Architectural Design Group

P R O J E C T S P E C I F I C A T I O N

Clip n Climb

80 Byron Street
Sydenham
Christchurch

Issued for Tender/Consent

5996

PROJECT OVERVIEW

Scope

Proposed commercial office extension to existing buidling, single level, new concrete slab and foundation, steel portal frame, timber framed internal walls, concrete block exterior walls, Dimond Rib50 cladding, DHS purlin, Dimond Top Span roofing, color steel boxed gutter, install Wilkins double check valve 950 XLT back flow device to main potable water supply.

Address

Site Address	80 Byron Street
Suburb	Sydenham
City	Christchurch
Lot #	1
DP #	449853

Site Conditions

Wind Zone	H - High Wind Speed
Earthquake Zone	Zone 2
Exposure Zone	Zone C - Medium
Snow Loading Zone	Zone N4

Related Parties

Designer

Architectural Design Group, Trevor Jones, adg@architecturaldesigngroup.co.nz, 47 Second Ave, Tauranga, 3112, 07 578 2899

Structural Engineer

Structex, Julia Clendon, JClendon@structex.co.nz, 5 Norwich Quay, Lyttleton, 8841, 03 929 0253

Fire Engineering Technician

Cosgroves Ltd, Nick Chen, nick.chen@cosgroves.com, Level 3 518 Colombo Street , Christchurch , 8011 , 03 377 8600

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1 PRELIMINARIES & GENERAL

1.1 Project Specifics

1.1.1 Warranties

Manufacturer/Supplier Warranties
Provide Manufacturer/Supplier warranties in favour of the Principal, covering materials, equipment, appliances, proprietary products, etc.

- The terms and conditions of the Manufacturer/Supplier warranty provided shall not negate the minimum remedies available under common law as if no warranty had been offered.
- Failure to provide the required Manufacturer/Supplier warranty does not reduce liability for execution and materials required for that section of work.
- Conform to the Manufacturer's/Supplier's standard warranty form.
- Commence all Manufacturer/Supplier warranties from the date normally applicable.
- Maintain the effectiveness of all Manufacturer/Supplier warranties for the period stated.
- Provide all Manufacturer/Supplier warranties before practical completion.

1.2 Project Overview

1.2.1 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.

1.2.2 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.

1.2.3 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.

1.2.4 Responsibility

The Contractor will be held responsible for the full period of his 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 himself or his subcontractors; for this reason few specific guarantees are required in these contract documents. The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.
No apparent expression of the Architect's/Designer's reasonable satisfaction shall be deemed to be acceptance of defective materials or workmanship within the terms of the Contract or to be an authority for any Variation except where such Variation is authorised as provided for in the Contract. Instructions that are given verbally are deemed to be instructions for proper execution of the works and do not involve extra charges.

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

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

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

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.

1.2.5 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).

1.2.6 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.

1.2.7 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.

1.2.8 Code Compliance Certificate

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

1.2.9 Co-ordination of the Works

Co-ordinate 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.

1.2.10 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.

1.2.11 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.

1.2.12 Site Safety

Comply with all of the requirements of the New Zealand Building Code, and in particular with Approved Documents F1 - F5 inclusive. Comply with all relevant Worksafe NZ Approved Codes of Practice and Information and Guidance requirements, particularly those for construction and building maintenance. Comply with any other relevant safety legislation and/or regulations.

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

In compliance with the Health and Safety in Employment Act 1992 the Contractor shall have:
a). A safety programme that shall include selection and training standards, monitoring of compliance, safety performance measures and safety rules.
b). A safety register to record accidents, injuries, operational safety, ACC claims, and so forth.
c). A health and safety plan specific to the contract works, which will address methods of identifying and controlling hazards, protective clothing and equipment to be used, staff training and supervisory requirements, management of subcontractors and their staff, and restricted areas and site security.
Notify the Ministry of Business, Innovation and Employment in writing of the Certified Safety Supervisor responsible for safety aspects of the works.

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

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

1.2.13 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 he 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.

1.2.14 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.

