitch, and layout shown on the drawings.
Rafters shall be aligned and paired at the required spacings to ridge boards, ridge beams, hip rafters and valley rafters, and as shown on the drawings, and installed parallel, true to line, pitch and plane, and fixed in accordance with NZS 3604 Table 10.1.
Any required jointing of rafters shall be made over supports shown on the drawings only.
Unless shown otherwise, rafter seating to top plates, beams, and lintels shall have a minimum bearing of 32mm without reducing the rafter depth to less than 65mm, or 80%, at the birds mouth.
Extend rafter ends to form eaves as detailed on the drawings and in accordance with NZS 3604 10.2.1.14.
Fly rafters and outriggers installed to form gable verges as detailed on the drawings and in accordance with NZS 10.2.1.15.3

5.5.6.2 Ridge Beams

Ridge beams shall be to the dimensions and locations shown on the drawings, and installed true to line and level.
Unless specified or shown otherwise, ridge beam ends shall be secured by and fixed to wall framing in accordance with NZS 3604 Table 10.2.

5.5.6.3 Valley Boards

Valley boards shall be sized to the dimensions and installed to the supporting framing as detailed on the drawings.

5.5.6.4 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.

5.5.6.5 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.

5.5.6.6 Roof Bracing

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

5.5.7 Ceiling Framing

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.

5.6 GIB® Plasterboard Linings

5.6.1 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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5.6.2 Requirements

5.6.2.1 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 of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

5.6.2.2 Warranty

GIB® Product & System Warranty:

GIB Systems Durability.
The following systems have, unless stated otherwise in GIB® technical literature, a serviceability life in excess of that stated and satisfy the requirements of NZBC Clause B2 Durability:
15 Years:
- GIB Aqualine® Wet Area Systems.

50 Years:
- GIB® Fire Rated Systems
- GIB EzyBrace® Systems
- GIB X-Block® Systems
- GIB Noise Control® Systems.

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.

5.6.2.3 Quality Assurance

Ensure that the installation and finishing of GIB® Plasterboard Linings and associated GIB® 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.

5.6.2.4 Inspection & Acceptance of GIB® Plasterboard Linings

Carry out all necessary pre-installation, installation and finishing inspections of GIB® Plasterboard Linings for each area of work in accordance with the requirements of the GIB® Site Guide and associated industry Code of Practice (AWCI) recommendations.

Complete the GIB® Site Guide Pre-Installation Checklist prior to installing GIB® plasterboard linings, and relevant GIB® Performance Systems Installation Checklists.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

5.6.2.5 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 GIB® Plasterboard Linings and GIB® Systems 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.

5.6.2.6 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.

5.6.2.7 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® System 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® Site Guide: 2.3 - Board Substitution Options, and relevant GIB® Systems literature. 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.

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5.6.3 Performance

5.6.3.1 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.

5.6.3.2 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® Bracing 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.

5.6.3.3 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 publication, BRANZ Appraisal No.427 (2021), and other relevant product manufacturers' recommendations. Refer to separate specification GIB Aqualine® Wet Area Systems.

5.6.4 GIB® Plasterboard Linings

5.6.4.1 GIB® Standard Plasterboard, 10mm

GIB® Standard Plasterboard, 10mm. A 10mm thick standard plasterboard interior lining. Suitable for use in residential and commercial applications on walls. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

5.6.4.2 GIB® Standard Plasterboard, 13mm

GIB® Standard Plasterboard, 13mm. A 13mm thick standard plasterboard interior lining. Suitable for use in residential and commercial applications on walls and ceilings. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

5.6.4.3 GIB Braceline® & GIB Noiseline®, 10mm

GIB Braceline® & GIB Noiseline®, 10mm. A 10mm thick dual purpose plasterboard interior lining, with a high-density core for extra bracing and noise control performance. Suitable for use in residential and commercial applications on walls and ceilings where increased bracing and noise control performance is required. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

5.6.4.4 GIB Aqualine®, 10mm

GIB Aqualine®, 10mm. A 10mm thick moisture resistant plasterboard interior lining, with a water resistant polymer impregnated core to help prevent moisture penetration. Suitable for use in residential and commercial applications on walls and ceilings in spaces at risk from water or moisture damage. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

5.6.4.5 GIB Aqualine®, 13mm

GIB Aqualine®, 13mm. A 13mm thick moisture resistant plasterboard interior lining, with a water resistant polymer impregnated core to help prevent moisture penetration. Suitable for use in residential and commercial applications on walls and ceilings in spaces at risk from water or moisture damage. Manufactured to exceed the requirements of AS/NZS 2588. Refer to the GIB® Site Guide.

Installed Location:

5.6.5 Components & Accessories

5.6.5.1 Timber Ceiling Battens

Timber Ceiling Battens. Except where specified otherwise on the approved drawings, timber ceiling battens shall be minimum 70mm x 35mm, H1.2 treated, Merchantable grade Radiata, fixed in accordance with NZS 3604: Table 13.3. Refer to the GIB® Site Guide., and to separate specification section Timber Framing.

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5.6.5.2 Plasterboard Fasteners

GIB® Plasterboard Fasteners. Fasteners for fixing GIB® Plasterboard Linings shall be selected and used according to best fixing practices and the GIB® Site Guide and relevant GIB® Systems literature. Fastener heads shall be set slightly below the plasterboard sheet surface without breaking the paper facing.

Screw Fixing to Timber Framing:
- GIB® Grabber® High Thread Drywall Screws: A coarse high-thread screw for fixing into timber with superior holding power and ease of penetration.
- GIB® Grabber® Self Tapping Drywall Screws: A fine self-tapping thread, needle point screw, suitable for fixing to timber and light gauge steel framing.
- GIB® Grabber® Dual Thread Drywall Screws: A dual coarse/fine threaded, needle point screw, as a component of the GIBFix® Framing System and for fixing to timber framing.

Nail Fixing to Timber Framing:
- GIB Nail: Passivated coated, annular grooved, bugle head drywall nails with chequer-keyed head.

Screw Fixing to Light Steel Framing:
- GIB® Grabber® Self Tapping Drywall Screws: A fine self-tapping thread needle point screw, suitable for fixing to light gauge (0.45-0.95mm) steel framing.
- GIB® Grabber® Dual Thread Drywall Screws: A dual coarse/fine threaded, needle point screw, suitable for fixing to light gauge (0.45-0.95mm) steel framing.

5.6.5.3 Adhesives

GIB® Adhesives. In addition to GIB® plasterboard fasteners, fix GIB® Plasterboard Linings using GIB® adhesives in accordance with the requirements of the GIB® Site Guide and GIB® System literature.

GIB® Adhesives:
- GIBFix® One: An acrylic based plasterboard adhesive with ultra low VOC, suitable for use on timber and metal substrates, including all treated timber. Minimum application temperature - 10°C.
- GIBFix® All-Bond: A solvent based plasterboard adhesive, suitable for use on timber and metal substrates, including all treated timber. Do not use on polystyrene surfaces.

5.6.5.4 Metal Trims

GIB® Metal Trims. Perforated metal corner beads and edge trim made from galvanised steel. Installed in accordance with the requirements of the GIB® Site Guide and GIB® Systems literature.

GIB® Metal Trim Profiles:
- External 90° Perforated Corner Trim (P01): GIB® Slim Angle - Standard. Available in 2.4/2.7/3.0/3.6m lengths.
- External 135° Perforated Corner Trim (P01A): GIB® Slim Angle - Off Angle. Available in 2.4/2.7/3.0m lengths.
- Perforated Curvable Corner Edge trim (P10): GIB® Slim Arch Bead. Available in 2.4/3.0m lengths.
- L-Trim for Stopped End Trim: Rondo® Stopping Angle. Profiles available for 10/13/16mm thick plasterboard. Available in 3.0m lengths.
- End Cap Bead - stopped: Rondo® Stopping Bead. Profiles available for 10/13mm thick plasterboard. Available in 2.4/3.0m lengths.
- Reveal or Z-trim: Rondo® Shadowline Stopping Bead. Profile available for 10mm thick plasterboard. Available in 3.0m lengths.
- End Cap Bead - un-stopped (P50): Rondo® Casing Bead. Profiles available for 10/13mm thick plasterboard. Available in 2.4/3.0m lengths.

5.6.5.5 Paper Faced Metal Trims

GIB® Goldline® Paper Faced Metal Trims. Paper-faced metal corner beads and edge trim made with a patented, high quality paper laminated to galvanised steel forms. Paper faced metal trims shall be embedded in jointing compound - do not mechanically fasten paper faced trims. Installed in accordance with the requirements of the GIB® Site Guide and GIB® Systems literature.

GIB® Goldline® Profiles:
- External 90° Corner Trim (G1-W): profile available in 2.4/2.7/3.0m lengths.
- External 135° Corner Trim (G1-O): profile available in 2.4m lengths.
- Internal 90° Corner Trim (G2): profile available in 2.4/2.7/3.0m lengths.
- Internal 135° Corner Trim (G2-O): profile available in 2.4m lengths.
- Bullnose External 90° Corner Trim (G1-B): profile available in 2.4/2.7/3.0m lengths.
- Reveals (GR): profiles available for 10mm thick and 13mm thick plasterboard.
- L-Trims (G4): profiles available for 10mm thick and 13mm thick plasterboard.

5.6.5.6 Paper Faced Composite Trims

GIB® Paper Faced Composite Trims. Flexible, reinforced, cut-to-length, paper faced corner trims, suitable for use on internal and external corners with an angle between 90° and 270°. Paper faced composite trims shall be embedded in jointing compound - do not

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mechanically fasten paper faced trims. Installed in accordance with the requirements of the GIB® Site Guide and GIB® Systems literature.

GIB® Paper Faced Composite Trims:
- Flexible Composite Trim: GIB® LevelLine™. Available in 70mm roll width.
- High Impact Flexible Composite Trim: GIB® UltraFlex® No Coat. Available in 82mm and 112mm roll widths.

5.6.5.7 Joint & Finishing Compounds

GIB® Compounds. Use the most suitable GIB® Compounds to joint and finish GIB® Plasterboard Linings according to the plasterboard type, location, application, durability, and quality of finish required. GIB® Compounds shall be applied and finished in accordance with the manufacturer's requirements to the specified finish level, and used in conjunction with GIB® Paper Joint Tape and GIB® Plasterboard Trims.

GIB® Compounds:
- GIB TradeSet®: Setting type compound. Suitable for Tape Coat, 2nd Coat. Easy to scrape. 20/45/90/150 minute working/set times.
- GIB MaxSet®: Setting type compound. Suitable for Tape Coat, 2nd Coat. Scrape while 'green'. 90 minute working/set time.
- GIB Lite Blue®: Setting type compound. Suitable for 2nd Coat. Easy sanding. 90 minute working/set time.
- GIB Trade Finish® Heavy Weight: Air drying ready-mix type compound. Suitable for Finishing Coat. Moderate sanding.
- GIB Trade Finish® Multi: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat; Finishing Coat. Easy sanding.
- GIB Trade Finish® Lite: Air drying ready-mix type compound. Suitable for Finishing Coat. Very easy sanding.
- GIB Promix® Lite: Air drying ready-mix type compound. Suitable for Finishing Coat. Very easy sanding.
- GIB® U-Mix: Air drying powder-mix type compound. Suitable for Finishing Coat. Easy Sanding.
- GIB Plus 4®: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat, Finishing Coat. Very easy sanding.
- GIB Promix® All Purpose: Air drying ready-mix type compound. Suitable for Tape Coat, 2nd Coat, Finishing Coat. Moderate sanding.
- GIB-Cove® Bond: Setting type compound. Suitable for bonding GIB-Cove® cornice, back-blocking plasterboard linings, and direct-bonding plasterboard to concrete and masonry walls. Hard to scrape. 45/90 minute working/set times.
- GIB X-Block® Jointing Compound: Used in conjunction with GIB X-Block® plasterboard wall and ceiling linings in accordance with the GIB X-Block® Radiation Shielding publication.

5.6.5.8 Joint Tape

GIB® Paper Joint Tape. A 50mm wide, spark perforated paper joint tape used to strengthen joints between plasterboard sheets. Centre-creased for internal and external corner applications. Recommended for jointing GIB® plasterboard wall and ceiling linings in accordance with the GIB® Site Guide and GIB Systems literature.

5.6.5.9 Wet Area Sealant

Wet Area Sealant. A mould resistant, flexible, neutral curing silicone sealant with strong adhesion, suitable for wet area applications and where there is high humidity, including bathrooms, toilets, showers, wash-down areas, kitchens, laundries.

Applied in accordance with the sealant manufacturer's instructions, as required by the GIB® Site Guide and GIB® System literature. Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio.

Manufacturer & Brand:

5.6.5.10 Gap Filler

GIB® Gapfiller. A general purpose, gun applied, one-part water based, paintable acrylic gap filler. Provides excellent adhesion for gaps and cracks and other low movement joints. Used in strict in accordance with the manufacturer's requirements. Refer to the GIB® Site Guide.

5.6.6 Level of Finish

5.6.6.1 Level of Finish

To the areas noted as a specific Level of Finish (3-5) on the drawings, additionally comply with all relevant aspects of the GIB® Site Guide and AS/NZS 2589, complete with all system accessories, and other relevant product manufacturers' recommendations.

NOTE: Unless stated otherwise, Level 4 is the default Level of Finish.

5.6.6.2 Acceptance of Levels of Finish

Carry out all necessary inspections and assessments of completed plasterboard jointing and finishing prior to hand-over for subsequent decoration.

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Do not apply surface sealers and decorative treatments until written agreement between the Contractor and Painter/Decorator is given confirming the specified Finish Levels have been achieved and the plasterboard linings are ready for subsequent sealing and decoration.

5.6.7 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.

5.6.8 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.

5.6.9 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.

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 - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

5.6.10 Preparation

5.6.10.1 General

All framing and substrates shall be complete and ready for GIB® Plasterboard Lining 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.

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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 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. For of direct bonded plasterboard linings, concrete substrates must below 75% relative humidity prior to installation.

Concrete masonry substrates shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design. For of direct bonded plasterboard linings, concrete masonry substrates must below 75% relative humidity prior to installation.

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.

5.6.10.2 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.
- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according to 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.

5.6.10.3 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.

5.6.11 Installation

5.6.11.1 General

Install GIB® Plasterboard Linings and accessories in accordance with the requirements of the GIB® Site Guide and product technical literature and associated fixing schedules, to the locations and details shown on the drawings. For GIB® Performance Systems, refer to the relevant GIB® system specification.

Prior to installation, confirm:
- The locations and construction details of all movement control joints;
- The locations and installation details of all building services items within framed structures;
- The specified GIB® plasterboard installation and fixing requirements;

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- The specified Finish Level(s) for the plasterboard linings.
- Subsequent surface treatments and finishes applied to GIB® plasterboard.

5.6.11.2 Standard Ceiling - Timber Ceiling Battens

GIB® Plasterboard Ceiling Linings - Standard Ceiling Fixing with Timber Ceiling Battens. Timber ceiling battens shall be 75 x 35mm thick and fixed in accordance with NZS 3604: Table 13.3. Refer to separate specification section Timber Framing.

Unless independently supported, uniformly distributed loads (fixtures and fittings and/or overlaid insulation) supported by GIB® plasterboard ceiling linings shall not exceed 3.0 kg/m².

Timber ceiling batten spacings shall not exceed the spacings given in the GIB® Site Guide according to the specified plasterboard thickness - 600mm for 13mm or greater thickness, 450mm for 10mm thickness. Where a ceiling batten spacing given in NZS 3604: Table 13.1 is less than that stated in the GIB® Site Guide, the NZS 3604 spacing shall be achieved. Ceiling battens shall all run in the same direction within the ceiling area or between movement control joints. In no case shall ceiling battens be continuous over movement control joints in the structure.

Install GIB® Plasterboard sheets right angles to ceiling battens, with sheet end-joints staggered minimum 600mm and located off battens and back-blocked. Fully support sheets during positioning and fixing - for ceiling installations, the use of a mechanical lifting machine is recommended.

Plasterboard sheets shall be fixed to ceiling battens in conjunction with GIBFix® adhesive applied at maximum at 200mm centres. Do not apply adhesive at sheet edges or within 200mm of fasteners. Firmly press the plasterboard where adhesive has been applied to ensure full contact.

Fix sheets to timber ceiling battens with GIB® Grabber® High Thread Screws in accordance with GIB® Site Guide fastener schedule according to the plasterboard thickness. Position fasteners no closer than 12mm from a tapered edge or 18mm from a cut sheet edge.

Install all necessary paper-faced metal beads, casing beads, shadow and reveal beads and other edge trims to plasterboard corners and edges as necessary and as detailed on the drawings.

Form movement control joints to the locations and details shown on the approved drawings. Where not indicated on the drawings, movement joints shall be positioned at maximum 12m intervals in both directions on any single ceiling, and where there is a change in ceiling lining material, and shall coincide with the junctions between adjoining spaces.

Accommodate recessed light fittings, heating and ventilating diffusers and grilles and other utility fixtures and fittings that penetrate the ceiling lining.

5.6.11.3 Ceiling Diaphragms

Ceiling Diaphragms - refer to separate specification GIB® Ezybrace Systems, and to the GIB EzyBrace® Systems publication.

5.6.11.4 Wall Linings - Horizontally Fixed - Timber Frame

GIB® Plasterboard Wall Linings Horizontally-Fixed to Timber Framing. Install GIB® plasterboard sheets horizontally, at right angles to studs, with any end-joints staggered, and with the bottom edge of the lower sheet gapped 5–10mm off finished floor level.

All joints between sheets shall be touch fitted. Eliminate or minimise the butting of sheet end-joints by using full-length or long-length sheets. Give careful consideration to the placement of sheet joints. Where possible, place joints in situations where they are less likely to be affected by critical lighting.

It is recommended that sheet end joints in horizontally fixed plasterboard be unsupported, off-stud and back blocked - stud centres must not exceed 600mm. For plasterboard linings with Level 3 Finish and Level 4 Finish, sheet end joints can be located on-stud.

Sheet end joints at openings, such as window and door openings, shall not coincide with the vertical edges of the opening - sheets shall be fitted so that the vertical end joint falls minimum 200mm either side of the edge of the opening.

Plasterboard sheets shall be fixed to timber framing in conjunction with GIBFix® adhesive applied at maximum at 300mm centres to intermediate studs. Do not apply adhesive at sheet edges or within 200mm of fasteners. Firmly press the plasterboard where adhesive has been applied to ensure full contact.

Fix sheets to timber framing with GIB® Grabber® High Thread Screws or GIB® Nails in accordance with GIB® Site Guide fastener schedule. Place fasteners at 300mm centres to top and bottom plates and to perimeter studs, and to each stud where the horizontal joint crosses the stud, with screws no closer than 12mm from sheet edges. It is recommended that fasteners at wall corners are placed 50mm in from the corner in each direction (horizontal/vertical).

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Install all necessary paper-faced and metal beads, casing beads, shadow and reveal beads and other edge trims to plasterboard corners and edges as necessary and as detailed on the drawings.

Form movement control joints to the locations and details shown on the approved drawings. Where not indicated on the drawings, movement joints shall be positioned at maximum 12m intervals in both directions (horizontally/vertically), and shall coincide with movement joints in the primary structure, and where there is a change in wall lining material.

Accommodate piped and cabled services and other building services fixtures and fittings that penetrate the wall lining.

5.6.11.5 Jointing & Finishing

Joint and finish GIB® Plasterboard Linings with GIB® joint and finishing compounds appropriate for the plasterboard type and durability, and the finish level required. Refer to Joint & Finishing Compounds clause.

Carry out jointing and finishing according to the specified Finish Level in accordance with the GIB® Site Guide and GIB® Compounds brochure. Reinforce sheet joints and internal corners with joint tape or paper-faced trim embedded into the Taping (first) Coat.

Sheet joints, internal and external corners, and fastener heads shall be evenly finished with GIB® compounds. When dry, lightly sand to a smooth finish with 220 grit sandpaper or drywall sanding screen to remove tool marks, ridges and other imperfections prior to subsequent sealing and decorating.

5.6.12 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.

5.7 Thermakraft Underlay, DPM, DPC & Tapes

5.7.1 Scope

Supply and install Thermakraft Underlays and Membranes, as specified herein, 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 Thermakraft Ltd technical information and installation requirements (check www.thermakraft.co.nz, or call 0800 806 595 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the design drawings.

No substitutions are permitted for the specified products from Thermakraft Ltd.

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5.7.2 Requirements

5.7.2.1 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.

5.7.2.2 Warranty

Kingspan Thermakraft Product Warranty Statement:
- 15 Years Warranty - for all Thermakraft warranted products installed, according to the warranty conditions.
- Provide the Thermakraft Ltd Product Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of permanent installation.

5.7.2.3 Substitutions

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

The substitution of a specified Thermakraft product for an alternative Thermakraft 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 Thermakraft branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

5.7.3 Damp-Proof Membrane

Thermathene Black (250µm). A 250 micron thick (0.25mm), tear resistant, recycled polyethylene film sheet concrete underlay. Coloured black.

Installed over nominal 10mm (max. 25mm) thick compacted sand blinding layer, over a properly prepared base course, as a moisture vapour barrier under concrete slabs on-ground (prior to concreting), in accordance with the manufacturer's requirements and as shown on the drawings (Install Guide).

Thermathene Black must be laid in a continuous manner with all laps minimum 150mm, and penetrations to be taped with Thermakraft White General Purpose Tape. Tape-seal around penetrations. Inspect immediately before pouring concrete and repair any holes or other damage.

Installed Location:

5.7.4 Damp-Proof Course

Supercourse 500 DPC. A 0.75mm thick, high-impact, single-layer Polyethylene film, embossed on both sides. Available in 50mm 75mm, 90mm, 100mm, 150mm, 200mm, 250mm, 300mm, and 500mm roll widths. Supercourse 500 DPC is suitable for use as a separation barrier between most incompatible and dissimilar materials.

Used as a general damp proof course (DPC) for separating timber and wood-based products and metal from concrete, masonry, brick, and stone surfaces, and as a moisture barrier (Install Guide).

Also used as a concealed flashing behind brick veneer cladding in accordance with NZS 4229 and NZBC E2/AS1.

Installed in accordance with the manufacturer's requirements, BRANZ Appraisal No.329, and as shown on the drawings.

5.7.5 Roof Underlay

Covertek 407. A self-supporting, fire-retardant, absorbent, breathable, synthetic non-woven polyolefin underlay.

Can only be used in lined applications. Section E2 of the NZBC defines a lining as "the rigid sheet covering for a wall, ceiling or other interior surface." Must not be used in unlined buildings such as unlined garages, sheds, soffits or canopies.

Covertek 407 is CodeMark assured with the NZ Building Code: CodeMark Certificate of Conformity No:CM30028-RevI, issued by Global-Mark Pty Ltd.

Installed as a roof underlay over timber or steel roof framing in accordance with the manufacturer's requirements and BRANZ Appraisal No.651.

Covertek 407 roof underlay can be used directly under direct-fixed roof claddings, or directly under roof cavity battens or tile battens in accordance with Thermakraft requirements.

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Covertek 407 roof underlay must installed in a manner that prevents ponding of water. Refer to Covertek 407 Installation guide for underlay support requirements. Support requirements are dependent upon pitch, purlin spacing and installation direction of underlay.

Do not leave Covertek 407 exposed on roofs for more than a total of 7 days before covering.

Installed Location:

5.7.6 Joining Tapes

5.7.6.1 Thermakraft White General Purpose Tape

Thermakraft White General Purpose Tapes is an acrylic adhesive giving providing bonding in a wide range of environments. It is commonly used on synthetic underlays, or damp-proof membranes such as Thermathene. The tape is also ideal for sealing edges of vapour control layers.

It can be used to join the laps of wall and roof underlays, damp proof membranes, vapour control products such as foil underlays. Installer or designer must check the compatibility of Thermakraft White General Purpose Tape with the substrate manufacturer.

• With flexible underlays that meet the performance requirements outlined in standard NZS 2295.2006.
• Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent to flash off in a well-ventilated area. Recommended minimum 7 days.

General
Physical Properties:
- Installation temperature range: minimum +10°C.
- Tape width: Available in 66mx60mm wide rolls.

Limitations :

- Thermakraft White General Purpose Tape is NOT a window flashing tape and must NOT be used as a window flashing tape.

- Must be stored undercover well away from direct moisture, rainfall and sunlight (UV). Care should be taken not stack other materials on top of the product.

Installed in accordance with the requirements of the Thermakraft White General Purpose Tape Installation Guide, to the locations and details shown on the drawings.

5.7.7 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 Thermakraft Underlays, DPMs, and DPCs as required.

5.7.8 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.

5.7.9 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.

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

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.

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, as well as the Best practice guidelines for working on roofs for roofing installations.

5.7.10 Preparation

5.7.10.1 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 framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content of 20% at the time of cladding installation. Allow LOSP treated timber to sufficiently flash-off before installing Thermakraft building underlays and foils.

Supporting 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. Comply with the light structural steel framing fabricator's specifications and requirements for fixing cladding and roofing components.

Supporting heavy steel structures shall comply with NZS 3404.

5.7.10.2 Under-Slab Basecourse

Under-Slab Basecourse - prior to laying under-slab DPM, check all aspects of preparatory works, including but not limited to:
- Check that the under-slab basecourse has been correctly laid and compacted as specified.
- Check that the surface has been properly prepared and compacted to the required standard, and is smooth and flat.
- Ensure any sand blinding is free of aggregate, sharp protrusions.
- Ensure the final surface is free of hollows and ponded water prior to laying the DPM.

5.7.10.3 Roof Structure

Roof Structure - prior to roof underlay installation check all aspects of preparatory works, including but not limited to:
- Check that the supporting purlins or battens are set-out to the required set-out and spacings, are straight and true to line and plane, and are securely fixed.
- Check that all barge and fascia boards have been installed to the correct line and plane with all edge blocking complete and secure.
- Check that valley gutter and hidden gutter framing is to the required dimensions with solid backing supports securely fixed, true to line and plane.
- Check that internal gutter membrane linings are complete, and dressed back and adhered to a solid substrate along the roof edge as shown on the approved drawings.
- Check that all trimming for roof penetrations, all roof/wall junction blocking, and all necessary work by other trades is complete.
- Check that solid sarking required for fully-supported roofing is complete and securely fixed in accordance with the approved drawings.
- Check that any required anti-ponding boards for tiled roofs have been correctly installed to a minimum 5° (1:12) fall to the eaves gutter.

5.7.11 Installation - Roof Underlay

5.7.11.1 Covertek 407 - synthetic roof underlay

Covertek 407 synthetic roof underlay shall be installed without support on roofs with slopes 10° or greater (unless specified otherwise), run horizontally across the roof slope and over the purlins, starting from the gutter/lowest point up to the ridge/highest point, extending maximum 20mm into gutters, with minimum 150mm side and end laps, lapped such that any water will be shed to the outside of the underlay, and sufficiently tensioned without sagging.

Fix at maximum 300mm centres to purlins, with 8-12mm stainless steel staples or 20mm large-head galvanised clouts or galvanised proprietary grippers.

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For tiled roofs, lay Covertek 407 underlay over the anti-ponding board and rafters/trusses, and fix at maximum 300mm centres to the rafters/trusses before the tile battens are installed.

Can only be used in lined applications

Finish Covertek 407 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 Thermakraft requirements and as detailed. Leave underlay minimum 50mm distance clear of the outer liner of flue stacks.

5.7.12 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 Thermakraft 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 Thermakraft maintenance requirements and the Thermakraft product warranties for the installed products.

5.8 IBS RigidRAP®

5.8.1 Scope

Supply and install IBS RigidRAP®, as specified herein, to the locations indicated on the design drawings, complete with all system components and accessories required for proper installation and performance. This system can be used as a rigid air barier system or a structural bracing system, or both. All aspects of this work shall be in complete accordance with IBS RigidRAP® Design and Installation Guide (check https://www.ibs.co.nz/product/ibs-rigidrap/, or email info@ibs.co.nz, or call 0800 500 338 for the latest editions), and other relevant product manufacturers' recommendations. IBS RigidRAP® is CodeMark assured with the NZ Building Code: refer to CodeMark Product Certificate No: CM70035 Issued by Bureau Veritas Australia Pty Ltd.No substitutions are permitted for IBS RigidRAP®
For the purpose of this specification, all IBS RigidRAP® technical literature, including the Design & Installation Guide and CodeMark Certificate, is collectively referred to as the 'Technical Literature'.
This specification section must be read in conjunction with other specification sections and the contract documents, as they are interrelated. For more information, please refer to:
IBS RigidRAP® FAQ's: https://www.ibs.co.nz/wp-content/uploads/2019/08/IBS-RigidRAP-1-Page-FAQ.pdf
IBS RigidRAP® Booklet: https://www.ibs.co.nz/wp-content/uploads/2019/07/RigidRAP-Booklet.pdf
IBS RigidRAP® Design and Installation guide to: https://www.ibs.co.nz/wp-content/uploads/2019/07/RigidRAP-Design-Installation-Guide.pdf
IBS RigidRAP® CodeMark certificate to: https://www.ibs.co.nz/wp-content/uploads/2019/07/RigidRAP-Codemark-Certificate-CM70035.pdf
IBS RigidRAP® approved CAD details to:https://www.ibs.co.nz/download-centre-cad-files/

5.8.2 Requirements

5.8.2.1 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.

5.8.2.2 Warranty

IBS RigidRAP® Product Warranty - according to warranty terms and conditions:
- 50 Years Warranty for IBS RigidRAP® supplied by IBS.
- Provide the warranty on the supplier's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

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5.8.2.3 Substitutions

IBS RigidRAP® shall be as specified herein and on the design drawings. The substitution of IBS RigidRAP® for an alternative rigid air barrier material or wall bracing system is not permitted under any circumstances.
For all IBS RigidRAP® Wall Bracing Systems, no product substitution is allowed.
The substitution of a specified IBS RigidRAP® wall bracing system for an alternative IBS RigidRAP® wall bracing system 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 IBS RigidRAP® wall bracing system to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

5.8.2.4 Inspections & Reporting

BCA inspections of the works shall take place at each of the stages 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.

5.8.2.5 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.

5.8.2.6 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 IBS RigidRAP® work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional cost to the Principal.

5.8.3 Wall Bracing System

5.8.3.1 SYSTEM 3: IBS RigidRAP® 600 mm x 2400 mm wall GIB HandiBrac®

SYSTEM 3: IBS RigidRAP® 600 mm x 2400 mm wall GIB HandiBrac®
- Fixing 30 x 2.5 Galv clouts @ 150mm centres, 12mmm from edge.
- Fixing: Gib Handibrac® to concrete as per manufacturer’s instructions
- Minimum Wall Length: 600mm.
- Lining Requirements: 8mm IBS IBS RigidRAP® fixed to one side.
- BU/m - Wind: Concrete Floor = 76 BU/m. Timber Floor = 76 BU/m.
- BU/m - Earthquake: Concrete Floor = 81 BU/M. Timber Floor = 81 BU/m.

Installed to the locations indicated on the design drawings in accordance with the IBS RigidRAP® Design & Installation guide.
Wall length to not be longer than twice the stated length.
Installed Location:

5.8.3.2 SYSTEM 4: IBS RigidRAP® 1200 mm x 2400 mm wall GIB HandiBrac®

SYSTEM 4: IBS RigidRAP® 1200 mm x 2400 mm wall GIB HandiBrac®
- Fixing 30 x 2.5 Galv clouts @ 150mm centres, 12mmm from edge. Intermediate fixing at 600mm along stud @ 300mm centres.
- Fixing: Gib Handibrac® to concrete as per manufacturer’s instructions
- Minimum Wall Length: 1200mm.
- Lining Requirements: 8mm IBS IBS RigidRAP® fixed to one side.
- BU/m - Wind: Concrete Floor = 131 BU/m. Timber Floor = 131 BU/m.
- BU/m - Earthquake: Concrete Floor = 107 BU/M. Timber Floor = 107 BU/m.

Installed to the locations indicated on the design drawings in accordance with the IBS RigidRAP® Design & Installation guide.
Wall length to not be longer than twice the stated length.
Installed Location:

5.8.3.3 SYSTEM 5: IBS RigidRAP® 2400 mm x 2400 mm wall with GIB HandiBrac®

SYSTEM 5: IBS RigidRAP® 2400 mm x 2400 mm wall with GIB HandiBrac®
- Fixing 30 x 2.5 Galv clouts @ 150mm centres, 12mmm from edge. Intermediate fixing at 1200mm along stud @ 300mm centres.
- Fixing: Gib Handibrac® to concrete as per manufacturer’s instructions
- Minimum Wall Length: 2400mm.
- Lining Requirements: 8mm IBS IBS RigidRAP® fixed to one side.
- BU/m - Wind: Concrete Floor = 108 BU/m. Timber Floor = 108 BU/m.
- BU/m - Earthquake: Concrete Floor = 89 BU/M. Timber Floor = 89 BU/m.

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Installed to the locations indicated on the design drawings in accordance with the IBS RigidRAP® Design & Installation guide.
Wall length to not be longer than twice the stated length.
Installed Location:

5.8.3.4 SYSTEM 8: IBS RigidRAP® 600 mm x 2400 mm with GIB HandiBrac® and Gib Board lining

SYSTEM 8: IBS RigidRAP® 600 mm x 2400 mm wall with GIB HandiBrac® and Gib Board lining
- Fixing 30 x 2.5 Galv clouts @ 150mm centres, 12mmm from edge.
- Fixing: Gib Handibrac® to concrete as per manufacturer's instructions
- Minimum Wall Length: 600mm.
- Lining Requirements: 8mm IBS RigidRAP® fixed to outside and standard 10mm Gib plasterboard to inside.
- BU/m - Wind: Concrete Floor = 130 BU/m. Timber Floor = 120 BU/m.
- BU/m - Earthquake: Concrete Floor = 130 BU/M. Timber Floor = 120 BU/m.

Installed to the locations indicated on the design drawings in accordance with the IBS RigidRAP® Design & Installation guide.
Wall length to not be longer than twice the stated length.
Installed Location:

5.8.3.5 SYSTEM 9: IBS RigidRAP® 1200 mm x 2400 mm with GIB HandiBrac® and Gib Board lining

SYSTEM 9: IBS RigidRAP® 1200 mm x 2400 mm wall with GIB HandiBrac® and Gib Board lining
- Fixing 30 x 2.5 Galv clouts @ 150mm centres, 12mmm from edge. Intermediate fixing at 600mm along stud @ 300mm centres.
- Fixing: Gib Handibrac® to concrete as per manufacturer's instructions
- Minimum Wall Length: 1200mm.
- Lining Requirements: 8mm IBS RigidRAP® fixed to outside and standard 10mm Gib plasterboard to inside.
- BU/m - Wind: Concrete Floor = 150 BU/m. Timber Floor = 130 BU/m.
- BU/m - Earthquake: Concrete Floor = 150 BU/M. Timber Floor = 130 BU/m.

Installed to the locations indicated on the design drawings in accordance with the IBS RigidRAP® Design & Installation guide.
Wall length to not be longer than twice the stated length.
Installed Location:

5.8.4 Components & Accessories

5.8.4.1 IBS RigidRAP® 8mm OS3 Panel

IBS RigidRAP® (rigid air barrier panel). A 8mm thick, 3-layered, moisture resistant, oriented strand board structural bracing panel (sheet), manufactured in accordance with EN 13986:2004, and designed specifically for the New Zealand building and construction industry. IBS RigidRAP® is Codemarked that it complies with the NZBC.

IBS RigidRAP® is suitable for use:
- As an internal or external wall bracing element when used in conjunction with a specific fixing system - refer to Wall Bracing Systems clause.
- In exterior wall construction as an alternative to light or heavyweight wall wrap or where a rigid air barrier is required.
- As an internal wall substrate where high impact use is expected.

Standard Panel Sizes: 1196mm wide x 2440/2745/3050mm long.
Installed, in accordance with the IBS RigidRAP® Design and Installation Guide, to the locations and details shown on the design drawings.

Application:
Installed Location:

5.8.4.2 Panel Fixings

Refer to Panel Fixing clause for more information.

5.8.4.3 Mechanical Connections and Ties - Wall Bracing Systems

Mechanical Connections and Ties - for IBS RigidRAP® Wall Bracing Systems. Refer to the selected bracing systems in the Wall Bracing Systems clause and the IBS RigidRAP® Design and Installation Guide section 3.3.9, pg 12 for specific requirements.

5.8.4.4 Flexible Flashing Tape

Flexible Flashing Tapes - for exterior applications. Only use flexible sealing tapes approved for use with IBS RigidRAP® , in accordance with the tape manufacturer's instructions and the Technical Literature. Flexible flashing tapes shall be used to seal IBS RigidRAP® panel joints (vertical and horizontal), around framed window and door openings in exterior walls, and to seal pipes, ducts, etc penetrating exterior walls so as to form a weathertight rigid air barrier.

Approved Flexible Flashing Tapes:
- Hydro™ Flashing Tape (Masons)
- Super-Stick® Building Tape (Marshall Innovations)
- Tescon Extora (Pro Clima)

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- FlameFlash™ Flashing Tape (Techno Insulation)
- Watertight® Flashing Tape (Techno Insulation)
- 3M All Weather FLashing Tape 8067

5.8.4.5 Gib HandiBrac

GIB HandiBrac® is to be fixed to the 90 x 45mm studs with 4 No. supplied Tek Screws, and to the floor substrate with:
Fixing to timber framed floors: BOWMAC® screw bolt to achieve a characteristic uplift strength of 12kN.
Fixing to concrete slabs: BOWMAC® screw bolt to achieve a characteristic uplift strength of 15kN
Install as per manufacturers instructions. For more information on the system, refer to: https://www.gib.co.nz/assets/Uploads/LiteratureFile/PRODUCTS/GIB-HandiBrac-Brochure.pdf

5.8.5 Panel Fixing

5.8.5.1 Galvanised Nails - Rigid Air Barrier

IBS RigidRAP® Rigid Air Barrier. Fix panels to timber framing with 30 x 2.5mm hot-dip galvanised clouts. Set nail heads flush with the panel surface. Do NOT drive fixings below the surface.

Fixing Pattern:
- Panel Edges: fix at maximum 150mm centres on all sides (vertical and horizontal edges), including around window and door openings.
- Panel Body: fix at maximum 300mm centres to intermediate studs and along nog/dwang lines.

5.8.5.2 Galvanised Nails - Wall Bracing

IBS RigidRAP® (rigid air barrier panel) - Wall Bracing. Fix panels to timber framing with 30 x 2.5mm hot-dip galvanised clouts @ 150mm crs. around the perimeter, to the fixing pattern specified for the bracing system according to the IBS RigidRAP® Design & Installation Guide. Set nail heads flush with the panel surface. Do NOT drive fixings below the surface.

5.8.5.3 Bottom plate fixing

Bottom plate fixing for standard IBS installation shall be installed as per NZ3604:2011 figure 8.12 or as per IBS RigidRap® installation guidance 3.3.13.3

5.8.5.4 Gib Handibrac fixing

For installations where the IBS RigidRAP®system is to be used for bracing, the selected system shall have the studs fixed with Gib Handibrac using the supplied fixings, to the details and locations as shown in the contract documentation ,manufacturers instructions and as per IBS RigidRAP®installation guidance 3.3.13.3. Gib Handibrac is suitable for all exposure zones.

5.8.5.5 Mechanical hold down and uplift connections

Refer, for more information, to IBS RigidRAP®installation guidance 3.3.14, and to the appropriate proprietary system's installation instructions. Ensure that the mechanical connectors are suitable for the uplift and hold down forces required, the application, the structural engineers requirements, exposure zone requirements. If in doubt, contact IBS RigidRAP®.