1.2.15 Cleaning and Completion

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

In preparation for the Practical Completion inspection carry out the following:
- Clean the works thoroughly, removing all debris, surplus materials, splashes, marks, temporary markings, etc. (All cleaning methods and materials shall be as recommended by the manufacturer of the item being cleaned).
- Remove protective wrappings and coverings unless otherwise directed.
- Touch up minor painting faults, carefully matching colour, and brushing out edges. Repaint any badly marked surfaces back to suitable break-lines.
- Adjust, ease and/or lubricate as required all doors, drawers, controls and other moving parts to

ensure their efficient operation.
- Any other works required to leave all spaces ready for immediate occupation and all electronic/electrical/mechanical systems fully operational.
- Clean out all spoutings, gutters, downpipes, and gullies and flush out all drains.
- Clean all sanitary appliances and check all aspects of the water services.
- Thoroughly re-inspect all aspects of the works (and have any defects fully rectified) to be certain that the works are completely ready for the Practical Completion inspection - if an unreasonable number of items are noted by the Architect/Designer during the inspection it will be terminated and then rescheduled for at least a week forward to allow proper completion to be achieved.

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

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.

2.3 Site & Scope

2.3.1 Site

Note that no claims will be recognised on the grounds of insufficient description of existing site conditions in the Contract Documents.

Take great care to excavate exactly for the wall foundations to avoid any damage to adjacent property.

2.3.2 Scope

This section covers:

Demolition work

Excavation as required for foundations and slabs

Excavation as required for foundations

Supply, placing and compaction of hardfill basecourse and sand blinding
Supply and placing of any site concrete required

Supply and installation of retaining walls waterproofing systems and field drains
Backfilling behind retaining walls

2.3.3 Construction Sequence

The following construction sequence is suggested in the belief that it will benefit the actual construction process as well as the finished project. Tenderers must notify with their tender if they do not intend to follow this sequence:

2.4 Excavation & Siteworks

2.4.1 Excavation

Excavation work shall be carried out in accordance with the WorkSafe NZ Excavation Code of Practice. Co-ordinate with other trades as to set-out and timing to ensure that all cut faces are covered or finished etc. as soon as possible after the excavation is complete.

As the bulk scope of excavations works will have been carried out prior to commencing work on site, advise and co-ordinate with the separate contractor to ensure that the main building platform is consistent with what is expected. If any concerns are raised please immediately advise the Architect for direction.

Cease machine excavation above final levels and trim to the finish profiles by hand where appropriate. Any over excavation in critical foundation, etc. areas made up with 10MPa concrete unless otherwise approved. Trim slab benches exactly to the required level to allow for hardfill and blinding.

Noisy excavation equipment shall be used only during hours which will avoid undue nuisance to the occupants of adjacent properties.

Excavate accurately in position and true to line and minimum sizes and to levels and grades required for all slabs, footings and foundations, and over the rest of the areas shown for levels adjustment.

Excavations down to firm undisturbed ground, and footings and foundations 200mm minimum into solid, except where shown otherwise.

Below slabs on ground the general intent is to excavate to a stable undisturbed subgrade (of 150 kPa ultimate bearing capacity).

Ensure that rainwater runoff from excavated surfaces does not carry material onto adjacent properties.

Report for instruction when any unexpected voids, made-up ground or similar are encountered.

Report the finding of antiquities or other items of value, and leave them undisturbed until approval (and instruction) is given for their removal - they remain the property of the Principal.

As soon as excavation and filling is complete foundation material will be inspected by the Geotechnical Engineer, and any changes to foundation widths/details will be directed.

2.4.2 Hardfill & Blinding

A 300mm thick layer of compacted AP65 should be placed beneath the concrete slab. A layer of geotextile (Bidim A19 or equal) should be placed on the base and sides of the excavation. A layer of geogrid (Cirtex Duragrid 30/30 or equal) should be placed over the geotextile.

3 C O N C R E T E

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:

2295:2006(NZS)	Pliable, permeable building underlays
2904:1995(AS/NZS)	Damp-proof courses and flashings
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
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)
3124:1987(NZS)	Specification for concrete construction for minor works
3604:2011(NZS)	Timber-framed buildings
4200.1:1994(AS/NZS)	Pliable building membranes and underlays - Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4389:2015(AS/NZS)	Roof safety mesh
4455.1:2008(AS/NZS)	Masonry units, pavers, flags and segmental retaining wall units - Masonry units
4671:2001(AS/NZS)	Steel reinforcing materials
4859.1:2002(AS/NZS)	Materials for the thermal insulation of buildings - General criteria and technical provisions
NZBC B2	Durability
NZBC E2	External moisture
NZBC E2/AS1	External Moisture

3.3 Materials

3.3.1 Reinforcement

Reinforcing grades are identified by bar diameters prefixed with letters thus:

D indicates Grade 300E deformed bar
R indicates Grade 300E plain round bar
HD indicates Grade 500E deformed bar
HR indicates Grade 500E plain round bar
RB indicates Grade 500 Reidbar (uniquely deformation patterned bars)

SE72 Mesh reinforcing to overlay slab as per Structural Engineers design

Imported reinforcing steel will not be accepted without the prior approval of the Engineer. Reinforcing free of loose rust, mill scale, dirt, paint, oil, etc. and stored clear of the ground. Accurately place reinforcing and tie securely to prevent displacement during pouring of concrete. Tie wires must not project into specified concrete cover. Welding of reinforcing is not permitted unless specifically approved by the Engineer.

All terminal ends of reinforcing bars shall be hooked. Intersecting walls, beams and foundations shall contain return longitudinal reinforcement, as detailed for the intersecting members, all to NZS 3109 unless shown otherwise on the drawings.

Unless detailed otherwise all bars assumed to be continuous, with lap lengths not shown otherwise to be 40 diameters for grade 300 steel, 60 diameters for grade 500 steel, 250mm for mesh. Bars shall generally have minimum bends of five times their diameter.

Support slab steel at 1 metre maximum centres. Use plastic spacers for fairface concrete. Co-operate with others to accurately place all block/brick starters, as the bending of starters to the core position will not be permitted.

3.3.2 Concrete Cover

Concrete cover not shown otherwise to be:
- Foundations - 75mm where poured against ground, 50mm elsewhere.
- Beams and columns - 40mm (for main reinforcing).
- Slabs - 30mm for mesh
- Walls - 40mm where exposed or against ground, 30mm elsewhere.

3.4 Thermakraft Underlay, DPM & DPC

3.4.1 Scope

Supply and install the selected Thermakraft Industries Underlays and Membranes to the locations identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with Thermakraft Industries 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 drawings.

No substitutions are permitted for Thermakraft Industries Underlays and Membranes.

3.4.2 Damp-Proof Course

Supercourse 500 DPC: 0.75mm thick, single layer embossed Polyethylene waterproof membrane, installed as a 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 and concealed flashings in masonry veneer wall as required by NZS 4229 and NZBC E2/AS1, in accordance with the manufacturer's requirements, BRANZ Appraisal No.329 (2005) and as shown on the drawings.

3.4.3 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.
Co-ordinate with other trades to install Thermakraft Underlays, DPMs, and DPCs as required.

3.4.4 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 tradesmen, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements, and as noted and detailed on the drawings.

3.4.5 Delivery & Handling

Store underlay rolls on ends, undercover on a flat surface. Keep dry and out of direct sunlight and protect from damage. Handle products in accordance with the manufacturer's requirements.

3.4.6 Preparation

Check that timber framing has been completed as shown on the drawings, complies with NZS 3604 or AS/NZS 1170 for specific design for timber framing, and is in accordance with Thermakraft requirements. Ensure that framing is securely fixed, true to line and plane, is plumb and level where required, and is trimmed at edges, openings and penetrations as required, has a maximum moisture content of 20% at the time of installation, and that there are no projections due to structural bracing and bracketry etc.