5.8.6 Sealing tape

5.8.6.1 General

For joint sealing tape selection, refer for more information to IBS RigidRap® installation guidance 3.4, and to the appropriate proprietary system's installation instructions. The following sealaing tapes are suitable and compatible for use with the IBS RigidRap® system. If unsure, please contact RigidRap®. All joints and penetrations must be sealed including:
• Vertical and horizontal joints
• External and internal joints
• Penetrations
• Window and door joinery
Where sealing a joint, ensure the IBS RigidRAP® joins are centred under the tape joint. Use a 25 mm hard PVC roller to ensure full adhesion.

5.8.6.2 Selection: 3M™ All Weather Flashing Tape

The contractor is to use, for joint sealing, 3M™ All Weather Flashing Tape 8067, refer to: www.3mnz.co.nz

5.8.7 Co-operation

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

Coordinate with trades as necessary to install IBS RigidRAP® as required.

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5.8.8 Workmanship

5.8.8.1 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 (LBP). On completion of the installation, the installing LBP shall complete and sign a Restricted Building Work (RBW) memorandum and shall issue a copy to the Building Consent Authority and, where applicable, to the Main Contractor.

Installation and finishing work shall be carried out by suitably qualified and experienced tradespersons, familiar with the specified materials and their installation techniques and cavity construction, in accordance with the Technical Literature, and to fully comply with all warranty requirements.

All cutting, drilling and notching, jointing and sealing techniques shall be exactly as recommended by the manufacturer and shall be carried out using suitable tools and equipment.

All work shall be such as to leave a neat, efficient, robust and weathertight installation, to the required standard, free from damage and defects.

5.8.9 Delivery and Handling

Upon delivery to site inspect IBS RigidRAP® materials and reject those items found to be damaged, defective or substandard, and contact the supplier immediately. Any strapping and shrink-wrap must be removed from packed IBS RigidRAP® without delay. Allow IBS RigidRAP® to condition and acclimatise for at least 48 hours prior to commencing installation.

Store IBS RigidRAP® panels undercover in a well-ventilated area, stacked flat, off the ground and supported on level bearers spaced at maximum 800mm centres in accordance with the Technical Literature. Keep stored materials dry and protected from damage and contamination, and free from bending and distortion.

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

Should a problem be encountered with any IBS RigidRAP® product, immediately contact IBS on 0800 367 759. Do not continue to use the product that is not performing to specification or expectation. Keep the product in question, and where possible, document numbers and/or manufacturing details.

IBS RigidRAP® must not be exposed to weather (atmospheric conditions) for more than 3 months after installation - remove and replace with new IBS RigidRAP® if 3 months' exposure is exceeded.

Handle materials in accordance with the manufacturer's recommendations, and in a manner that prevents damage and does not reduce its performance.IBS RigidRAP® panels should always be carried manually on edge.

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 to 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.

5.8.10 Preparation

5.8.10.1 Preparation

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

Do not commence installation until all necessary preliminary work 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 work by other trades is complete.

Timber framed elements shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific-design, and have a maximum moisture content of 18% at the time of IBS RigidRAP® installation.

Lightweight steel framed elements shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. Comply with the light structural steel framing fabricator's specifications and requirements for fixing rigid wall underlay. Note: the installation of IBS RigidRAP® on lightweight steel framing is limited to the use as a rigid air barrier only (when fitted with a thermal break), NOT for structural bracing purposes.

5.8.10.2 Framing Check

Framing Check - prior to installation check all aspects of preparatory works, including but not limited to:
- Check that wall framing has been completed to the layout shown on the design drawings and complies with the relevant design and construction standards.
- Check the framing has studs spaced at maximum 600mm centres, has the required number of rows of horizontal nogs/dwangs at the correct spacings, is plumb and in true alignment,

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- Check the framing is securely fixed, true to line and plane, is plumb and level where required, and is correctly trimmed at edges, openings and penetrations as required.
- Check there are no projections due to structural bracing and bracketry etc.
- Exterior walls: check the required clearances from ground, deck, balcony or lower roof to the bottom edge of the rigid air barrier and cladding system are in accordance with NZBC E2/AS1.

5.8.11 Installation

Install IBS RigidRAP® as a rigid air barrier in accordance with the Technical Literature.

General:
- Panels must always be installed vertically when used as a bracing element.
- Always install panels with the printed side showing 'This Side Out' to the exterior of the building.
- Panels joints must be formed on solid framing with panel edges fully supported and gapped minimum 4mm apart (vertical and horizontal).
- Panel fixing - refer to Panel Fixing clause. Do NOT drive fixings below the panel surface.
- All vertical and horizontal panel joints, other than at mid-floor inter-storey junctions, must be sealed with an approved flexible flashing tape
- Allow a minimum of 4 mm between panel joints to accommodate dimension movement.

Horizontal Joints:
- Panel joints on walls greater than 3050mm high (except inter-storey joints) shall be formed on solid blocking, of the same gauge as the studs, with a 4mm gap between upper and lower panels. Panels higher than IBS RigidRAP® 2440 mm must be fixed top plate to bottom plate. When walls are higher than 2440 mm, IBS RigidRAP® 2745 or 3050 mm sheets can be used.
- Inter-storey joints shall be made at each mid-floor level and incorporate a proprietary rigid 'Z' flashing and a 15mm gap between upper and lower panels. The panels must NOT be fixed to the mid-floor structure (joists, blocking, etc). IBS RigidRAP® must not be exposed to weather (atmospheric conditions) for more than 3 months after installation. Install cladding systems as soon as possible to enclose and protect installed IBS RigidRAP®.
- If the bracing systems requires GIB HandiBrac® hold down brackets, they shall be fixed to each end-to-end studs and to bottom plate with concrete hold downs as per manufacturer’s specifications. Refer to the IBS RigidRap® installation guide 3.3.13.3 for more information.

5.8.12 Limitations

When specifying IBS RigidRAP® as a bracing element, the designer must take into account site specific conditions and the building with respect to, but not limited to, the
following:
• Environmental (exposure) zone
• Wind zone
• Wall bracing table for wind and EQ demand
• Structural design loads
• Structural framing requirements
• Preparation of substrate
• External envelope

• Other materials likely to affect the performance of IBS RigidRAP®Refer to the IBS RigidRAP® Design & Installation Guide for more information on limitations.
- Allow a minimum of 4 mm between panel joints to accommodate dimension movement.
- Maximum spacings of wall studs must not exceed 600 mm centres.
- Curved walls, minimum radius 2.5 m are allowable, the IBS RigidRAP® panels must be fixed horizontally onto framing studs with spacing and stud centres dependent on the radius.
- A proprietary ‘Z’ flashing must be installed at mid floor level where IBS RigidRAP® is installed on multi levels. Serviceability of the joints may be affected if - at the time the timber framing is installed - its moisture content is greater than 18%.
- For wall heights greater than 3050 mm horizontal wall joints are permitted, provided the panel joint is over solid blocking of the same gauge as the studs.
- Panels higher than IBS RigidRAP® 2440 mm must be fixed top plate to bottom plate. When walls are higher than 2440mm, IBS RigidRAP® 2745 or 3050 mm sheets can be used.
- All joints, other than mid floor level, (vertical and horizontal) must be sealed with an IBS approved self-adhesive “flashing tape” as specified in section 3.4. IBS recommend 150 mm flashing tape or a proprietary Z flashing for horizontal joins.
- A hole 100 x 100 mm maximum within an envelope of 100 mm from top and vertical edges and 200 mm from the bottom of the IBS RigidRAP® panel will not affect the bracing capacity. Multiple holes of this size are permitted provided the centre lines of the holes are not closer than 600 mm.
- Steel fixings and fastenings must be in accordance with table 4.1, NZS 3604: 2011.
- IBS RigidRAP® must be allowed to acclimatise for at least 48 hours prior to installation.
- Do not install IBS RigidRAP® if the building paper has delaminated from the OSB sheet.

5.8.13 Completion

Check IBS RigidRAP® rigid air barrier and bracing systems have been installed correctly according to the Technical Literature and as indicated on the design drawings.

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Check that all IBS RigidRAP® panel joints, window and door openings and panel penetrations are correctly sealed with flexible flashing tape according to the Technical Literature.

Check for damage and defects - replace or repair as necessary to the required standard.

Ensure 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.

Leave all of this work complete and to the required standard in accordance with the Technical Literature and 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.

Complete and sign the Restricted Building Work (RBW) memorandum. Issue a copy of the RBW document to the Building Consent Authority and, where applicable, to the Main Contractor.

Issue to the Owner a copy of the IBS RigidRAP® Care & Maintenance requirements, and a copy of the IBS RigidRAP® Product Warranty.

5.9 Rosenfeld Kidson & Co Cedarscreen Weatherboard Systems

5.9.1 Scope

5.9.1.1 Cedarscreen Vertical Shiplap Weatherboard - 20mm Cavity

Supply and install the Rosenfeld Kidson Cedarscreen Vertical Shiplap Weatherboard 20mm Cavity System, as specified herein, to the walls identified on the drawings, complete with all accessories and trim. All aspects of this work shall be in complete accordance with the Rosenfeld Kidson Cedarscreen product specifications and technical literature (check www.cedarscreen.co.nz for the latest editions), NZBC E2/AS1, other relevant product manufacturers' recommendations, and as shown on the drawings.

The Rosenfeld Kidson Cedarscreen Vertical Shiplap Weatherboard 20mm Cavity System is CodeMark assured: CodeMark Product Certificate No. CM70083, issued by Bureau Veritas Australia Pty Ltd.

No substitutions or deletions are permitted for the Rosenfeld Kidson Cedarscreen Vertical Shiplap Weatherboard 20mm Cavity System.

5.9.2 Timber Species

5.9.2.1 Western Red Cedar, Premium Clears No 1 – Vertical Shiplap Weatherboard

Rosenfeld Kidson Vertical Shiplap Weatherboard Premium Grade PC1 Clears shall be manufactured from sustainably sourced Canadian Western Red Cedar (*Thuja plicata)*. Producers carry SFI, CSA, FSC or PEFC Certifications.

Western Red Cedar used above ground complies with New Zealand Building Code Clause B2 Durability, Performance Requirement B2.3.1(b) and NZS 3602: Part 1:2003 Timber and Wood based products for use in Buildings.

5.9.3 Weatherboard Profile

5.9.3.1 RK55 Vertical Shiplap

RK55 Rosenfeld Kidson Vertical Shiplap Weatherboard: 110mm effective cover, 135mm wide x 18.5mm thick.

Installed Location:

5.9.4 Weatherboard Finish & Coating

5.9.4.1 Bandsawn Face - Dryden WoodOil ColorTone Finish - Western Red Cedar

Cedarscreen Western Red Cedar weatherboard profiles and timber mouldings shall be manufactured with a Bandsawn Face (BSF) and supplied factory-coated with Dryden WoodOil and specified Dryden ColorTone tint applied to all faces and edges.

All site-cut ends, notches and holes in weatherboards and timber mouldings must be sealed with one coat of Dryden WoodOil

Following installation, Cedarscreen Western Red Cedar weatherboards and timber mouldings shall be coated with a finishing coat of Dryden WoodOil, applied to all exposed surfaces.

The use and application of Dryden WoodOil shall be carried out in strict accordance with the manufacturer's requirements.

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Dryden Colortone:

5.9.5 Cavity Battens

5.9.5.1 Timber Cavity Battens, 20mm Cavity - Vertical Weatherboard

Timber Cavity Battens (non-structural) to form a nominal 20mm deep drained cavity for vertical weatherboards.

Horizontal Battens: Rosenfeld Kidson CS-H 20x45mm, H3.1 treated Radiata pine, bevelled and castellated cavity battens, incorporating 25mm wide x 6mm deep rebates alternating at 75mm centres either side of the batten.

Installed horizontally, with batten edges sloping down and away from the framing, at maximum 400 - 480mm vertical centres, to the layout and details shown on the drawings and in accordance with Cedarscreen installation requirements.

NOTE:

- CS-H 20 Horizontal Cavity Battens require additional dwang support.

Vertical Battens: Rosenfeld Kidson CS-V 20x45mm & CS-V 20x75, H3.1 treated Radiata pine cavity battens.

Installed vertically to form a cavity at window jambs and at internal and external corners as per the layout and details shown on the drawings and in accordance with Cedarscreen installation requirements.

Fixing to Timber Framing:

- **CS-H 20**: Position castellated cavity battens to timber framing using 40 x 2.5mm hot-dip galvanised flat head nails. Final fixing of battens by cladding fixings through to wall framing.
- **CS-V 20:** Position cavity battens to timber framing with 40 x 2.5mm hot-dipped galvanised flat head nails. Final fixing of battens by cladding fixings through to wall framing.

5.9.6 Flashings

5.9.6.1 Flashings - Aluminium, 20mm Cavity, Standard Finish, Low-Very High Wind Zones

Flashings manufactured from Grade 5005 H32 aluminium, 0.70mm thick, and formed to suit the details indicated on the design drawings and in accordance with the Cedarscreen Installation Manual. Flashing materials shall comply with the requirements of NZBC E2/AS1 Tables 20, 21 and 22.

Standard Finish: Dulux Duralloy 'Matt Black'

Standard concealed and exposed flashings include:

- RKFL-09 65mm x 65mm internal/external corner flashing

- RKFL-11 23.5mm J Mould

- RKFL-12 42x14mm Cavity Closure

- RKFL-17 33mm J Mould

- RKFL-31 18mm External Corner Flashing

- RKFL-34 28mm External Corner Flashing

- RKFL-35 18mm External Corner Flashing

- RKFL-36 28mm External Corner Flashing

- RKFL-40 Vertical Joint Flashing

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5.9.7 Timber Mouldings

5.9.7.1 RK33 Eaves Mould

Rosenfeld Kidson & Co Timber Moulding - RK33 : 26 x 15mm Eaves Mould with 3mm arris. Supplied by Rosenfeld Kidson & Co, and selected to match the specified cladding material. Installed to the locations and details shown on the approved drawings in accordance with the applicable Cedarscreen Weatherboard Cladding Manual(s)

5.9.7.2 RK97 External Timber Moulding

Rosenfeld Kidson & Co Timber Moulding - RK97 : 45 x 45mm External Timber Moulding. Supplied by Rosenfeld Kidson & Co, and selected to match the specified cladding material. Installed to the locations and details shown on the approved drawings in accordance with the applicable Cedarscreen Weatherboard Cladding Manual(s)

5.9.8 Co-operation

5.9.8.1 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works, including membranes, flexible underlays, rigid air barriers, and trims and any other related works are completed in accordance with the Cedarscreen Weatherboard Cladding System technical manuals and approved construction drawings.

Refer www.cedarscreen.co.nz or contact Rosenfeld Kidson & Co on 09 573 0503 (North Island) or 03 349 3316 (South Island) for any technical assistance required, and ensure that current Cedarscreen technical literature is referenced and followed when installing Cedarscreen weatherboards.

Coordinate with trades the locations of pipes, outlets, cables, meter boards and other fittings installed by others, and to install Cedarscreen Weatherboard Cladding System as required.

5.9.9 Workmanship

5.9.9.1 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 (LBP). On completion of the installation, the installing LBP shall complete and sign a Restricted Building Work (RBW) memorandum, and shall issue a copy to the Building Consent Authority and to the Main Contractor (as applicable).

Installation work shall be carried out by suitably qualified and experienced tradespersons, familiar with the specified products and the required construction and installation techniques, in accordance with applicable Cedarscreen Weatherboard Cladding Manual(s) and to fully comply with all warranty requirements.

All work shall be such as to leave a neat, efficient, robust and weathertight installation, to the required standard, free from damage and defects, including surface marking.

Make all necessary provisions to protect adjacent finished work and surfaces from damage during installation.

5.9.10 Delivery & Handling

5.9.10.1 Delivery and Handling

Take delivery of materials undamaged. Reject any item found to be defective or damaged and contact the supplier for replacement.

Store Cedarscreen weatherboards and accessories undercover, flat and true, clear of the ground by at least 100mm and supported on dry and clean timber in accordance with Rosenfeld Kidson & Co recommendations. Keep stored weatherboards and accessories dry and protected from damage and contamination.

Do not use damaged or defective weatherboards or accessories. Should a problem be encountered with any Rosenfeld Kidson & Co product, immediately contact Rosenfeld Kidson & Co on 09 573 0503 (North Island) or 03 349 3316 (South Island). 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 details.

Handle weatherboards 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 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 at height in NZ, and the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

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5.9.11 Preparation

5.9.11.1 Cavity Fix over Rigid Underlay - 20mm Cavity, Vertical Weatherboard

Cedarscreen Shiplap Weatherboard Cladding - installed over bevelled and castellated Cavity Batten profiles with a Rigid Wall Underlay as required by E2/AS1 Table 23 over Timber framing - check all aspects of preparatory works, including, but not limited to:
- Check that the timber wall framing complies with NZS 3604, has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres for vertical cladding, is plumb and in true alignment, includes all blocking required for cavity battens and fixing at openings, joints, corners, soffits, etc., and has a maximum moisture content of 18% at the time of cladding installation.
- Check that the rigid wall underlay, as specified, has been installed in accordance with NZBC requirements and the manufacturer's recommendations, with all finishing tapes, flashings etc. at windows, doors, corners and penetrations all correctly incorporated to provide a continuous seal.
- Check that all preparatory materials are lapped such that any water will run down to the exterior.

5.9.12 Installation

5.9.12.1 Cladding General

Install Cedarscreen Weatherboard Cladding, complete with all system components and accessories required for proper installation and performance, in accordance with the appropriate Cedarscreen Cladding System Manual and as shown on the approved construction drawings.

Confirm the layout and location of movement control joints, the layout of cavity battens, and any specific cladding detailing requirements prior to installation.

Ensure that all associated preliminary and preparatory works are completed to the required standard and specification, and as shown on the drawings.

Ensure that the current, up-to-date Cedarscreen technical literature is readily available on site for reference during installation. Where there is any doubt, contact Rosenfeld Kidson & Co on 09 573 0503 (North Island), 03 349 3316 (South Island) or visit www.cedarscreen.co.nz

Ensure that all site-cuts to weatherboards and timber mouldings are properly sealed with Dryden WoodOil accordance with WoodOil application requirements

Refer to Fixing clause for fixing type and placement etc.

All internal and external weatherboard corner junctions, inter-storey junctions, and weatherboard trim and accessories, shall be constructed and installed to the details shown on the drawings and Cedarscreen technical resources.

All flashings around windows, doors and other openings, at corner junctions, inter-storey junctions, soffit junctions, and pipe penetrations, shall be carefully constructed, fixed and finished to the details shown on the drawings and Cedarscreen technical resources.

- Start the fixing process from either an internal or external corner.

- The layout of the vertical shiplap weatherboards should be configured against the prevailing wind.

- Establish an accurate measurement between the starting corner and finishing point, working out an even board set out taking into account all associated junctions, including window jambs.

- Ensure full width boards are allowed for trimming into window jamb to head Junctions.

- Jamb to head and sill junctions – ensure weatherboards are full width and continuous in length.

- Ensure vertical weatherboards are continuous in length between inter storey heights (maximum height 2 storey).

- Check weatherboard length spread and use appropriately to suit each cladding face.

5.9.13 Fixing

5.9.13.1 Fixing - Vertical Weatherboard, Stainless Steel

Fix Cedarscreen Weatherboards with Rose Head, Annular Grooved, Grade 316 Stainless Steel Nails in accordance with Cedarscreen fixing requirements and as shown on the design drawings. Nail fixings shall be hand-driven, and placed so as to be accurately aligned without deviation along vertical, plumb lines.

Fixing to Timber Framing over 20mm Packer Cavity Battens (non-structural):
- Flexible Underlay - Fix to timber framing using minimum 75 x 3.15mm nails.
- Rigid Underlay - Fix to timber framing using minimum 85 x 3.15mm nails

- The nail length must allow minimum 35mm penetration into into timber framing. Cavity Battens are fixed by the cladding fixings to wall framing members.