3.4.7 Completion

Check that all underlay has been installed correctly, and is correctly supported, and that all edges, joins and ends are correctly finished prior to closing off with claddings. Check for damage and repair or replace as necessary. Remove rubbish from the site.

Issue to the Owner a copy of the Thermakraft maintenance requirements and the Thermakraft product warranties for the installed products.

3.5 Workmanship

3.5.1 Qualifications

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 the latest and best trade practise standards by experienced and competent tradesmen, familiar with the materials specified and installation techniques.

3.5.2 Formwork

Provide all necessary formwork to produce finished concrete to the required dimensions, surface finishes and structural tolerances (NZS 3109 table 4, note that slab surfaces shall not vary by more than 3mm from a 3m straightedge placed anywhere on the surface, and that this maximum variation shall extend over a minimum distance of 1m).

Design and construct formwork to withstand total weights and all construction loads. Formwork constructed tightly to prevent undue slurry leaks, with no wire formwork ties, and no part of the formwork ties left within required concrete cover. 20 x 20mm fillet corners. Any release agents used shall be non staining and shall be compatible with all subsequently applied finishes.

Position construction/crack control joints (except where shown otherwise) under walls or elsewhere as approved, in accordance with the following maximum criteria:
- Slabs on ground - area 50 sq.m, length 7.5m.
- Suspended slabs - area 150 sq.m, length 15m.
- Walls - length 10m, lift 4m.

Retarders only to provide a scabbled surface at construction joints.

Coordinate with all trades to build in all necessary starters, fixings, anchorages, chases, sleeves, bolts, conduits, electrical / plumbing devices etc., and check their exact positioning before pouring. Coordinate with all trades to form all necessary holes, openings etc. with their positions and sizes exactly as required.

Strike formwork without shock or vibration, and without disturbing, damaging or overloading the structure. Fill all bolt holes as soon as practicable.

3.5.3 Concreting & Curing

All concrete shall be power mixed in a plant approved by the Ready Mixed Concrete Association for required grade. All structural concrete shall have a compressive strength of 25MPa at 28 days. 19mm max aggregate, 80mm slump, and with a maximum water cement ratio of 0.55.

Where considered desirable the manufacturer may add an air entrainment agent complying with NZS 3109 and 3119. No other additives may be used without specific approval of the engineer. Mixes shall be capable of being readily placed and compacted and finished as specified. The manufacturer shall carry out quality control testing to NZS 3104. All other concrete 20 MPa Ordinary Grade with maximum water cement ratio 0.7.

Grout for concrete blockwork shall be in accordance with the requirements of Section 2.3 of NZS 4210, shall have a spread value 450 to 530mm when tested in accordance with Section 11 of NZS 3112: Part 1. The grout shall incorporate an appropriate expansive admixture, added in accordance with NZS 42102 Section 3.2.3. The grout shall have a minimum compressive strength of 17.5 MPa for all durability zones, except for Seaspray (B2) where the minimum compressive strength shall be 25

MPa. 25 MPa grout shall be supplied by a concrete producer certified as having production compliance with 3104.

Note that appropriate cold weather pouring and curing techniques MUST be adopted if construction timing/temperatures so dictate.

Advise for inspection 24 hours before placing any concrete. Sequence and size of concrete pours to approval. No concrete pouring in wet weather. Clean out all formwork thoroughly before pouring. Handling, placing and vibration/compaction of concrete shall all be exactly to NZS 3109 requirements, and carried out by skilled operatives. Slabs power float finished to NZS 3114 U2 surface by kelly float, with steel troweling to a similar finish in corners etc., and to a U3 finish localized to resilient flooring areas.

Scabble the face of construction joints to 20mm from edges.

Cure all concrete for 14 days. Do not use sprayed membranes. As soon as practicable pond all horizontal surfaces, or fully cover with polythene or hessian (kept wet). Periodically hose down all formwork. Stripped vertical surfaces shall be kept wet with perforated hoses or similar.

Form shrinkage control joints in concrete floor slabs-on-ground by saw cutting, without chipping, spalling and tearing the surface, to the locations and layout shown on the drawings. Saw cuts shall extend to a quarter of the depth of the slab. Saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20°C, and 48 hours for average ambient temperatures below 20°C.

3.5.4 Surface Finishes

General floor slabs - U3 finish.

Prepare surface for HTC superglaze 'bronze' finish as indicated on floor finishes plan

3.5.5 Documentation

Concrete delivery dockets shall state job, date and time of mixer loading, grade, strength, and slump. Dockets shall be kept and forwarded to the Architect/Designer. Water must NOT be added after the concrete leaves the plant.

4 STRUCTURAL STEELWORK

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:

1554.1:2014(AS/NZS)	Structural steel welding - Part 1: Welding of steel structures
3404.1&2:1997(NZS)	Steel Structures Standard
4680:2006(AS/NZS)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
4781:1973(NZS)	Code of practice for safety in welding and cutting
BS 4360	Weldable structural steels
BS 4848	Hot rolled structural steel sections
BS 6497	Powder organic coatings for steel

4.3 Workmanship

4.3.1 Scope

The work to be done under this Section comprises the supply of all labour, materials and plant for the fabrication and erection of all structural steelwork and the supply only of sundry metalwork shown or implied on drawings or in this specification.

4.3.2 Workmanship

Steelwork fabrication and welding shall be by personnel qualified and certified in accordance with AS/NZS 1554.1. Confirm all dimensions with the Main Contractor before fabrication. Allow for minimal erection tolerances - excessive will not be accepted. All items true to line and detail, with no welding or shaping distortion. Flame cutting of steel generally unacceptable.

Co-ordinate steelwork with Concretor, Carpenter, and all services subcontractors as appropriate with regard dimensions and setting-out of built-in items and fixings for peripheral elements. Supply and install all associated sundry fixings, weld plates, brackets, etc. necessary to complete the contract. Hollow sections ends sealed with 6mm plate unless noted otherwise.

4.3.3 Fabrication & Erection

All steelwork fabricated and erected in accordance with the requirements of NZS 3404.

All welding to be Category SP in accordance with AS/NZS 1554.1. Butt welds full penetration with seal runs or backing strips. Fillet welds 5mm continuous unless otherwise noted. Welds exposed to weather and welds subject to hand contact shall be finished to a smooth even surface.

Steelwork shall be erected plumb, true to line, square and without strain, and shall be temporarily braced, as necessary, to provide adequate stability during erection.

Dry packing under baseplates shall be undertaken using an approved non-shrink grout, mixed to consistency suitable for the nature of the application. Clean surfaces before grouting, pack the grout tightly, and smooth the edges.

All bolts and fasteners shall be fitted with appropriate washers and shall be thoroughly tightened (to torque settings as recommended by manufacturers). Protruding ends of bolts to be centre-punched against nuts to prevent loosening.

4.4 Materials

4.4.1 Materials

All steel shall be completely free from defects such as laminations, rust or pitting. Any defective material found will be rejected before or after fabrication and must be removed from site and replaced with approved materials at the Contractor's expense.

All steel shall comply with the relevant following specification and grades, unless noted specifically otherwise : AS 1204: Grade 300

5 B L O C K W O R K

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:

3103:1991(NZS)	Specification for sands for mortars and plasters
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
4210:2001(NZS)	Masonry construction: Materials and workmanship
4229:2013(NZS)	Concrete masonry buildings not requiring specific engineering design
4230:2004(NZS)	Design of reinforced concrete masonry structures
4455.1:2008(AS/NZS)	Masonry units, pavers, flags and segmental retaining wall units - Masonry units
4671:2001(AS/NZS)	Steel reinforcing materials
CCANZ CP 01:2011	Code of Practice for Weathertight Concrete and Concrete Masonry Construction

5.3 Workmanship

5.3.1 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.

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

All walls shall be true to line, level and plumb, and with perpends 'kept' (the mean alignment of all corners, edges and conspicuous lines shall be +/-3mm in 3 metres, without local irregularities). All concrete blockwork stretcher bond, with joints width 10mm +/- 2mm (blockwork with a number of joints exceeding this tolerance may be required to be demolished and rebuilt). Webs and ends to be fully buttered.