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Fixing to 45mm Structural Cavity Battens:
- minimum 60 x 3.15mm nails
- The nail length must allow minimum 35mm penetration into the structural cavity batten.

All nail fixings shall be pre-drilled slightly smaller than the nail gauge. Do not brad weatherboards prior to face nailing.

Single fix rusticated weatherboards at every fixing point, located 35-40mm up from the bottom or lapped edge of the weatherboard, and no closer than 20mm from the end of the board.

Ensure the weatherboards are set-out with an overlap of 25mm, with a 2mm expansion gap between boards at the overlap.

Set rose head nails flush onto the board surface - not into or below the surface.

Fix Timber Mouldings using 40-50mm x 2.8mm, Grade 316 Stainless Steel, Annular Grooved, Rose Head Nails.

5.9.14 Completion

5.9.14.1 Completion

Check that the CedarscrenWeatherboard Cladding system has been correctly installed and fixed to the layout and details shown on the drawings and in accordance with the requirements of the applicable Cedarscreen Cladding Manual(s)
Check that all joints, associated trim and accessories are correct, that junctions with other materials and elements are sealed, and the weatherboard cladding system is weathertight.

Check for damage and defects - replace or repair as necessary to the required standard.

Ensure 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.

Leave all of this work complete and weathertight and to the required standard in accordance with Cedarscreen requirements and NZBC E2/AS1.

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

Complete and sign the Restricted Building Work (RBW) memorandum, and the Cedarscreen Cladding System Quality Assurance Check List. Issue a copy of the RBW document to the Building Consent Authority and to the Main Contractor.

Issue to the Owner a copy of the Cedarscreen Cladding maintenance requirements.

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6 ROOFING

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:

1170.0:2002 SUPP1(AS/NZS)	Structural design actions - General principles - Commentary
1170.2:2011(AS/NZS)	Structural design actions - Wind actions
2295:2006(NZS)	Pliable, permeable building underlays
2728:2013(AS|NZS)	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
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
NZBC F2	Hazardous Building Materials
NZBC G12	Water Supplies
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0

6.3 Metalcraft Longrun Roofing

6.3.1 Scope

Supply and install Metalcraft Longrun Roofing, 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 Metalcraft Longrun Roofing technical literature and publications (check http://www.metalcraftgroup.co.nz or call (0800) 766 369 for the latest editions), and other relevant product manufacturers' recommendations.

No substitutions are permitted for Metalcraft Longrun Roofing.

For the purpose of this specification, Metalcraft Longrun Roofing is referred to as 'Longrun Roofing', and all 'Metalcraft' associated technical literature and publications, including the 'Metalcraft Product Technical Statement', installation instructions and drawings, are collectively referred to as the 'technical literature'.

Extent of work:

The following is a list and/or general description of the extent of the Metalcraft Longrun Roofing works, which are more specifically defined in the contract documents, required for the completion of the contract works:

6.3.2 Requirements

6.3.2.1 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.

6.3.2.2 Warranty:

Warranty for Manufacturer or Supplier:

- 15 years minimum for coatings

Commence the warranty from the date of installation.

Warranty - Installer/ Applicator:

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Warrant this work under normal environmental and use conditions against weatherproofing failure.

Workmanship – Refer to Supplier.

6.3.2.3 Substitutions:

The Metalcraft Longrun Roofing shall be as specified herein and on the design drawings. The substitution of the Metalcraft Longrun Roofing for an alternative brand is not permitted under any circumstances.

The substitution of the specified Metalcraft Longrun roofing or ancillary component for an alternative Metalcraft Longrun Roofing system or ancillary component 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 Metalcraft Longrun Roofing or ancillary component to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

6.3.2.4 Producer statement (PS3):

The Metalcraft Longrun Roofing 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 Metalcraft Longrun Roofing in accordance with the consented drawings and specifications.

6.3.2.5 Inspections & reporting:

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.

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.

6.3.2.6 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.

6.3.2.7 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 Metalcraft Longrun Roofing 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.

6.3.3 Profile

Metalcraft - Trapazoidal roof sheet - a trapazoidal profile; 19mm rib height and 875mm effective cover based on the selected BMT.

Material type - Refer to ‘Roof Sheet Material’ clause.
Thickness - 0.40mm BMT (G300), 0.55mm BMT (G550)
Windload – Refer to 'technical literature'
Mass (KG/M2)- Refer to ‘Metalcraft’
Minimum pitch - 3 degrees (conditions apply - refer to Metalcraft for technical assistance)

- Sheets shall be continuous from ridge to gutter, or 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:

6.3.4 Roof Sheet Material

COLORSTEEL Maxam ® to selected BMT. Pre-painted hot dipped aluminium/zinc/magnesium alloy coated steel coil, with a minimum coating weight of 150g/m², conforming with AS/NZS 2728 Class 6. COLORSTEEL®

Colour:

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6.3.5 Roof Ancillary Components & Accessories

Fit and lap roofing underlay over the netting/mesh or use a self-supporting underlay. Lay underlay horizontally or vertically with a 150mm side lap, over-sailing the spouting and/or gutters by 10mm, in accordance with 'technical literature'.

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.

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.

Cladding screw 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 cladding profile and material and the supporting structure material; all in accordance with the NZMRM Code of Practice and E2 External Moisture.

Metal Flashings. Profiled metal cladding flashings shall be fabricated from material with the same coating as the cladding material, to maintain durability and compatibility requirements. Flashings shall be 0.55BMT G300 steel or H34 Aluminium coated to the same standards as the profiled cladding sheets, and notched/scribed when installed across the cladding profile or provided with a soft edge – in accordance with selected roof sheet material and NZMRM Code of Practice requirements.

Flashings, flashing fastenings and fastening frequency shall be in accordance with the NZMRM Code of Practice.

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

Rivet Fastenings. Rivets shall be sealed aluminium minimum 4mm diameter.

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

Proprietary Collar Flashings. EDPM or silicone-polymer proprietary flexible collar flashings for weatherproofing cladding-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.

Profiled Foam Closure Strip. Non-bituminous, compressible, closed-cell foam strips profiled to fit the specified cladding profile. Installed to the details shown on the drawings and in accordance with selected roof sheet material and NZMRM Code of Practice recommendations.

6.3.6 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 other trades, as required, on the assembly and installation of the Metalcraft Longrun Roofing to the required layout, details and tolerances.

6.3.7 Qualifications & 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 and suitably qualified to install Metalcraft Longrun Roofing, to fully comply with all warranty requirements in accordance with the manufacturer's requirements.

All cutting, fixing and installation techniques, fastenings and sealants shall be exactly as recommended by and in accordance with the NZMRM Code of Practice, and carried out with the use of suitable tools and equipment appropriate for the application.

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Always maintain isolation of dissimilar materials in accordance with the NZMRM Code of Practice Section 4.10. Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by fitting separator strips. Place isolators between metals and treated timber or cement-based materials.

Do not allow unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto Zincalume or galvanised materials.

All work shall be such as to leave a neat, efficient, robust and weathertight installation.

6.3.8 Delivery & Handling

Store Metalcraft Longrun Roofing, flashings and accessories clear of level ground, on bearers at evenly spaced centres as recommended by the NZMRM Code of Practice. Keep stored materials and accessories dry and protected from damage and contamination at all times.

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

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.

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 have been completed to specification and as shown on the approved drawings.

Do not commence installation until all necessary preliminary works by others are 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 are 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 light-gauge steel framed structures shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria.

Supporting heavy steel structures shall comply with NZS 3404 and the NZ Building Code.

Roof Structure - check all aspects of preparatory works, including but not limited to:

- Check that the purlins are installed to the required set-out and spacings, are straight and true to line and plane, and are securely fixed.
- Check that all barge and fascia boards have been installed to the correct line and plane with all edge blocking complete and secure.
- Check that valley gutter and hidden gutter framing is to the required dimensions with solid backing supports securely fixed, true to line and plane.
- Check that internal gutter membrane linings are properly dressed back and adhered to a solid substrate along the roof edge as shown on the design drawings.
- Check that all trimming for roof penetrations, all roof/wall junction blocking, and all necessary work by other trades are complete.
- Check that solid backing required for fully supported roofing is complete and securely fixed in accordance with the design drawings.

6.3.10 Installation

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 Working at Heights.

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

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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).

Accurately set-out the planned cladding layout prior to fixing to ensure true and accurate cladding lines and incorporate correct relationships with other design features shown on the drawings; maintain this accurate set-out throughout installation.

Keep cladding lines consistent and true along the roof; with side-laps of sheets to be straight, true and accurately aligned up and down. Check for and eliminate any creep and/or spread of sheets during installation.

Cut metal cladding and flashings by shear only - do not use abrasive cutting tools. Do not use black lead pencils for marking pre-finished metal cladding and flashings.

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

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

Install fasteners in a straight line with a consistent fastening pattern on each sheet in accordance with 'technical literature' requirements. Fasteners are to be set using a snug fitting socket and a setting tool that does not unduly damage the finish coating of the screw. Depth of setting is to be sufficient to achieve slight compression of the sealing washer without distorting the profile or the sealing washer itself.

Aluminium rivets are to be sealed type pre-painted to match cladding, minimum 4mm diameter. Clip-fastened sheets shall be fixed with concealed proprietary fastening clips appropriate for the cladding profile and material, substrate/structure and the environment in accordance with the NZMRM Code of Practice recommendations.

Install flashings as detailed on the drawings and in accordance with the Zealand Metal Roofing 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. Penetration flashings shall be as per the design details and shall not rely solely on silicone sealant to achieve weathertightness of the flashing.

Handle sheets carefully to avoid scratching and denting. Do not walk on wall cladding sheets prior to installation. Remove strippable film, if applied, immediately after installation of roof cladding to avoid resin staining. All accessories are to be colour matched prior to installation, do not use colour match paint for repairing any blemishes. Ensure sealant is trapped between joint surfaces and not exposed to the visual surface.

6.3.11 Compatibility

Ensure material is isolated from incompatible materials. It must not be in contact with, or receive run off from, less noble metals such as copper, brass and lead. It should not be in wet contact with stainless steel. Sustained wet contact with timber, either treated or untreated, must be avoided.

6.3.12 Completion

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

Leave all work complete and weathertight and to the required standard in accordance with the New Zealand Metal Roofing Code of Practice.

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

Maintenance should be carried out in accordance with Metalcraft maintenance requirements.

6.4 Metalcraft Rainwater & Fascia Systems

6.4.1 Scope

Supply and install Metalcraft Rainwater & Fascia Systems, 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 Metalcraft technical literature and publications (check http://www.metalcraftgroup.co.nz or call (0800) 766 369 for the latest editions), and other relevant product manufacturers' recommendations.

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No substitutions are permitted for Metalcraft Rainwater & Fascia Systems.

For the purpose of this specification, Metalcraft Rainwater & Fascia Systems is referred to as 'Rainwater & Fascia Systems', and all 'Metalcraft' associated technical literature and publications, including the 'Metalcraft Product Technical Statement', installation instructions and drawings, are collectively referred to as the 'technical literature'.

Extent of work:

The following is a list and/or general description of the extent of the Metalcraft Rainwater & Fascia Systems works, which are more specifically defined in the contract documents, required for the completion of the contract works:

6.4.2 Requirements:

6.4.2.1 Defective Material & Workmanship:

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected Metalcraft Rainwater & Fascia 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.

6.4.2.2 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.

6.4.2.3 Inspection and reporting:

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.

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.

6.4.2.4 Substitutions:

The Metalcraft Rainwater & Fascia Systems shall be as specified herein and on the design drawings. The substitution of the Metalcraft Rainwater & Fascia Systems for an alternative brand is not permitted under any circumstances.

The substitution of the specified Metalcraft Rainwater & Fascia Systems or ancillary component for an alternative Metalcraft Rainwater & Fascia ancillary component 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 Metalcraft Rainwater & Fascia ancillary component to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

6.4.2.5 Warranty:

Warranty for Manufacturer or Supplier:

- 15 years minimum for coatings

Commence the warranty from the date of installation.

Warranty - Installer/ Applicator:

- Warrant this work under normal environmental and use conditions against weatherproofing failure.

Workmanship – Refer to Supplier.

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6.4.2.6 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.

6.4.3 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 Rainwater & Fascia system to the required layout, details and tolerances.

6.4.4 Product

COLORSTEEL® Maxam™ - Pre-painted hot dipped aluminium/zinc/magnesium alloy coated steel coil, with a minimum coating weight of 150g/m², conforming with AS/NZS 2728 Class 6. COLORSTEEL®

Colour:

6.4.5 Spouting Profile

A proprietary box guttering system manufactured from Zinc/alum coated steel substrate conforming with AS 1397:2013. **NO SWAGES**

System:

- 170 x 78 x 128 high
- Cross-section area - 9750 mm/2
- Cross section capacity – 7875 mm/2

Accessories:

- Internal brackets
- External brackets
- Stop ends

Installed in accordance with ‘technical literature’ requirements.

6.4.6 Downpipe Profile

Metalcraft COLORSTEEL MAXAM downpipe system including round down pipes, bends and clips to the the requirements of the plans.

- 80mm round - internal dimension 79mm. Total cross sectional area = 4902mm/2
- 100mm round - internal dimension 101mm. Total cross sectional area = 8012mm/2
- 150mm round - internal dimension 158mm. Total cross sectional area = 19607mm/2

Installed in accordance with ‘technical literature’ requirements.

6.4.7 Preparation

Check all aspects of preparatory works, including but not limited to:-

Check that the timber framing complies with NZS 3604, is in true alignment and includes all blocking required for joints, corners and soffits etc., and has a maximum moisture content of 24% at the time of Metalcraft Rainwater & Fascia Systems installation.

Check that all preparatory materials are lapped such that any water will run down to the exterior.

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6.4.8 Installation

6.4.8.1 Workmanship

All installation work shall be carried out by experienced and competent tradesmen who are familiar with the techniques and materials specified. All handling and fixing techniques, and all jointing and sealing materials and techniques, shall be exactly as required by Metalcraft.

Handle spouting and fascia without scratching, distorting or damaging.

Protect the coated surface from damage at all times; replace the whole section where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf as the work proceeds.

Screw fixings shall be in accordance with Metalcraft requirements and as noted on the drawings, and of a compatible material and finish with the fascia, spouting, and spouting brackets. Exposed screws should be factory prepainted for an accurate colour match. Support brackets fixed in accordance with Metalcraft 'Technical literature' requirements.

6.4.8.2 Spouting

Screw fix spouting brackets, true to line, at maximum 900mm centres and to falls as shown on the drawings. Form spouting joints and downpipe droppers in strict accordance with Metalcraft 'technical literataure' requirements. Locate downpipe droppers to the set-out shown on the drawings.

6.4.8.3 Downpipes

Downpipes and spreaders setout and installed complete with bends as shown on the drawings. All joints lapped and sealed to Metalcraft 'technical literature' requirements. Screw fix down pipes plumb to walls with matching support brackets. Direct downpipes into stormwater system as noted on the drawings.

6.4.9 Completion

6.4.9.1 Completion:

Clean up thoroughly and remove debris and unused material from the site.

Issue to the Main Contractor a copy of the Metalcraft Rainwater Systems maintenance requirements together with the Metalcraft Rainwater Systems Warranty for the completed works.

6.5 Metalcraft Roofing Wall Cladding

6.5.1 Scope

Supply and install the selected Metalcraft Roofing Profiled Metal Cladding as a wall cladding to the walls identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with Metalcraft Roofing guides and technical manuals, (check 0800 766 369 for the latest editions), and other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Metalcraft Roofing Profiled Metal Wall Cladding.

6.5.2 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 trades the locations of pipes, outlets, cables, meter boards and other fittings installed by others.

6.5.3 Material

Steel, 0.55mm BMT.

6.5.4 Product

COLORSTEEL® Maxam™ to selected BMT. Pre-painted hot dipped aluminium/zinc/magnesium alloy coated steel coil, with a minimum coating weight of 150g/m², conforming with AS/NZS 2728 Class 6. COLORSTEEL®

Colour:

6.5.5 Profile

Metalcraft - Trapazoidal sheet - a trapazoidal profile; 19mm rib height and 875mm effective cover based on the selected BMT.

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Material type - Refer to ‘Material’ clause.
Thickness - 0.40mm BMT (G300), 0.55mm BMT (G550)
Windload – Refer to 'technical literature'
Mass (KG/M2)- Refer to ‘Metalcraft’

- 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:

6.5.6 Colour

Flaxpod® Matte

6.5.7 Components & Accessories

Profiled metal cladding flashings shall be fabricated from the same material and coating as the cladding material, to maintain durability and compatibility requirements.
Unless otherwise noted or specified, flashings shall be formable grade 0.55 BMT for galvanised, aluminium/zinc-coated and pre-painted steel, and 0.9mm BMT for aluminium, to the same standards as the profiled cladding sheets, and notched/scribed when installed across the cladding profile or provided with a soft edge - in accordance with the manufacturer's requirements.
Flashings, flashing fastenings and fastening frequency shall be in accordance with the manufacturer's technical literature and the NZMRM Code of Practice.
Do not construct flashing joints and flashing junctions in a manner that rely entirely on sealant to maintain weathertightness.

Profiled Foam Closure Strip. Non-bituminous, compressible, closed-cell foam strips profiled to fit the specified cladding profile. Installed to the details shown on the drawings and in accordance with the profiled metal cladding manufacturer's recommendations.

Compressible Foam Sealing Tape. Self-adhering, compressible foam sealing tape for sealing metal flashings and generally as required in accordance with the manufacturer's requirements and the NZMRM Code of Practice.

Metal Cladding Sealant. Use only neutral-curing silicone sealant, compatible with the specified metal cladding and flashing materials and finishes, that is suitable for the required application and use in accordance with the sealant manufacturer's instructions and to the profiled metal cladding manufacturer's requirements. 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.

Proprietary Collar Flashings. Approved EDPM or silicone-polymer proprietary flexible collar flashings for weatherproofing cladding-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 EDPM) collar flashings for heated flues and pipes with temperature range between 60°C - 200°C.

6.5.8 Preparation

Check all aspects of preparatory works, including but not limited to:-
- Check that the timber wall framing complies with NZS 3604, has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres for vertical cladding, is plumb and in true alignment, includes all blocking required for cavity battens, and fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 18% at the time of Metalcraft Roofing Wall Cladding installation.
- Check that the rigid air barrier, as specified, has been installed in accordance with NZBC requirements and the manufacturer’s recommendations, with all finishing tapes, flashings etc. at windows, doors, corners and penetrations all correctly incorporated to provide a continuous seal.
- Check that all preparatory materials are lapped such that any water will run down to the exterior.

6.5.9 Vented Cavity Closure Material

PVC cavity closure strip.

6.5.10 Installation

All installation work shall be carried out by experienced tradesmen familiar with the techniques and materials specified. All fixing, jointing and sealing, techniques and materials shall be exactly as recommended by Metalcraft Roofing.
Handle cladding material without damaging or scratching. Store undercover and off the ground on even bearers, and keep dry until installed.

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Fix cavity battens through the rigid air barrier into the timber framing as noted on the drawings.
Sheets set out vertically with side laps away from the main line of sight, to straight plumb line. Keep cladding lines consistent and true along walls and around corners. Check for and eliminate any creep and/or spread of sheets during installation.

Screws to comply with AS 3566 (Class 4 minimum and not less than the roofing material) and must be of a compatible material and finish with the cladding. Screws for pre-painted cladding should be factory pre-painted for an accurate colour match. Use only low carbon (<15%) non-conductive sealing washers. Set exposed fixings to level string lines. Screw fixings to be in accordance with Metalcraft Roofing requirements and as noted on the drawings.
Screw fix through cladding trough/pan and cavity battens and rigid air barrier, minimum 30mm embedment into timber framing, at centres noted on the drawings.

All jointing techniques, fixings and sealants to be in accordance with Metalcraft Roofing recommendations, as noted on the drawings, and compatible with the cladding material and finish.

Flashings shall all be matching Colorsteel or other specified material, and shaped as shown on the drawings. Flash and seal services penetrations to details shown on the drawings.

Protect the coated surface from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged. Completely clean off all drill and power-saw swarf as the work proceeds.

6.5.11 Completion

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. Clean up thoroughly and remove debris and unused material from site.
Issue to the Main Contractor a copy of the Metalcraft Roofing maintenance requirements together with the Metalcraft Roofing Wall Cladding Warranty for the completed works.

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7 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:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
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
3604:2011(NZS)	Timber-framed buildings
4211:2008(NZS)	Specification for performance of windows
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4303:1990(NZS)	Ventilation for acceptable indoor air quality
4680:2006(AS/NZS)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
NZBC B1	Guidance on Barrier Design
NZBC B1/VM1	Structure
NZBC B2/AS1	Durability
NZBC E2/VM1	External Moisture
NZBC F2	Hazardous Building Materials
NZBC F4	Safety from Falling
NZBC G4/AS1	Ventilation
NZBC H1	Energy Efficiency

7.3 APL Residential Aluminium Windows & Doors

7.3.1 Scope

7.3.1.1 APL Aluminium Window & Door Systems

APL Aluminium Window & Door Systems
Supply and install the specified Aluminium Windows and Doors from APL- Window Solutions to the locations and details shown on the drawings; complete with all components (flashings, support mechanisms, brackets, etc) where required, for proper installation and operation; and commissioned to the required performance and functionality. All aspects of this work shall be in strict accordance with the manufacturer's technical literature and installation requirements (check www.aplnz.co.nz, call 07 849 8888, or email techinfo@aplnz.co.nz for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Aluminium Windows and Doors from APL - Window Solutions

7.3.2 Warranty

Warranty APL - Window Solutions Materials & Workmanship Warranty:
- 12 Years Warranty on Materials – AGP® Insulated glass units (Warrant glass under normal environmental and use conditions against failure of materials).
- 5 Years Warranty on Materials and Workmanship - for all APL window and door products.
- 2 Years Warranty on Materials and Workmanship – for all mirror glass and hardware.
- Provide the Materials & Workmanship Warranty on the Manufacturer's Standard Warranty Form.
- Commence the warranty from the date of practical completion of the contract works.

View the "Care and Maintenance for Windows and Doors". Terms and Conditions are here www.AGPL.co.nz

7.3.3 Requirements

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.

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Shop Drawings
Prepare and submit to the Main Contractor for verification and approval prior to the commencement of 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 aluminium 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.

Producer Statement PS1
If required, as a component of the consent process APL can provide a "Letter of Intended Design" outlining the evidence used in the selection of the specified window and door systems. Upon request, the successful tenderer/manufacturer shall furnish a completed Producer Statement PS1 (Design) as confirmation that the specified window and door systems complies with the relevant clauses of the New Zealand Building Code. To ensure accuracy, the PS1 Producer Statement will be prepared as a part of the shop drawing process but will not serve as a product warranty or guarantee of compliance.

7.3.4 Performance Criteria - Wind Zone - Durability

General Performance - Wind Zone: Very High
The specified APL Aluminium Window and Door Systems shall comply with the requirements of NZS 4211 for all relevant clauses.

Wind Load - Non-Specific Design Wind Zone Classification. The specified APL Aluminium Window and Door Systems joinery installation is located in a NZS 3604 Wind Zone: VH - Very High; with a maximum pressure of 1.25kPa SLS and 1.76kPa ULS.

Durability - Exposure Zone B: Low
Durability. The specified APL Aluminium Window and Door Systems 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 specified APL Aluminium Window and Door System, including surface finishing and hardware, shall meet the durability requirements for the given Exposure Zone in accordance with NZBC B2.

7.3.5 Performance Criteria - Energy Efficiency for All Small Buildings Under 300m2

Thermal Performance - Climate Zone 6
Thermal Performance. The APL Aluminium Residential Window & Doors joinery, installation is located within the boundaries of Climate Zone 6, as defined by H1 Energy Efficiency. Unless specified otherwise, the combination of insulation, should meet the minimum H1 requirements tabled below and in accordance with, H1 Energy Efficiency for this Climate Zone.

Building Element	Construction R-values [m^2K/W] No embedded heating		Construction R-values [m^2K/W]
	Climate Zone 6		
Roof	R6.6	Heated Ceiling	R6.6
Wall	R2.0	Heated Wall	R2.9
Slab-on-ground Floors	R1.7		
Floor other than slab-on-ground floor	R3.0	Heated Floor	R3.0
Window and Doors	R0.50		
Skylights	R0.62		

7.3.6 APL Aluminium Joinery Range

Metro Series ThermalHEART
'Metro Series ThermalHEART' Windows and Doors, fully glazed, finished, and complete with hardware and other specified components - all as specified in the following clauses. Manufactured and installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.

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7.3.7 Awning & Casement Windows

Metro Series ThermalHEART
Awning and casement windows shall be manufactured using APL branded Metro Series ThermalHEART frame, with a 44mm platform incorporating a polyamide thermal break, and a cover facing to overlap the wall cladding.
Specification:
- Mullions, Transoms: with/without external fins, with guidance from APL Span Tables, shall be selected by the manufacturer for compliance with the project wind load.
- Maximum Glass Thickness: 32mm IGU
- Thermal Values: U-value 3.683 R-value 0.272
- Performance: Tested to Extra High wind zone
- Sashes: Pocket Glazed or Bead Glazed - as specified below (if not specified, the default shall apply).
- Glass: Double glazed; complying with NZS 4223.1., NZS4223.3 & NZS4223.4 Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause.
- Reveals: Refer to Jamb Liner clause.

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.

7.3.8 Hinged & French Doors

Metro Series ThermalHEART - Hinged & French Doors
Glazed aluminium hinged doors shall be manufactured from APL-branded Metro Series ThermalHEART hinged door frames incorporating a polyamide thermal break. Outward-opening and/or inward-opening door leaves as detailed in the accompany drawings.
Specification:
- Maximum Glass Thickness: 32mm IGU
- Thermal Values: U-value 3.749 R-value 0.267
- Performance: Tested to Extra High wind zone
- Glass: Single glazed or double glazed; complying with NZS 4223.1., NZS4223.3 & NZS4223.4 Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause.
- Reveals: Refer to Jamb Liner clause.

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.

7.3.9 Sliding Doors

Metro Series ThermalHEART - Sliding Doors
Sliding doors shall be manufactured from APL-branded Metro Series ThermalHEART sliding door frames.
Metro Series ThermalHEART sliding door frames, incorporating fixed panels and bottom-sliding door panels.
Specification:
- Mullions, Transoms, Stiles, Interlockers: with guidance from APL Span Tables, shall be selected by the manufacturer for compliance with the project wind load.
- Maximum Glass Thickness: 30mm IGU
- Thermal Values: U-value 4.814 R-value 0.208
- Performance: Tested to Extra High wind zone
- Glass: Single glazed or double glazed; complying with NZS 4223.1., NZS4223.3 & NZS4223.4 Refer to Glazing and Glass clauses.
- Finish: Refer to Aluminium Finish clause.
- Reveals: Refer to Jamb Liner clause.

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.

7.3.10 Entrance Door

Plasma Entrance Door Range
Entrance doors shall be from the APL 'Plasma' Entrance Door range. Refer to Entrance Door Style clause for the Plasma Entrance Door model/configuration number(s) and details. Installed in accordance with the manufacturer's requirements to the locations, configurations and details shown on the drawings and schedules.
Dimensions:
Sheet and glass clad panels 3600mm x 1500mm wide, depending on wind load - Pivots essential over 960mm wide
Maximum Glass Thickness: 22mm double glazing as standard

7.3.11 Aluminium Finish

Powder Coated Aluminium - DULUX Duralloy®
The specified aluminium joinery shall be powder coated with DULUX Duralloy® to the specified colour. Nominal 50 - 90 micron thick coating (minimum 50 microns). Duralloy® has a 10-year warranty on film and colour integrity.
DULUX Duralloy® meets the performance requirements for AAMA 2603-05.

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DULUX Duralloy® is suitable for use on residential projects, within three floors from the ground, and situated within NZS 3604 Exposure Zone B or C.

DULUX Duralloy® coatings shall be factory-applied by a Dulux Registered Applicator to the requirements of AS 3715 and to fully comply with all Dulux NZ Ltd warranty requirements.
All substrate preparation and treatments, and powder coating application and finishing techniques, shall be exactly as recommended by the manufacturer.
DULUX Duralloy® colour: TBC by Client

7.3.12 Jamb Liner

Paint-Quality Timber - 25mm thick, Grooved - H3.1 Treated
Paint-quality Timber Jamb Liners - Grooved. Manufactured from 25mm thick, dressing-grade, finger-jointed or clear Radiata pine complying with NZS 3602, H3.1 treated. Mitred corner joints; factory pre-primed on all faces.
Jamb liners shall be straight and true and free of warp or distortion. The depth of the jamb liners shall be sized to suit the wall construction thickness and grooved to suit the interior lining thickness as shown on the drawings. Jamb liners will be grooved for 10mm plasterboard unless nominated otherwise.
Except where indicated otherwise on the drawings and schedules, jamb liners shall be fitted to the head, jambs and sill of each aluminium joinery element.

Aluminium Sill Infill (doors/full-height windows) - Powder Coated
APL Aluminium Sill Infill. As shown on the drawings and schedules, doors and/or full-height windows shall have an aluminium infill fitted to the sill to suit the wall construction type and thickness. Manufactured from extruded aluminium. Factory powder coated to the specified colour and coating. Includes adaptors, brackets and clips as necessary.

7.3.13 Flashings & Support Bars

Aluminium Sill Support Bar - Cavity Construction
Aluminium Sill Support Bar for Installations in Drained Cavity Construction. Extruded aluminium sill support bar, with built-in drainage and ventilation, for continuous support to the window or door unit. Mill finish aluminium. 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.

Support bars to be powdercoat aluminium finish, to match joinery, when located where visible

Support Angles
Support Angles. Where required support angles shall be provided. Either extruded aluminium or galvanised mild steel, used to support window and door frames. Support angle sizes, fixing and installation requirements as shown on the drawings.

Custom Flashings
Supply and install custom flashings as required and as shown and described on the approved drawings and herein. Special flashings shall be formed to suit the details shown and the application.

Special Flashings (except where otherwise specified on the drawings):
- Material & thickness:
- Finish:

7.3.14 Hardware Range

Urbo™ Hardware
APL aluminium window and door hardware and furniture shall be selected from the Urbo™ Hardware range. Manufactured from die-cast zinc and powder coated to the specified colour. Supplied and installed by the APL aluminium joinery manufacturer to the windows and doors as indicated on the drawings and schedules.
Powder coat colour:

7.3.15 Co-operation Workmanship & Delivery

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 establish exact sizes for all aluminium window and door frames; and to ensure that each element correctly allows for the installation and finishing of exterior claddings and interior linings and any specific detailing shown on the drawings; and generally, to install all APL aluminium windows, doors and accessories as required.

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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.

Aluminium window and door joinery fabrication, assembly and installation work shall be carried out by experienced and competent tradespersons, authorised to manufacture and install APL - Window Solutions aluminium windows and doors, under controlled supervision and procedures, to fully comply with all warranty requirements and in accordance with the manufacturer's requirements.

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.

All fabrication and assembly processes and techniques, materials and accessories shall be exactly as recommended by the manufacturer and shall be carried out using suitable machinery, tools and equipment, in a factory workshop.

All work shall be such as to leave a neat, efficient, robust and weathertight installation.

Leave aluminium joinery and glazing clean and free from damage and defects of any kind.

Delivery & Handling
Aluminium joinery frames shall be braced and restrained as necessary for transportation and delivery to site. All surfaces, including glass, shall be appropriately protected from marking and damage during manufacture, delivery and installation.

Inspect all aluminium joinery units upon delivery and reject any damaged or defective items. Contact the manufacturer for replacement of rejected items at time of delivery to site. Do not use or install damaged or defective materials, products and joinery elements.

Store aluminium windows, doors and accessories undercover, off the floor, on a flat, even and level surface as recommended by the manufacturer and in a manner that prevents any frame distortion and surface damage and deterioration. Keep stored aluminium joinery dry and protected from damage, moisture and contamination at all times.

Handle aluminium joinery units and accessories in accordance with the manufacturer's requirements and in a manner that prevents distortion to joinery frames and any damage to the elements - including surface marking. Retain manufacturer's protective coverings for as long as possible, and remove them upon completion.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear and equipment during all stages of manufacture and installation.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Best practice guidelines for working at height in NZ, and the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

7.3.16 Preparation

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 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.
Check that all window openings and door openings are correctly sized for fitting tolerances, are square and correctly aligned, with all sides plumb, level and true to line and plane.
Check window and door openings adjoining other building elements to ensure that all necessary works have been completed that will enable the windows and/or doors to be installed correctly and as shown on the drawings.
Supporting concrete structures shall be within the scope of NZBC E2/AS3, and comply with NZS 3109. New concrete must have aged for a minimum of 28 days prior to installation.
Supporting concrete masonry structures shall be within the scope of NZBC E2/AS3, and shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design, and NZS 4210.
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 NZ NASH 3405, or the NZBC for specific design.
Supporting steel structures shall comply with NZS 3404.

Concrete Slab Rebates
Concrete Slab Rebates: check that concrete slabs have been correctly rebated to accommodate door sills and floor-mounted window frames as detailed on the drawings, and that any required waterproofing membrane has been applied to the rebates.

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Timber Framed Walls - Rigid Underlay
Timber Framed Walls (within the scope of NZBC E2/AS1) - check all aspects of preparatory works to window and door openings, including but not limited to:
- Check that the timber framing is complete at window and door openings, and is in accordance with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design.
- Check that the timber framing has a maximum moisture content of 20% at the time of joinery installation.
- Check that the rigid wall underlay has been correctly finished around framed window and door openings in accordance with E2/AS1 and the manufacturer's requirements.
- Where flexible wall underlay is installed over the rigid underlay, check that the flexible underlay has been correctly finished around framed window and door openings in accordance with E2/AS1 and the manufacturer's requirements.
- Check that flexible flashing tape has been correctly applied and finished to window and door openings in accordance with E2/AS1 and the manufacturer's requirements.

7.3.17 Fabrication

Fabrication
Do not commence production and fabrication of the joinery elements until the 'For Fabrication and Installation' shop drawings have been verified and approved by the Architect/Designer.
Fabricate and install aluminium window and door joinery in accordance with the approved shop drawings, design calculations, and the project documentation.

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

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

Window and door hardware shall be fixed true to line and position, and adjusted and oiled as required for correct operation. The aluminium joinery manufacturer shall notify the Architect/Designer if any scheduled hardware item or fixing position appears incorrect. Account for all keys and deliver separately to the site manager.

Factory-fit safety stays as scheduled to all opening windows, and to opening windows where safety stays are required to comply with the requirements of NZBC F4/AS1.
Factory-fit all required and scheduled passive ventilation systems to NZBC G4/AS1, 1.3.9 - Trickle ventilators, NZS 4303, and the manufacturer's requirements.

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

7.3.18 Installation

Flashings - Framed Openings
Install metal flashings to window and door openings, accurately level and plumb, and to the required tolerances as detailed - with the head flashing weathering jamb flashings, jamb flashings weathering sill flashing, and sill flashings open (draining) to the exterior.
Overlap and the top edge of head flashings with flexible flashing tape, or a section of additional flexible wall underlay, along the top edge to ensure water drains to the exterior.
Except where windows and doors are recessed, and where detailed otherwise, all head flashings shall extend minimum 30mm beyond the edge of the window/door frame.

Aluminium Joinery
Installation of aluminium window and door joinery shall be to the requirements of the approved shop drawings and installation details, including fixings and fasteners, flashings, bedding compounds, pointing sealants, weathering sealants, and other components and accessories required for proper installation.
Use only fasteners compatible with the materials involved, as recommended by the window manufacturer and to comply with durability and performance requirements. Fixings and fasteners exposed to weather shall be aluminium or Grade 316 stainless steel. Fixings and fasteners not exposed to weather may be galvanised in accordance with AS/NZS 4680.
Set proprietary plastic packers, sized to the required installation tolerances, to the formed opening at the appropriate fixing spacings for secure installation and allowance for wind loading for windows.
Install aluminium windows and doors exactly square, true to line, plumb and level for proper operation of opening sashes and door leaves, and with fixings fastened through jamb liners and packers.
Door installation shall allow for a minimum clearance gap of 5mm above the specified floor covering in the space that the door opens into.
Form a continuous air-tight seal between the window/door frames and the adjacent structure with a proprietary expanding foam, or appropriate sealant, to a depth of 15mm - 20mm over PEF backing rod at head, jambs and sill.
Commission opening windows and doors, sliding carriage assemblies, and all moving components to the required operation, performance and tolerances, and ensure that all hardware is in full working order.

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Weather Sealing
Weather-seal frame jambs etc. to adjacent surfaces (or to each other) as detailed or as required by the window manufacturer, to achieve a fully weathertight installation.
Sealants shall be BRANZ approved for the application and be compatible with all surfaces and any applied finish.
Insert closed cell PEF backing rods or a polyethylene bond breaker tape slip where required and as shown on the drawings.
Ensure substrates are clean and dry; mask off adjacent surfaces; prime substrates and apply sealant in accordance with the sealant manufacturer's requirements and tool finish to a smooth, even surface.
Where required and as shown on the drawings, install aluminium wind deflection or pressure relief angles, over the head and jambs of frames installed within a recessed opening, prior to weather-sealing frames.

Temporary Safety Indicators
As necessary, provide temporary safety indicators to clear glass until completion of adjacent work. Do not use masking tape or materials incompatible with the glass for this purpose.

7.3.19 Completion

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 APL Aluminium Windows & Doors work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional cost to the Principal.

Completion
Check that APL aluminium window and door joinery and accessories have been installed, glazed and finished correctly and fully tested for weathertightness.
Check that all opening window sashes, doors, sliding carriage assemblies and all moving components have been commissioned to the required operating performance and functionality.
Check that all hardware, locks, latches and handles are firmly fixed in place without restricting the operation of their moving parts, and that latches and locks fully engage with strikes and keepers and are free of slack when engaged.
Check all aluminium joinery elements for damage, defects, faults and weathertightness - carry out repairs and/or replace elements as necessary in accordance with the manufacturer's instructions to the required standard.
Remove applied safety indicators and protective coverings, and clean all joinery surfaces inside and out and leave perfectly clean.
Leave this work complete, weathertight and leak-free, and in full working order to the required operating performance and functionality in accordance with the manufacturer's warranty requirements. Leave all locking keys with the Contractor.
Leave the surrounding work area clean and free of rubbish. Remove rubbish and waste material from the site.

Complete the manufacturer's warranty and maintenance requirements, online process **FOUND HERE**. APL Product and Installation Warranty for the installed aluminium windows and doors can be **FOUND HERE**.

Provide all necessary Producer Statements.

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8 INSULATION

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:

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

8.3 Pink Batts Insulation

8.3.1 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. All aspects of this work shall be in complete accordance with Tasman Insulation technical information and installation requirements (check pinkbatts.co.nz, call 0800 746 522, or email customer@pinkbatts.co.nz for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Pink® Batts® Insulation.

Pink® Batts® insulation is certified under the GREENGUARD Certification Program (UL 2818). Being certified for indoor air quality gives an assurance that products meet strict chemical emissions limits (including minimal levels of VOCs and formaldehyde), to help create healthier indoor environments.

8.3.2 Requirements

8.3.2.1 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.

8.3.2.2 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.

8.3.2.3 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.

8.3.2.4 Inspections

Carry out all necessary pre-installation and pre-line inspections of Pink® Batts® Insulation for each area of work in accordance with the requirements of industry best practice recommendations and manufacturer guidelines.

Complete a Pre-Installation Checklist prior to installation, and a Pre-Line Checklist before handing over for subsequent work.

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Note: Pink® Batts® checklist applies only to Pinkfit.