No retempering of partially set or dried mortar. Insitu concrete at the base of walls shall be scabbled to provide a key for mortar and grout. All part masonry units that are required shall be sawn cut to

clean straight lines. Keep wall faces clean as the work proceeds and regularly inspect for mortar droppings etc.

Mortar joints shall be burnished smooth and pointed to a light concave to achieve full compaction of mortar to a depth not exceeding 6mm after the initial stiffening has occurred.

Coordinate with all trades to build in all required starters, anchors, bolts, fixings, sleeves, conduits, chases, or electrical or plumbing devices etc. (conduits vertical only unless otherwise is approved). Check that positions are correct before pouring. Coordinate with all trades to form all necessary holes, openings etc. with positions and sizes exactly as required.

During the progress of work every care must be taken to prevent moisture penetration of the blocks. No blocklaying shall proceed during wet weather. Turn back scaffold planks at night and during rain. Upon completion of each days work, exposed tops of block walls shall be protected from weather.

On completion thoroughly clean all surfaces affected by this work.

5.3.2 Concrete Blockwork

Reinforcement shall be as specified on the drawings. Vertical rods tied to starter rods. Hook horizontal and vertical rods around the trimmer rods at openings, ends and tops of walls. Delay grouting until the mortar has sufficient strength. Thoroughly clean the grout space. Close ports only after inspection and approval; close by mortaring the face shell neatly in place, and brace them to prevent displacement during grouting.

For epoxy fixed starter bars drill holes to the depths indicated on the drawings and 6mm larger in diameter than the nominal size of the fixing. Thoroughly clean out the holes with a stiff brush and compressed air. Use an approved product, injected to completely fill the hole prior to inserting the fixing.

All lapped reinforcing steel shall be in contact and shall be tied. Starter bars which have not been cast in the correct location shall not be cranked into position - refer to Engineer for instruction.

5.3.3 Grouting of Cells & Cavities

The grout pump shall be squeeze type. Use a pencil vibrator, and have a standby unit on site. All blockwork cells filled solid, and all grout shall be thoroughly vibrated. Grouting is to be high-lift grouting with expansive additive as NZS 4210.

5.3.4 Works Inspection

Blockwork shall be constructed and inspected to the requirements for Grade B masonry. Inspection by the Engineer will be in accordance with NZS 4230. Give 24 hours notice for inspections of blockwork and completed reinforcement placement, with the clean out ports left open, prior to grouting.

6 CARPENTRY

6.1 Preliminary

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

6.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
2295:2006(NZS)	Pliable, permeable building underlays
2588:1998(AS/NZS)	Gypsum plasterboard
2589:2007(AS/NZS)	Gypsum linings - Application and finishing
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3602:2003(NZS)	Timber and wood-based products for use in building
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
3618:1984(NZS)	Mechanical stress grading of timber
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
4200.1:1994(AS/NZS)	Pliable building membranes and underlays - Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4389:2015(AS/NZS)	Roof safety mesh
4859.1:2002(AS/NZS)	Materials for the thermal insulation of buildings - General criteria and technical provisions
NZBC E2	External moisture
NZBC E2/AS1	External Moisture

6.3 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.

6.4 Timber Framing

6.4.1 Scope

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

6.4.2 Workmanship

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

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

6.4.3 Timber Framing

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.

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.

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.

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.

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.

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.

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.

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.

6.4.4 Steel Fixings

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.

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.

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.

6.4.5 Wall Framing

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.

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.

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.

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.

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.

6.4.6 Roof Framing

Ceiling Joists

Unless specified or shown otherwise, ceiling joists shall be to the dimensions and spacings given in NZS 3604 Table 10.3.

Ceiling joists shall be installed parallel true to line and plane, and shall be joined directly over framing supports and lapped minimum 300mm, or butted and flitched, in accordance with NZS 3604 10.2.1.6.5.