8.3.3 Wall Thermal Insulation

8.3.3.1 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:

8.3.3.2 Pink® Batts® Ultra® R4.0 140mm Wall

Pink® Batts® Ultra® R4.0 140mm Wall - product code 7127140. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-4.0. 140mm 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® R4.0 140mm 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:

8.3.4 Ceiling Thermal Insulation

8.3.4.1 Pink® Batts® Superbatts® R5.0 Ceiling

Pink® Batts® Superbatts® R5.0 Ceiling - product code 7113150. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-5.0 - 225mm thick x 460mm wide x 1220mm long segments.

Pink® Batts® ceiling insulation is a lightweight flexible glasswool insulation product 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.

Pink® Batts® Ultra® R5.0 Ceiling is BRANZ Appraised - refer to BRANZ Appraisal No.238.

Pink® Batts® Ultra® R5.0 Ceiling is licenced with Environmental Choice New Zealand: Thermal

Building Insulants Licence No.2504017. Refer to data - 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:

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8.3.4.2 Pink® Superbatts® Skillion Roof R5.0

Pink® Superbatts® Skillion Roof R5.0 - product code 7113250. A non-combustible, resin bonded fibrous glasswool insulation manufactured from recycled and virgin glass and cured urea extended phenolic resin. R-value R-5.0. 180mm Max. thickness x 560mm wide x 1220mm long segments.

Pink® Superbatts® Skillion Roof insulation products are specifically designed for skillion roofs, and provide high levels of thermal performance while ensuring the maximum thickness the segments can achieve.

Pink® Superbatts® Skillion Roof insulation has been BRANZ Appraised for use as a thermal insulating material for timber framed skillion roofs of domestic and commercial buildings - refer to BRANZ Appraisal No.767.

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

Installed Location:

8.3.5 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.

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

8.3.6 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.

The building envelope must be fully enclosed and weatherproof, with construction materials framing at or below the required moisture content, before insulation installation commences.

All installation work shall be carried out by registered PinkFit® 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.

Carry out all necessary pre-installation and pre-line inspections of Pink® Batts® Insulation for each area of work in accordance with the requirements of industry best practice recommendations and the manufacturer's guidelines. Inspect all Pink® Batts® insulation work before it is closed off with linings or made inaccessible.

Insulation shoud be installed without leaving gaps or compresing the material. Always maintain full insulation thickness to ensure that the stated thermal and acoustic values are achieved. Do not install insulation into closed cavities with a cavity depth less than the insulation's stated thickness.

8.3.7 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.

Do not use damaged or defective materials.

Should a problem be encountered with any Pink® Batts® Insulation product, immediately contact Pink® Batts® on 0800 746 522. Do not continue to use the product that is not performing to specification or expectation. Keep the product in question and where possible, the bale package documentation with batch number and/or date of manufacture.

Handle Pink® Batts® Insulation products in accordance with the manufacturer's requirements and in a manner that prevents damage to and contamination of the product. Ensure installed Pink® Batts® Insulation remains dry at all times.

Installers shall be familiar with and comply with the manufacturer's https://www.pinkbatts.co.nz/assets/Products/April-2022-changes-/Pink-Batts-Insulation-SDS-v-1.6.pdfprecautions for use, and use recommended safety gear when handling materials.

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.

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8.3.8 Installation

8.3.8.1 General

Install Pink® Batts® Insulation in accordance with NZS 4246 and the manufacturer's requirements.

Each installation is unique, so prior to installation:
- check for all hazards that may cause injury; and
- carry out any required repair work before starting installation; and
- ensure there's adequate lighting to identify any hazards; and
- treat all electrical cables as live, being careful not to cut or expose cables and wires; and
- beware of other sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work.

8.3.8.2 Pink® Batts® Wall

Pink® Batts® wall insulation segments shall be oversized by no more than 10mm than the wall framing spacings. If cutting is required, cut oversize by 5mm to ensure a good friction fit.

Friction fit the insulation segments between wall framing members ensuring there is no undue compression, gaps, creases, tucks or folds, and the insulation is finished flush with the framing edges.

Firmly butt all insulation segment joins together, ensuring there are no gaps, and maintain full thickness of the insulation to ensure maximum thermal performance.

Refer to installation instructions - https://www.pinkbatts.co.nz/assets/Products/April-2022-changes-/Wall-Installation-instructions_April22_1076RevH.pdf

Fit Pink® Batts® insulation tight and close around electrical cables and pipes. As necessary, partially cut and fit insulation around cables and pipes. Take extreme care when working around exposed electrical cables - treat all cables as live.

8.3.8.3 Pink® Batts® Ceiling - Truss/Framed Roof

Pink® Batts® insulation segments shall be oversized by no more than 10mm wider than the ceiling framing spacings.

Lay the insulation segments over the ceiling, friction fitted between the ceiling joists/truss chords, ensuring there is no undue compression, gaps, creases, tucks or folds in the insulation.

Firmly butt all insulation segment joins together, ensuring there are no gaps, and maintain full thickness of the insulation to ensure maximum thermal performance.

Cover the entire ceiling, including the outer edge of the top plate of external walls - the insulation must cover at least 50% of external top plates.

Maintain a minimum 25mm clearance between the top of the ceiling insulation and any roofing material, including underlay. If required, trim the insulation or use a thinner product around the perimeter.

Refer to installation instructions - https://www.pinkbatts.co.nz/assets/Uploads/Downloads/Roof-Installation-Instructions-February-2023.pdf & https://www.pinkbatts.co.nz/assets/Uploads/Downloads/Pink-Superbatts-Installation-Instructions-April-2023-v2.pdf

Ensure that the appropriate clearances are maintained for electrical equipment, heating and ventilation equipment, heated flues and pipes, etc. Where possible, place insulation beneath electrical wiring and plumbing. Take extreme care when working around exposed electrical cables - treat all cables as live.

8.3.8.4 Pink® Batts® Skillion Roof

Pink® Batts® Skillion Roof insulation segments shall be oversized by no more than 10mm wider than the rafter spacings.

Friction fit insulation segments between rafters/top chords, behind ceiling battens where provided, ensuring there is no undue compression, gaps, creases, tucks or folds in the insulation.

Maintain a minimum 25mm clearance between the top of the insulation and any roofing material, including underlay.

Firmly butt all insulation segment joins together, ensuring there are no gaps, and maintain full thickness of the insulation to ensure maximum thermal performance.

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Cover the entire area, including the outer edge of the top plate of external walls - the insulation must cover at least 50% of external top plates.

Refer to installation instructions - https://www.pinkbatts.co.nz/assets/Uploads/Downloads/Skillion-Roof-Installation-Instructions-February-2023.pdf

Ensure that the appropriate clearances are maintained for electrical equipment, heating and ventilation equipment, heated flues and pipes, etc. Where possible, place insulation beneath electrical wiring and plumbing. Take extreme care when working around exposed electrical cables - treat all cables as live.

8.3.9 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.

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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9 PAINTING & DECORATING

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:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2017(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards

9.3 General

9.3.1 Alternatives

The materials specified in this section or on the drawings indicate the required standards for these works. Alternatives which are considered equal to or superior to these may be tendered for approval (in writing, and they must NOT be used unless they are approved in writing).

9.3.2 Co-operation

Co-operate with all trades and attend upon Concretor, Joiner, Carpenter, etc. to ensure that the surfaces provided by these trades are completely suitable for the Painter works that are required.

9.3.3 Preparation

No painting or varnishing or other surface coating work shall be undertaken unless the surfaces to be coated are in a correct and proper condition to ensure first class results.

Inspect the works of other trades on which Painter work is scheduled and report to the Main Contractor and the Architect/Designer any defects or irregularities that would affect the permanency or finish of the painting work, and do not proceed until the defects or irregularities have been completely rectified. Failure to examine and report will be construed as an acceptance that all preparatory works are completely satisfactory.

This clause does not relieve the Painter of any of the usual preparatory work to surfaces customarily performed by this trade.

Clean down all surfaces with sugar soap, strippers, mould killers, etching agents, etc. as required. Sand or rub all sharp edges off exterior timbers and other materials as appropriate before painting. Finish rub down ALL surfaces. Ensure that the moisture content of all substrates is appropriate. Remove locks, fastenings, and similar hardware before painting and refix on completion. Remove all electrical switch and power plates before painting and refix them on completion. Mask adjacent surfaces as required to a true line and remove the masking on completion. Dust and wipe down all surfaces for Painter work and completely remove all dust, rubbish, dirt etc. from areas involved immediately prior to commencement. To each area of the works complete all surface preparation before applying paint to any surface.

9.3.4 Protection

Take adequate precautions to prevent paint spots falling on prefinished or similar surfaces, and extreme care to keep absorbent materials (e.g. cedar, sawn framing, decking, paving) completely clean during all adjacent painting work. Correction of any such disfigurement shall be to the Architect/Designer's approval.

9.3.5 Qualifications

All work by the Painting Subcontractor shall be of the highest reasonable standard, and executed by experienced and competent tradesmen to the Architect/Designer's approval.

9.3.6 Workmanship

Strictly adhere to all Manufacturers' instructions.

Strictly observe Manufacturers' requirements with regard to surface and air temperatures for painting. No work shall be carried out on surfaces that are not completely dry, and no external work shall be carried out during damp or wet conditions.

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In all finishes any irregularities or brushmarks or dust etc. in each preceding coat shall be rubbed down to provide a smooth clean surface for the following coat. Each coat shall be finished over all surfaces before a further coat is applied, and each coat shall be completely dry before subsequent coats. Finish broad areas before painting trim, paint ceilings before walls and walls before joinery, trim and other items.

Each coat and the full completed system shall be of uniform finish, colour, texture and sheen, shall have proper covering of thin edges, corners, end grain etc. and shall be free of blemishes such as runs, sags, fat edges, entrained hairs, brush marks, starved patches etc.

9.3.7 General

The schedules indicate the general extent of the works to be carried out but are in no way exhaustive in their description of the actual items for painter work. Complete all work necessary for the proper and entire completion of the works. All items and portions of items reasonably inferable but not specifically mentioned are deemed included, i.e. cupboard interiors, the top and bottom of doors, unseen cabinetry tops, etc. All doors shall have equal painter work on ALL surfaces.

Where timber work is specified for priming before fixing the priming shall be thoroughly brushed in to all surfaces, and all exterior timber work for paint finishing shall be fully primed within one week of fixing. Should more than one month elapse between priming and undercoating the timber shall be fully reprimed.

Stopping up work shall be carried out immediately the priming or sealing coat is dry, and shall be solidly placed to finish clean and dry. Stopping tinted to match the timber for clear finished work.

Paint putties within one month of glazing timber frames; paint to impinge on glass to assist sealing.

9.3.8 Materials

All Painter materials shall be ready mixed and delivered in unopened containers. Materials shall be used only for the purpose and in the manner intended by the manufacturer; any apparent scheduled discrepancy in this respect shall be referred to the Architect/Designer immediately for clarification.

Where surfaces are specified to be finished in a particular manner or material, all preparatory work, priming, or undercoating, that is necessary to ensure a proper finish shall be provided, irrespective of any apparent omission herein.

Thinning shall only be to manufacturer's specification. Thoroughly stir as required to lift any settled pigment and ensure the paint is homogeneous. Paints shall be factory or shop tinted to the colour required. Undercoats shall be fully tinted to match the final colour scheduled. All paints shall have the finished film thickness that is specified by the manufacturer (checked by monitoring the coverage per litre).

9.3.9 Completion

Allow to touch up to approval any Painter work which is damaged during the finishing works of other trades. Replace all hardware, remove all masking, covers, containers etc., thoroughly clean all affected surfaces, and leave all spaces ready for immediate occupation. Avoid scratching or abrading glass or hardware during any cleaning.

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10 FLOOR COVERINGS

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:

1884:2013(NZS AS)	Floor coverings - Resilient sheet and tiles - Installation practices
2358:1990(AS)	Adhesives - For fixing ceramic tiles
2455.2:2007(AS/NZS)	Textile floor coverings - Installation practice - Carpet 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	Access Routes
NZBC D1/AS1	Access Routes
NZBC E3/AS1	Internal Moisture

10.3 Carpet & Resilient Floor Coverings

10.3.1 Scope

Supply and install the specified Floor Coverings and flooring products to the areas and surfaces, layouts and details shown on the drawings, complete with all accessories. All aspects of this work shall be in accordance with the specified floor covering manufacturers' technical literature and installation requirements, relevant Standards and Code requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Floor Coverings and flooring products.

10.3.2 Floor Coverings

10.3.2.1 Carpet

Carpet flooring; to the specified product, pile style and content, and colour and pattern. Installed in accordance with the manufacturer's requirements and AS/NZS 2455.1 to the locations and layout shown on the drawings.

Manufacturer, brand name & range:
Pile style:
Pile content/fibre:
Pile thickness:
Construction:
Colour/Pattern code:
Grading:
Location:

10.3.3 Adhesives

Floor covering adhesives shall be as recommended by the floor covering manufacturer, and be suitable and compatible with the specified flooring product, substrate type and environment, and the flooring product's end use; and shall be applied in accordance with the adhesive manufacturer's instructions. Seal or prime porous substrates exactly as recommended by the adhesive manufacturer.

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10.3.4 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 as required to install the specified floor coverings and accessories.

10.3.5 Workmanship

All installation work shall be carried out by experienced and competent floor layers, familiar with the products specified and installation techniques, under the direct supervision of a Registered National Flooring Association (NFA) Member, in accordance with the manufacturer's installation requirements, NZS/AS 1884, AS/NZS 2455.1, AS/NZS 2455.2 and AS/NZS 4586 as relevant, and as noted and detailed on the drawings.
Use only approved adhesives that are compatible with the specified floor covering product and the substrate as recommended by the floor covering manufacturer.
The building must be fully enclosed and weathertight with all doors and necessary fittings and trim installed prior to laying floor coverings.

10.3.6 Delivery & Handling

Store and handle all floor covering products and accessories in accordance with the manufacturer's recommendations. Store products and accessories under cover and out of direct sunlight on a flat and level surface; keep dry and protect from damage and contamination at all times.
Do not use damaged or defective flooring products or accessories, or products that are beyond their designated shelf life. Do not damage or mark or distort flooring products and accessories during handling.
Allow floor coverings and accessories to properly condition for a minimum of 24 hours, or as recommended by the manufacturer, prior to laying in accordance with the manufacturer's requirements. Unless recommended otherwise by the manufacturer, do not lay floor coverings below 15ºC room temperature.

10.3.7 Substrate Preparation

10.3.7.1 General

Ensure the substrate surface is free of oil, grease and other contaminants, then sweep or vacuum as required to ensure it is absolutely clean. Ensure that any expansion or crack control joints are appropriately trimmed - do not install floor coverings over them.
The commencement of work on each section of floor shall be deemed to indicate a full acceptance by the relevant Flooring Subcontractor that all preparatory works by other trades are appropriate to achieve the required finished results.

10.3.7.2 New Concrete Floors

New concrete substrates must be compliant with NZS 3114 'U3 Surface Finish' and with the floor covering manufacturer's requirements and must have aged for a minimum of 28 days prior to laying the floor coverings. Check for moisture content by hygrometer reading to BRANZ BU330 - do not commence laying floor coverings until the substrate is surface-dry and the moisture readings are less than 75% relative humidity over the entire surface.
Grind off any high spots on the concrete slab, and using the specified proprietary levelling compound repair flush with feathered edges any low spots or damaged areas then grind smooth.
Lightly grind or shot blast any surface that is glazed to the extent that may compromise the adhesive bond. Leave the surface clean and free of dust and contaminants etc.

Location:

10.3.8 Installation

10.3.8.1 Carpet Floor Coverings - Direct Stick

Install by direct stick method carpet floor coverings and accessories, including all jointing, in accordance with the manufacturers' recommendations, procedures and techniques, AS/NZS 2455.1, and as shown on the drawings.

Allow carpet floor coverings to properly condition in accordance with the manufacturer's recommendations prior to laying. Turn underfloor heating systems off 48 hours prior to installation and leave off during installation and for a minimum of 48 hours after completion. Thoroughly clean each area before commencing work. Seal or prime as necessary any porous surface receiving floor covering adhesive, and apply adhesive exactly to the manufacturer's recommendations.

Confirm the location of all carpet joints and seams prior to laying. Install carpet rolls in consecutive sequence and in the same direction. Do not install carpet floor coverings over expansion joints - use only the specified expansion joint cover strip and neatly finish carpet flooring in accordance with the cover strip manufacturer's requirements.

Carpet flooring accurately laid, fitted and jointed and fully bonded to the substrate. All seams and cross joins to be close-fitting and fused together with a low profile heat bond tape. Cut and properly prepare cross joins to ensure accurate pattern alignment. Roll carpet flooring with a suitably weighted roller as recommended by the manufacturer to ensure maximum adhesion.
Accurately install stair tread nosings and lay pre-cut carpet pieces to each stair tread and riser and finish neatly into or under the

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nosing edge as necessary.
Install any required carpet skirting, capping and edge trim, transition strips and naplock bars, as noted and detailed on the drawings; all finished straight and level and true to line.

Keep the working area cordoned off and protected during installation and protect completed installation work from damage and contamination until hand over of the works as programmed/scheduled.

10.3.9 Completion

Ensure that the specified floor coverings have been installed correctly, and that all seams, joints and accessories have been and completed correctly. Check for damage and defects and repair or replace as necessary.
Thoroughly clean the installed floor coverings in accordance with the manufacturers' recommended techniques and procedures.
Carry out any product specific finishing/polishing applications as recommended only by the floor covering manufacturer.
Leave the works area clean and remove all rubbish and waste material from the site.

Protect the completed works from damage, trafficable dirt and grime, and stains as necessary while other works are in progress.

Issue to the Owner a copy of the Manufacturers' maintenance requirements and a copy of the Manufacturers' Materials Warranties and the Applicators' Installation Warranties for all of the installed floor coverings.

10.4 Overlay Flooring

10.4.1 Scope

Supply and install the specified Overlay Floorings to the locations, layouts and details shown on the drawings, complete with all accessories. All aspects of this work shall be in accordance with the manufacturers' technical literature and installation requirements, relevant Standards and Code requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Overlay Floorings.

10.4.2 Overlay Flooring

10.4.2.1 Engineered Timber Overlay Flooring - Fixed

Engineered Timber Interlocking Overlay Flooring: prefinished, engineered timber interlocking plank flooring, to the specified product, and surface layer wood species and finish, and size. Installed as a fixed overlay floor covering in accordance with the manufacturer's requirements and as specified, to the locations, layout and details shown on the drawings.

Manufacturer & brand name:
Species/colour code:
Finish:
Board size:
Location:

10.4.3 Substrate Type

10.4.3.1 Concrete Floor - Engineered Timber Overlay Flooring (fixed)

The specified fixed Engineered Timber Overlay Flooring is to be installed over a concrete floor.

10.4.4 Vapour Barrier & Underlays

10.4.4.1 Vapour Barrier - Liquid Membrane

Liquid applied vapour barrier membrane as specified. Applied to properly prepared concrete floors/screeds for the prevention of moisture vapour transmission in accordance with the manufacturer's instructions.

Manufacturer & brand name:
Substrate:
Overlay flooring:
Location:

10.4.5 Adhesives

Overlay flooring adhesives shall be as recommended by the overlay flooring manufacturer, and be suitable and compatible with the specified overlay flooring product, substrate type and environment.

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Adhesive for fixed engineered timber overlay flooring, as specified. Applied in accordance with the manufacturer's instructions and requirements for open time, substrate porosity, ambient temperature, and relative humidity.

Manufacturer & brand name:
Substrate:

10.4.6 Trim & Accessories

10.4.6.1 Edge Trim

Edge trim; to the specified product and material and size. Installed as an edge trim in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Manufacturer, brand name:
Material:
Size:
Overlay flooring:
Location:

10.4.6.2 Threshold Strip

Threshold strip; to the specified product, material, and finish and colour, and size. Installed as a threshold strip between the overlay flooring and other floor finishes at door openings in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Manufacturer, brand name:
Material:
Finish & colour:
Size:
Overlay flooring:
Location:

10.4.7 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 trades the locations of pipes, cables, outlets, and other fittings installed by others, and to install the specified Overlay Flooring as required.

10.4.8 Workmanship

All installation work shall be carried out by experienced and competent installers, familiar with the products specified and installation techniques, in accordance with the manufacturer's installation requirements, AS/NZS 4586, and as noted and detailed on the drawings.
Use only approved adhesives that are compatible with the specified overlay flooring product and the substrate as recommended by the overlay flooring manufacturer.
The building must be fully enclosed and weathertight with all doors and necessary fittings and trim installed prior to laying overlay floorings.

10.4.9 Delivery & Handling

Store and handle overlay flooring products and accessories in accordance with the manufacturer's recommendations. Store products and accessories under cover and out of direct sunlight on a flat and level surface; keep dry and protect from damage and contamination at all times.
Do not use damaged or defective overlay floorings or accessories, or products that are beyond their designated shelf life. Do not damage or mark or distort overlay flooring and accessories during handling.
Allow overlay floorings and accessories to properly condition prior to laying in accordance with the manufacturer's requirements.
Refer to the manufacturer's installation recommendations for minimum and maximum floor and ambient temperatures.

10.4.10 Substrate Preparation

10.4.10.1 General

Ensure the substrate surface is free of oil, grease and other contaminants, then sweep or vacuum as required to ensure it is absolutely clean. Ensure that any expansion or crack control joints are appropriately trimmed - do not install overlay flooring over them.
The commencement of work on each section of floor shall be deemed to indicate a full acceptance by the relevant Flooring Subcontractor that all preparatory works by other trades are appropriate to achieve the required finished results.

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10.4.10.2 New Concrete Floors

New concrete substrates must be allowed to properly dry out and be compliant with NZS 3114 'U3 Surface Finish' and with the overlay flooring manufacturer's requirements and must have aged for a minimum of 28 days prior to laying the overlay floor coverings.
Check for moisture content by hygrometer reading to BRANZ BU330 - do not commence laying overlay flooring until the substrate is surface-dry and the moisture readings are less than 70% relative humidity over the entire surface.
Substrate surfaces must not deviate more than 3mm over 3000mm in any direction and have no abrupt variation greater than 1mm over 250mm.
Grind off any high spots on the concrete slab, and using the specified proprietary levelling compound repair flush with feathered edges any low spots or damaged areas then grind smooth.
Lightly grind or shot blast any surface that is glazed to the extent that may compromise the adhesion of the vapour barrier and/or acoustic underlay. Leave the surface clean and free of dust and contaminants etc.

Location:

10.4.11 Installation

10.4.11.1 Vapour Barrier - Liquid Membrane

Apply the specified liquid vapour barrier system over the entire area of the prepared concrete substrate in accordance with the manufacturer's installation requirements. Carry out any necessary surface repairs to ensure the surface is smooth and even all over. Protect the membrane from pedestrian traffic and damage and contamination and allow to dry/cure for the specified period.

10.4.11.2 Engineered Timber Overlay Flooring - Fixed

Install the specified engineered timber overlay flooring and accessories in accordance with the manufacturer's recommendations, procedures and techniques, and as shown on the drawings.

Allow engineered timber overlay flooring to properly condition in accordance with the manufacturer's recommendations prior to laying.

Confirm the overlay flooring layout pattern and direction prior to laying. Do not install overlay floor coverings over expansion joints - use only the specified expansion joint and neatly finish overlay flooring in accordance with the manufacturer's requirements.

Engineered timber overlay flooring accurately laid, fitted and jointed, and fully bonded to the substrate without cupping or surface deviation. Leave expansion gap at all fixed objects, walls and flooring transitions and junctions. Remove excess adhesive as the work proceeds.
Accurately install stair tread nosings and adhesive fix pre-cut timber overlay pieces to each stair tread and riser and neatly finish to the nosing edge as detailed.
Install any required engineered timber skirting, capping and edge trim, transition strips and bars, as noted and detailed on the drawings; all finished straight and level and true to line.

Keep the working area cordoned off and protected during installation and protect completed installation work from damage and contamination until hand over of the works as programmed/scheduled.

10.4.12 Completion

Ensure that the specified Overlay Floorings have been installed correctly, and that all joins and accessories have been and completed correctly. Check for damage and defects and repair or replace as necessary.
Thoroughly clean the installed overlay flooring in accordance with the manufacturers' recommended techniques and procedures.
Carry out any product specific finishing/polishing applications as recommended only by the floor covering manufacturer.
Leave the works area clean and remove all rubbish and waste material from the site.

Protect the completed works from damage, trafficable dirt and grime, and stains as necessary while other works are in progress.

Issue to the Owner a copy of the Manufacturer's maintenance requirements and a copy of the Manufacturer's Material Warranty and the Applicator's Installation Warranty for the installed overlay flooring.

10.5 Tiling

10.5.1 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.

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10.5.2 Requirements

10.5.2.1 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.

10.5.2.2 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.

10.5.2.3 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.

10.5.2.4 Evidence of Slip Resistance

If requested, provide certified evidence of the slip resistance classification for each floor tile specified.

10.5.2.5 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.

10.5.2.6 Provision for Spare Tiles

Provision for Spare Tiles - refer to Reserve Material clause.

10.5.3 Performance

10.5.3.1 Interior Wet Area Performance

Interior Wet Area Performance. The performance of tiled interior wet areas shall comply with the requirements of NZBC E3/AS1.

10.5.4 Interior Dry Area Tiles

10.5.4.1 Floor Tile - Selection 1

Interior Dry Area Tiles - Floor Tile, Selection 1 - as specified below. Tiles shall be true to shape; free of warp; accurate in dimensions to facilitate laying with minimum joint width; free of imperfections; and true to samples. Tiles shall be from the same batch where possible, and delivered with the original packaging and labeling intact.

Installed in accordance with AS 3958.1, as an interior dry area floor tile, to the locations, layout and details shown on the drawings.

Tile Brand & Style:
Material:
Finish:
Dimensions:
Colour:
PEI Rating:
Slip Resistance:
Installed Location:

10.5.4.2 Wall Tile - Selection 1

Interior Dry Area Tiles - Wall Tile, Selection 1 - as specified below. Tiles shall be true to shape; free of warp; accurate in dimensions to facilitate laying with minimum joint width; free of imperfections; and true to samples. Tiles shall be from the same batch where possible, and delivered with the original packaging and labeling intact.

Installed in accordance with AS 3958.1, as an interior dry area wall tile, to the locations, layout and details shown on the drawings.

Tile Brand & Style:
Material:
Finish:

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Queenstown Lakes District Council

Dimensions:
Colour:
Installed Location:

10.5.5 Interior Wet Area Tiles

10.5.5.1 Floor Tile - Selection 1

Interior Wet Area Tiles - Floor Tile, Selection 1 - as specified below. Tiles shall be true to shape; free of warp; accurate in dimensions to facilitate laying with minimum joint width; free of imperfections; and true to samples. Tiles shall be from the same batch where possible, and delivered with the original packaging and labeling intact.

Installed in accordance with AS 3958.1, as an interior wet area floor tile, to the locations, layout and details shown on the drawings.

Tile Brand & Style:
Material:
Finish:
Dimensions:
Colour:
PEI Rating:
Slip Resistance:
Installed Location:

10.5.5.2 Wall Tile - Selection 1

Interior Wet Area Tiles - Wall Tile, Selection 1 - as specified below. Tiles shall be true to shape; free of warp; accurate in dimensions to facilitate laying with minimum joint width; free of imperfections; and true to samples. Tiles shall be from the same batch where possible, and delivered with the original packaging and labeling intact.

Installed in accordance with AS 3958.1, as an interior wet area wall tile, to the locations, layout and details shown on the drawings.

Tile Brand & Style:
Material:
Finish:
Dimensions:
Colour:
Installed Location:

10.5.6 Undertile Waterproofing

10.5.6.1 Interior Wet Area Tiles - 1-Part Liquid-Applied Membrane

Interior Wet Area Tiles - Undertile Waterproofing System: 1-Part Liquid-Applied Undertile Waterproofing Membrane - as specified below. A proprietary, 1-part, flexible liquid-applied waterproofing membrane system suitable for interior wet area tiling applications - including showers. Complete with all system components and accessories required for proper installation and performance. Applied to properly prepared substrates in strict accordance with the manufacturer's instructions to the locations and details shown on the approved drawings.

Brand & Product:

10.5.7 Tile Adhesive

10.5.7.1 Interior Dry Area Tiles - Floor Tile

Interior Dry Area Tiles - Floor Tile Adhesive - as specified below. A proprietary, high strength, flexible tile adhesive for bonding most types of floor tiles, including large-format and heavy tiles; and approved for use with the specified floor tiles (type), tiling application and substrate type. Suitable for interior dry area floor tiling applications; on new and existing substrates. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:

10.5.7.2 Interior Dry Area Tiles - Wall Tile

Interior Dry Area Tiles - Wall Tile Adhesive - as specified below. A proprietary, high strength, flexible tile adhesive for bonding most types of wall tiles; and approved for use with the specified wall tiles (type), tiling application and substrate type. Suitable for interior dry area wall tiling applications; on new and existing substrates. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:

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10.5.7.3 Interior Wet Area Tiles - Floor Tile

Interior Wet Area Tiles - Floor Tile Adhesive - as specified below. A proprietary, high strength, flexible tile adhesive for bonding most types of floor tiles, including large-format and heavy tiles; and approved for use with the specified floor tiles (type), tiling application and substrate type. Suitable for interior wet area floor tiling applications; on new and existing substrates. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:

10.5.7.4 Interior Wet Area Tiles - Wall Tile

Interior Wet Area Tiles - Wall Tile Adhesive - as specified below. A proprietary, high strength, flexible tile adhesive for bonding most types of wall tiles; and approved for use with the specified wall tiles (type), tiling application and substrate type. Suitable for interior wet area wall tiling applications; on new and existing substrates. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:

10.5.8 Tile Grout

10.5.8.1 Interior Dry Area Tiles - Floor Tile

Interior Dry Area Tiles - Floor Tile Grout - as specified below. A proprietary, high performance, coloured tile grout. Suitable for interior dry area floor tiling applications, and approved for the tiling application. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:
Colour:

10.5.8.2 Interior Dry Area Tiles - Wall Tile

Interior Dry Area Tiles - Wall Tile Grout - as specified below. A proprietary, high performance, coloured tile grout. Suitable for interior dry area wall tiling applications, and approved for the tiling application. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:
Colour:

10.5.8.3 Interior Wet Area Tiles - Floor Tile

Interior Wet Area Tiles - Floor Tile Grout - as specified below. A proprietary, high performance, flexible, water-repellent, coloured tile grout with anti-fungal agent. Suitable for interior wet area floor tiling applications, and approved for the tiling application. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:
Colour:

10.5.8.4 Interior Wet Area Tiles - Wall Tile

Interior Wet Area Tiles - Wall Tile Grout - as specified below. A proprietary, high performance, flexible, water-repellent, coloured tile grout with anti-fungal agent. Suitable for interior wet area wall tiling applications, and approved for the tiling application. Used in strict accordance with the manufacturer's instructions and recommendations.

Brand & Product:
Colour:

10.5.9 Flexible Sealant

10.5.9.1 Interior Dry Area Tiles - Floor Tile

Interior Dry Area Tiles - Floor Tile Flexible Sealant - as specified below. Acetic-curing, UV-resistant, mildew-resistant, waterproof silicone sealant. Suitable for interior and exterior tiling applications, including general sealing, movement control joints, internal corner junctions, worktops and benches, sanitary installations. Applied in accordance with the sealant manufacturer's instructions, and neatly finished with the tiled surface.

Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio. When sealing movement control joints, the sealant shall be applied over a suitably sized PEF backing rod inserted into the joint to the required depth.

Brand & Product:
Colour:

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10.5.9.2 Interior Dry Area Tiles - Wall Tile

Interior Dry Area Tiles - Wall Tile Flexible Sealant - as specified below. Acetic-curing, UV-resistant, mildew-resistant, waterproof silicone sealant. Suitable for interior and exterior tiling applications, including general sealing, movement control joints, internal corner junctions, worktops and benches, sanitary installations. Applied in accordance with the sealant manufacturer's instructions, and neatly finished with the tiled surface.

Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio. When sealing movement control joints, the sealant shall be applied over a suitably sized PEF backing rod inserted into the joint to the required depth.

Brand & Product:
Colour:

10.5.9.3 Interior Wet Area Tiles - Floor Tile

Interior Wet Area Tiles - Floor Tile Flexible Sealant - as specified below. Acetic-curing, UV-resistant, mildew-resistant, waterproof silicone sealant. Suitable for interior and exterior tiling applications, including wet areas, showers, sanitary installations, kitchen worktops and benches, movement control joints, internal corner joints, general sealing, etc. Applied in accordance with the sealant manufacturer's instructions, and neatly finished with the tiled surface.

Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio. When sealing movement control joints, the sealant shall be applied over a suitably sized PEF backing rod inserted into the joint to the required depth.

Brand & Product:
Colour:

10.5.9.4 Interior Wet Area Tiles - Wall Tile

Interior Wet Area Tiles - Wall Tile Flexible Sealant - as specified below. Acetic-curing, UV-resistant, mildew-resistant, waterproof silicone sealant. Suitable for interior and exterior tiling applications, including wet areas, showers, sanitary installations, kitchen worktops and benches, movement control joints, internal corner joints, general sealing, etc. Applied in accordance with the sealant manufacturer's instructions, and neatly finished with the tiled surface.

Sealant joints shall be in accordance with the sealant manufacturer's joint design width-to-depth ratio. When sealing movement control joints, the sealant shall be applied over a suitably sized PEF backing rod inserted into the joint to the required depth.

Brand & Product:
Colour:

10.5.10 Aluminium Trim

10.5.10.1 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:

10.5.11 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 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.

10.5.12 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.

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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.

10.5.13 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 the Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

10.5.14 Preparation

10.5.14.1 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.

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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.

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.

10.5.14.2 New Concrete Floor

New Concrete Floor - check all aspects of preparatory works, including but not limited to:
- Check that the concrete slab has been formed and finished to the levels and falls indicated on the drawings, including any tanking or waterproofing requirements.
- New concrete floors must have aged for a minimum of 28 days, and have dried over the entire area to a relative humidity of 75% or less.
- 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.
- Mechanically grind or acid etch very dense concrete surfaces and any surface that is glazed to the extent that may compromise adhesion.
- Leave the surface clean, free of dust and surface contaminants.
- Check that any protruding or exposed bare metal has been treated with a suitable corrosion-inhibiting primer.

10.5.14.3 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.

10.5.15 Installation

10.5.15.1 Undertile Waterproofing System - Interior Wet Area

Undertile Waterproofing System - Interior Wet Area. Install the specified undertile, liquid-applied waterproofing membrane in accordance with the manufacturer's instructions, to properly prepared, clean, dry substrates, and at the specified coverage rate and to the required dry film thickness.

Where required by the membrane manufacturer, prime substrates with a manufacturer-approved primer/sealer in accordance with the primer manufacturer's instructions.

Reinforce all junctions of the waterproofing membrane in accordance with the manufacturer's instructions, including floor/wall junctions, internal and external corner junctions, movement control joints, floor waste and drain outlets, pipe penetrations, etc.

Eliminate any pin holes, surface imperfections and defects as the work proceeds. Apply the required number of coats, with each successive coat at right angles to the previous coat.

Complete the installation to the required standard and leave waterproof and leak free. Allow the finished membrane to dry as recommended by the membrane manufacturer before flood testing and/or tiling.

Unless indicated otherwise on the drawings, interior wet-area undertile waterproofing membranes shall be installed to cover the following minimum dimensions:
For an Unenclosed Shower:
- Walls: extending to 1800mm above the floor, and 300mm above the shower rose, and horizontally 1500mm from the shower rose.
- Floor: extending to a 1500mm horizontal radius from the shower rose.

For a Bath with a Shower over and no Shower Screen:
- Walls: extending to 1800mm height above base of the bath, and horizontally 1500mm from the shower rose.
- Floor: extending to a 1500mm horizontal radius from the shower rose.

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For a Bath with a Shower over and a Shower Screen:
- Walls: extending to 1800mm height above the base of the bath along its sides.

For a Bath:
- Walls: extending to 150mm height above the sides of the bath, and 150mm horizontally along walls.

For a vanity Splashback:
- Wall: to 300mm height above the vanity top behind the vanity.
- Floor: extending to twice the width (front-to-back) of the vanity, and to 500mm beyond the ends of the vanity.

10.5.15.2 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.

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.

10.5.15.3 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. 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.

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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.

10.5.15.4 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.

10.5.15.5 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.

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.

10.5.15.6 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.

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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.

10.5.15.7 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.

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.

10.5.16 Reserve Material

10.5.16.1 Interior Dry Area Tiles - Floor Tile

Reserve Material (spares) - Interior Dry Area Tiles - Floor Tile. Upon completion of the Tiling works, supply and deliver to the Principal the specified quantity of unopened packs of each tile specified.

Quantity:

10.5.16.2 Interior Dry Area Tiles - Wall Tile

Reserve Material (spares) - Interior Dry Area Tiles - Wall Tile. Upon completion of the Tiling works, supply and deliver to the Principal the specified quantity of unopened packs of each tile specified.

Quantity:

10.5.16.3 Interior Wet Area Tiles - Floor Tile

Reserve Material (spares) - Interior Wet Area Tiles - Floor Tile. Upon completion of the Tiling works, supply and deliver to the Principal the specified quantity of unopened packs of each tile specified.

Quantity:

10.5.16.4 Interior Wet Area Tiles - Wall Tile

Reserve Material (spares) - Interior Wet Area Tiles - Wall Tile. Upon completion of the Tiling works, supply and deliver to the Principal the specified quantity of unopened packs of each tile specified.

Quantity:

10.5.17 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.

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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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11 DRAINLAYING

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:

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
2439.1:2007(AS)	Perforated plastics drainage and effluent pipe and fittings Part 1: Perforated drainage pipe and associated fittings
2566.1:1998(AS/NZS)	Buried flexible pipelines - Structural design
2566.2:2002(AS/NZS)	Buried flexible pipelines - Installation
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

11.3 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.

11.4 Foul Water Drainage

11.4.1 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.

11.4.2 Requirements

11.4.2.1 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, in

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particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry', and the 'Excavation Safety - Good Practice Guidelines'

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

11.4.2.2 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.

11.4.2.3 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.

11.4.2.4 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.

11.4.2.5 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.

11.4.2.6 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 and comply with the requirements of the New Zealand Building Code, related compliance Standards, and the design documents.

11.4.2.7 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.

11.4.2.8 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.

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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.

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.

11.4.2.9 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.

11.4.2.10 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.

Conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - in particular the 'OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry' and the 'Excavation Safety - Good Practice Guidelines'.

11.4.2.11 As-Built Drawings

On completion and before application for Code Compliance Certificate, prepare As-Built Drawings of the foul water drainage system, that accurately record the new and/or modified foul water 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.

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11.4.2.12 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.

11.4.3 Materials

11.4.3.1 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.

11.4.3.2 PVC-U Pipes & Fittings

PVC-U foul water drain pipes and fittings for non-pressure applications shall comply with AS/NZS 1260: 'PVC-U pipes and fittings for drain, waste and vent application'. Installed in accordance with AS/NZS 3500.2, and AS/NZS 2032 or AS/NZS 2566.2.

Pipe Classification:
Class SN4-SN6 - Rubber Ring Joint or Solvent Welded Joint. For domestic and residential applications, and low load areas.
Class SN8-SN10 - Rubber Ring Joint or Solvent Welded Joint. For commercial and industrial applications, and medium load areas.
Class SN16 - Rubber Ring Joint or Solvent Welded Joint. For heavy traffic load areas.

11.4.3.3 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.

11.4.3.4 Bedding & Surround Material

Except where specified otherwise on the drawings, bedding (underlay, side support, overlay) material shall be compacted clean granular non-cohesive material - crushed rock or gravel screenings - of nominal particle size range of 7-10mm with a maximum particle size of 20mm, that is free from organic material and clay, and have a moisture content appropriate to the degree of compaction required. If the bedding material is contaminated or an excessive amount of oversized particles are present, the bedding material shall be rejected and not used.

11.4.3.5 Backfill Material

Except where specified otherwise, backfill material above the pipe embedment layer (150mm above the top of pipe) shall be selected 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.

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.

11.4.4 Trench Excavation

11.4.4.1 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.

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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.

11.4.4.2 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.

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.

11.4.4.3 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.

11.4.5 Pipe Laying

11.4.5.1 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.

11.4.5.2 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.

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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.

11.4.5.3 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.

11.4.5.4 Concrete Support

Concrete pads used to support foul water drains, gully traps, risers, etc., shall be minimum 100mm thick and in accordance with AS/NZS 3500.2: Section 5.3.

11.4.5.5 Jointing - Rubber Ring Joints

PVC-U drain pipes shall be jointed using rubber ring seals in preference to the solvent welded method - which shall be used where rubber ring jointed fittings are not manufactured. Only use seals and lubricants recommended by the pipe or fitting manufacturer. 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.

Rubber ring joints shall be assembled in accordance with the pipe manufacturer's instructions and generally as follows:
- Ensure that all components are clean and free of dirt and debris during all stages of the jointing process;
- Ensure the pipe spigot is correctly chamfered and has a clearly visible witness mark to the correct insertion length;
- Clean and generously lubricate with jointing lubricant, especially the chamfer. Do not lubricate the ring groove;
- Where elastomeric seals are required to be fitted, clean and fit the seal, and check the elastomeric seal sits evenly in the housing;
- Apply the manufacturer’s specified lubricant to the end of the spigot and chamfer of the pipe;
- Keep the elastomeric seal and its housing free of lubricant, unless otherwise recommended by the manufacturer;
- Align the pipes so there is no deflection at the joint, then insert the spigot in the socket and push home to the witness mark;
- Hold the socket end firmly during the jointing to prevent previously assembled joints from moving;
- If excessive force is required and/or the jointing process does not comply with the manufacturer's instructions, disassemble and remake the joint.

Field cutting pipes:
- cut the spigot end square and remove all burrs;
- chamfer the cut end of the pipe with a taper of 15° to approx. half the wall thickness, or as specified by the pipe manufacturer;
- as appropriate, witness mark the pipe at the specified insert by the manufacturer.

11.4.5.6 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.

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- 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.

11.4.5.7 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.

11.4.6 Connection

11.4.6.1 Public Network - Boundary Connection

Connect to discharge the foul water drainage line directly to the public mains street-edge/boundary connection in accordance with the requirements of the Territorial Authority and as shown on the drawings.

11.4.7 Testing

11.4.7.1 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.

11.4.7.2 Water Test Procedure - to AS/NZS 2302

Water test procedure of foul water drains (non-pressure) - to AS/NZS 2302: Section 7.3.2.
- The pipeline shall be filled with water to a height of not less than 1m above the natural ground level at the highest point of the section being tested, or to the flood level of the lowest sanitary fixture, but not exceeding 5m at the lowest point of the test section.
- The pressure shall be maintained without leakage for at least 15 minutes.
- The source of any leaks shall then be ascertained and any defects repaired.
- The pipeline shall then be retested.

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Note: Testing should not be carried out if groundwater is present above the pipeline. If groundwater is present, the test pressure should be increased to compensate for the depth of groundwater at a rate of 10 kPa for every 1m of groundwater depth.

11.4.8 Backfilling

11.4.8.1 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.

11.4.9 Reinstatement of Surfaces

11.4.9.1 Reinstatement of Surfaces

Refer to separate specification section - Siteworks - Reinstatement of Surfaces.

Ground and paved surfaces above excavated foul water drainage trenches shall be reinstated to the standard specified. Reinstatement shall generally achieve a standard equal to or better than the pre-existing situation - in no case will a lower standard be accepted.

Hedges, fences and other features to be retained that have been damaged or removed during the work shall be reinstated to the satisfaction of the Contract Administrator.

11.4.9.2 Public Property

Reinstatement of surfaces to public property shall comply with the requirements of the relevant controlling authorities.

11.5 Groundwater Drainage

11.5.1 Scope

Supply, install and commission new gravity groundwater subsoil 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 groundwater drainage system. All aspects of this works shall comply with the requirements of the NZ Building Code, relevant Standards, Regulations and Acts, and to the requirements of the Territorial Authority, and as specified herein and on the approved drawings and schedules.

11.5.2 Requirements

11.5.2.1 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, in particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry'.

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

11.5.2.2 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 drainlaying works.

The Drain Layer shall be deemed to have allowed for all work associated with the safe and orderly execution of the drainlaying 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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11.5.2.3 Subsoil Drains

Construct subsoil drains in natural ground, in accordance with AS/NZS 3500.3 or as otherwise specified herein, to the locations, layout and details shown on the drawings. As shown on the approved drawings, outlets from subsoil drains shall be connected (downstream) to the stormwater system or constructed to discharge clear of embankments.

The groundwater drainage plans are diagrammatic only. Allow for all necessary pits and connections indicated on the drawings and as required by the controlling Territorial Authority. Refer to the drawings for the dimensioned locations of pits etc.

As necessary, check on site before excavation of trenches commences to ensure the required minimum gradient and cover are achieved.

The groundwater subsoil drains are intended as a permanent feature of the contract works, and not construction purposes. The use of permanent groundwater subsoil drains for construction purposes during the construction period is not permitted.

11.5.2.4 Inspections

Inspection of the groundwater drainage work shall take place at each of the stages as scheduled in the Building/Resource 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.

11.5.2.5 Records & Testing

Maintain records of the type, size, and location and levels of subsoil drains laid for documenting subsequent As-Built drawings.

On completion, demonstrate by flow-testing to the satisfaction of the Contract Administrator that a clear waterway has been provided and the subsoil drains perform the required standard. Any deficiencies in the performance of subsoil drains during the Contract Period or Maintenance Period shall be remedied by the Drain Layer, at no additional expense to the Principal.

11.5.2.6 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 other trades as necessary to install groundwater subsoil drains to the required locations, tolerances and standards.

11.5.2.7 Workmanship

All drainlaying work shall be carried out by qualified and experienced tradespersons, familiar with the specified system design requirements and installation techniques, under the direct supervision of a NZ certified Registered Drainlayer, in accordance with the manufacturer's installation requirements, AS/NZS 3500.3 in compliance with the New Zealand Building Code, and with all local codes and regulatory authority requirements, and as shown on the drawings. Comply with the requirements 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 and robust installation.

Carry out all necessary inspections and tests during installation to ensure compliance with the design documents and the specification is achieved. Submit test result sheets to show compliance with the design drawings and specification.

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.

11.5.2.8 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 groundwater drainage materials and/or work shall be repaired and/or replaced to the satisfaction of the Contract Administrator, without delay and at no additional expense to the Principal.

11.5.2.9 Delivery & Handling

Store ground water darainagel 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.

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Do not used damaged or faulty materials or products, or products that are beyond their designated shelf life. Do not use PVC/uPVC 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 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 Approved Codes of Practice - in particular the Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

11.5.2.10 As-Built Drawings

On completion and before application for Code Compliance Certificate, prepare and submit scaled 'As-Built' drawings of the new groundwater subsoil drainage system that accurately record the new and/or modified groundwater drainage installation

Information shall include, but not limited to, subsoil drain pipe type and size, the location, grade and direction of flow of all pipes, the location of all bends, changes in direction, cleaning access positions, 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.

11.5.3 Materials

11.5.3.1 Geotextile

Unless specified otherwise on the drawings, geotextile fabric shall be Strength Class B, Filtration Classes 1-4, non-woven needle-punched continuous filament polyester geotextile. Installed in accordance with the manufacturer's requirements and as shown on the drawings.

Pins for securing the geotextile shall be of steel, a minimum of 5mm in diameter, and at least 400 mm in length. Other equivalent securing devices may be substituted if recommended by the geotextile manufacturer.

The geotextile shall not be left exposed for more than two weeks without being covered by backfill. Geotextile that becomes torn or otherwise damaged through any cause shall be removed and replaced with undamaged geotextile with a minimum 500mm overlap requirement in all directions.

11.5.3.2 Drainage Aggregate

Unless specified otherwise on the drawings, filter and bedding material shall be drainage 40/20 open coarse graded clean (preferably washed) durable aggregate.

11.5.3.3 Pipe

Perforated corrugated plastic pipes used in subsoil drains shall comply with AS 2439.1.

Pipe Schedule:
- Subsoil Drains NOT Subject to Traffic Loading: Iplex Novaflo or approved-equivalent pre-perforated single-wall corrugated high-density polyethylene (HDPE) subsoil drainage pipe; pre-fitted with a full-length polypropylene or polyester filter sock.
- Subsoil Drains Subject to Traffic Loading: Iplex Nexus Hi-Way or approved-equivalent heavy-duty pre-perforated double-wall corrugated high-density polyethylene (HDPE) roadworthy subsoil drainage pipe; pre-fitted with a full-length polypropylene or polyester filter sock.

Pipe diameters shall be as indicated on the drawings. Pipes shall be installed only with the use of proprietary components recommended by the pipe manufacturer for all joints, bend fittings, couplers, end caps, etc., and in accordance with the manufacturer's requirements to the locations, layout and details shown on the drawings.

Do not allow pipes and fittings to be exposed to direct sunlight for extended periods of time - refer to the manufacturer's technical literature.

11.5.4 Trench Excavation

11.5.4.1 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.

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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.

11.5.4.2 Excavation

Unless specified otherwise, the excavation for trenches shall be taken out by open cut to the depths shown or implied on the drawings. Excavate trenches to the depths which will provide for the appropriate bedding depth.

Trenches shall be cut in such a manner as will ensure that the geotextile wrapped aggregate subsoil drains, and pipes if included, will be laid true to the depths, grades and lines shown on the drawings.

Unless otherwise specified trenches shall have: a minimum gradient of 1:100; vertical sides; and a minimum depth that will ensure that the invert level shall be not less than 1 metre below finished subgrade level; and a minimum depth of cover over the flexible pipes.

Where a trench has been excavated deeper than necessary, the excess depth shall be filled either with embedment material compacted to achieve a density as near to the original soil density as possible.

Excavated material shall be stacked at least the excavated depth away from the edge of the excavation and the size of the spoil bank shall be limited to avoid any danger to stability of the trench or adjacent buried services.

All spoil shall be managed so as to avoid contamination of the clean drainage aggregate.

Surplus excavated material shall be disposed of as detailed in the Siteworks specification.

Trenches shall be graded to obtain smooth side and bottom surfaces so that the geotextile will not bridge cavities in the soil or be damaged by projecting rock.

11.5.4.3 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.

11.5.5 Laying Subsoil Drains

11.5.5.1 Perforated Corrugated Plastic Pipe Subsoil Drain

Perforated corrugated plastic pipe subsoil drains shall be installed with a geotextile fabric filter to the trench perimeter, and generally as follows:
- Following trench excavation the geotextile filter fabric shall be placed in the trench so as to conform loosely to the shape of the trench. The geotextile shall be laid flat, but not stretched on the soil, and shall be anchored with securing pins.
- Use single full width fabric sections only cut to suit the required trench width, drainage height and fabric overlap. Longitudinal joints in the fabric are not permitted.
- Geotextile fabric end-joints (transverse) shall be overlapped minimum 500mm and shall be anchored with securing pins to ensure this required overlap is maintained.
- Geotextile fabric sides shall be cut to size to provide a minimum longitudinal lap of 300mm on the top of the drainage aggregate when placed to the specified depth.
- Place a 100mm thick bedding layer of drainage aggregate in the base of the fabric lined trench.
- Lay pipe straight and true along the centre of the trench.
- Back fill with drainage aggregate at least 150mm above the pipe - to the depth specified.
- Wrap the sides of the fabric over the top of the drainage aggregate, longitudinally overlapped 300mm minimum.
- Backfill above the geotextile fabric shall be as specified on the drawings.
- Backfill shall be compacted to provide support of not less than that of the adjacent soil.
- As shown on the approved drawings, outlets from subsoil drains shall be connected to the stormwater system or constructed to discharge clear of embankments.

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11.5.6 Reinstatement of Surfaces

11.5.6.1 Reinstatement of Surfaces

Refer to separate specification section - Siteworks - Reinstatement of Surfaces. Ground and paved surfaces above excavated groundwater drainage trenches shall be reinstated to the standard specified. Reinstatement shall generally achieve a standard equal to or better than the pre-existing situation - in no case will a lower standard be accepted.

Hedges, fences and other items to be retained that have been damaged or removed during the work shall be reinstated to the satisfaction of the Contract Administrator.

11.6 Stormwater Drainage

11.6.1 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.

11.6.2 Requirements

11.6.2.1 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 of Practice and WorkSafe Information and Guidance, in particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry', and the 'Excavation Safety - Good Practice Guidelines'

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

11.6.2.2 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.

11.6.2.3 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.

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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.

11.6.2.4 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.

11.6.2.5 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.

11.6.2.6 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.

11.6.2.7 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.

11.6.2.8 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.

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.

11.6.2.9 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.

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11.6.2.10 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.

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.

Conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - in particular the 'Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry' and the 'Excavation Safety - Good Practice Guidelines'.

11.6.2.11 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.

11.6.2.12 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.

11.6.3 Materials

11.6.3.1 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.

11.6.3.2 PVC-U Pipes & Fittings

PVC-U stormwater drain pipes and fittings for non-pressure applications shall comply with AS/NZS 1254: 'PVC-U pipes and fittings for stormwater and surface water applications'. Installed in accordance with AS/NZS 3500.3 and AS/NZS 2032 or AS/NZS 2566.2

Pipe Classification:
Class SN4-SN6 - Rubber Ring Joint or Solvent Welded Joint. For domestic and residential applications, and low load areas.
Class SN8-SN10 - Rubber Ring Joint or Solvent Welded Joint. For commercial and industrial applications, and medium load areas.
Class SN16 - Rubber Ring Joint or Solvent Welded Joint. For heavy traffic load areas.

11.6.3.3 Concrete

Cast insitu concrete used for stormwater drainage installation shall be 20 MPa Normal Concrete complying with NZS 3104. Where specified, used as bedding, capping and surround concrete, and for any cast-insitu concrete elements (to NZS 3104 unless specified otherwise).

11.6.3.4 Bedding & Surround Material

Except where specified otherwise, bedding (underlay, side support, overlay) material for PVC-U pipes shall be GAP 7 - General All Passing 7mm - clean, granular, non-cohesive crushed rock or gravel screenings, that is free from organic material and clay, with a moisture content appropriate to the degree of compaction required. If the bedding material is contaminated or an excessive amount of oversized particles are present, the bedding material shall be rejected and not used.

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11.6.3.5 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.

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.

11.6.4 Trench Excavation

11.6.4.1 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.

11.6.4.2 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.

11.6.4.3 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.

11.6.5 Pipe Laying

11.6.5.1 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.

11.6.5.2 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.

11.6.5.3 Jointing - Rubber Ring Joints

PVC-U drain pipes shall be jointed using rubber ring seals in preference to the solvent welded method - which shall be used where rubber ring jointed fittings are not manufactured. Only use seals and lubricants recommended by the pipe or fitting manufacturer. 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.

Rubber ring joints shall be assembled in accordance with the pipe manufacturer's instructions and generally as follows:
- Ensure that all components are clean and free of dirt and debris during all stages of the jointing process;
- Ensure the pipe spigot is correctly chamfered and has a clearly visible witness mark to the correct insertion length;
- Clean and generously lubricate with jointing lubricant, especially the chamfer. Do not lubricate the ring groove;
- Where elastomeric seals are required to be fitted, clean and fit the seal, and check the elastomeric seal sits evenly in the housing;
- Apply the manufacturer's specified lubricant to the end of the spigot and chamfer of the pipe;
- Keep the elastomeric seal and its housing free of lubricant, unless otherwise recommended by the manufacturer;
- Align the pipes so there is no deflection at the joint, then insert the spigot in the socket and push home to the witness mark;
- Hold the socket end firmly during the jointing to prevent previously assembled joints from moving;
- If excessive force is required and/or the jointing process does not comply with the manufacturer's instructions, disassemble and remake the joint.

Field cutting pipes:
- cut the spigot end square and remove all burrs;
- chamfer the cut end of the pipe with a taper of 15° to approx. half the wall thickness, or as specified by the pipe manufacturer;
- as appropriate, witness mark the pipe at the specified insert by the manufacturer.

11.6.5.4 Jointing - Solvent Welded Joints

Solvent welded joints shall 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.

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- 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.

11.6.5.5 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: 450mm.
- where subject to vehicular loading - in sealed roadways: 600mm.
- where subject to vehicular loading - in unsealed roadways: 750mm.
- pipes in embankment conditions or subject to loading from heavy construction equipment: 750mm.

11.6.6 Connection

11.6.6.1 Public Network - Street Kerb Connection

Connect to discharge the stormwater drainage line directly to the street kerb outlet in accordance with the requirements of the Territorial Authority and as indicated on the drawings.

11.6.7 Testing

11.6.7.1 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.

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.

11.6.7.2 Water Test Procedure - to AS/NZS 3500.3

Water test procedure of stormwater drains (non-pressure) - to AS/NZS 3500.3: Section 9.4: The head of water on any section of drain shall not exceed 3m.

The procedure shall be as follows:
- Seal all openings except the top of the section of the below-ground drain to be tested.

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- Fill the below-ground drain with water to the highest level in that section.
- 10 minutes for vitrified clay drains; or
- 5 minutes for drains of any other material.

The drain shall be deemed to have passed the test if no make-up water is required.

11.6.8 Backfilling

11.6.8.1 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 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.

11.6.9 Reinstatement of Surfaces

11.6.9.1 Reinstatement of Surfaces

Refer to separate specification section - Siteworks - Reinstatement of Surfaces. Ground and paved surfaces above excavated stormwater drainage trenches shall be reinstated to the standard specified. Reinstatement shall generally achieve a standard equal to or better than the pre-existing situation - in no case will a lower standard be accepted.

Hedges, fences and other features to be retained that have been damaged or removed during the work shall be reinstated to the satisfaction of the Contract Administrator.

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12 ELECTRICAL

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:

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

12.3 Interconnected Smoke Alarms

12.3.1 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.

12.3.2 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.
Co-ordinate with other trades to install Interconnected Smoke Alarms as required.

12.3.3 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.

12.3.4 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.

12.3.5 Alarm Type

Install interconnected Photoelectric type smoke alarms.

Manufacturer, brand name & type:

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12.3.6 Heat Alarms & Heat Detectors

In addition to installing interconnected smoke alarms; install heat alarms or heat detectors, interconnected to the smoke alarms, to the locations shown on the drawings.

Manufacturer, brand name & type:

12.3.7 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.

Install smoke alarms to sloping ceilings at the high end of the ceiling slope.

Do not install smoke alarms to exposed bulkheads, beams, joists or purlins greater than 300mm deep.

Do not install smoke alarms closer than 400mm to any forced-air supply opening or to any blade of a ceiling fan.

12.3.8 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.

12.4 Workmanship

12.4.1 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.

12.4.2 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.

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12.4.3 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.

12.5 Materials & Control

12.5.1 Materials

All materials delivered with packaging and labeling intact. All required incidentals (insulating tape, seals, fixings, etc.) shall be completely appropriate for the application involved. The use of items damaged in any way is subject to approval in each instance.

12.5.2 Switchboard

The switchboard shall be an appropriate size standard PDL DBF series board installed fully recessed where shown and at 2m to the top of the board. Install appropriate sized MCB's for all circuits, including a minimum of two power and one lighting RCDs as required to cover all outlets.

12.6 Systems

12.6.1 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.

12.6.2 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.