Do not support ceiling joists from a strutting beam.

6.5 GIB® Plasterboard Sheets

6.5.1 Scope

Supply and install the selected GIB® Plasterboard sheets, complete with all accessories, as sheet lining material to the walls, ceilings and other elements identified on the drawings. All aspects of this work shall be in complete accordance with Winstone Wallboards Ltd technical literature and installation guidelines (call Winstone Helpline on 0800 100 442 or check www.gib.co.nz for the latest editions) and other relevant product manufacturers' recommendations.

Substitution of any specified GIB® system, GIB® System component or GIB® plasterboard is not permitted.

6.5.2 Components

To the areas noted on the drawings as ‘general plasterboard wall or ceiling lining’, shall additionally comply with all relevant aspects of the GIB® Site Guide January 2010 literature, complete with all recommended components and accessories and other relevant manufacturers recommendations.

To the areas noted as ‘Wet Area’ on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems March 2007, complete with all system accessories, BRANZ Appraisal No.427 (2007) and other relevant product manufacturers' recommendations.

6.5.3 GIB Plasterboard

GIB® Standard plasterboard, 10mm thick.

Location: Generally on all interior walls

GIB® Standard plasterboard, 13mm thick.

Location: to all areas of ceiling joists fixed to rondo battens

GIB Aqualine® plasterboard, 10mm thick.

Location: to WC walls and behind Staff Kitchen

6.5.4 Fixings

Fix sheets with adhesive and GIB® Grabber® drywall screws in accordance with Winstone Wallboards Ltd requirements.

Fix sheets with GIBFix® adhesive and GIB® Nails in accordance with Winstone Wallboards Ltd requirements.

GIBFix® All-Bond adhesive. Use to adhere the sheets and accessories to the framing in accordance with Winstone Wallboards Ltd requirements.

6.5.5 Level of Plasterboard Finish

To the areas noted as a specific Level of Finish (3-5) on the drawings, additionally comply with all relevant aspects of Winstone Wallboards Ltd literature 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.

To the areas noted as ‘control joint’, comply with all relevant aspects of Winstone Wallboards Ltd literature and AS/NZS 2589.

6.5.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to ensure that appropriate clearances are allowed from adjacent internal linings, fixtures, products, and associated services, etc, that the sheets correctly allow for door and window installation, and that services penetrations are correctly handled to maintain sheet integrity.

6.5.7 Workmanship

All installation work shall be carried out by experienced tradesmen familiar with the techniques and materials specified and in accordance with the current requirements of Winstone Wallboards Ltd.

6.5.8 Delivery & Handling

Store GIB® plasterboard sheets undercover inside a watertight building and keep sheets dry at all times. Stack sheets flat on a dry level surface in accordance with Winstone Wallboards Ltd recommendations. Avoid damage to sheet edges, ends, and surfaces. Carry all sheets on edge.
Do not use damaged or faulty sheets.

6.5.9 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and otherwise in accordance with the specified Level of Finish and Winstone Wallboards Ltd requirements. Framing shall be plumb and in true alignment, complete and suitable for the sheets, and maximum moisture content 18% or as recommended by Winstone Wallboards Ltd. Ensure that the framing is true to line and plane and with no projections due to structural and bracing bracketry etc. Ensure that all framing brackets, plates, braces and hold-downs etc. are correctly installed.

Check that the building has been completely finished to all penetrations including doors, windows, services, etc so that the sheets can be installed without being affected by any weather conditions. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flooring, setout of services, etc. that will enable the sheets and accessories to be installed. Clear building debris and rubbish from framing voids and keep clean until GIB sheet linings are installed.

6.5.10 Installation

Install the sheets, complete with all accessories, to the framing in accordance with the relevant Winstone Wallboards Ltd recommendations and literature, and as noted and detailed on the drawings.

6.5.11 Completion

Ensure that the sheets have been cut, fitted and joined, and fixed correctly. Check for damage and replace as necessary.
Clean up thoroughly on completion and remove all waste and rubbish from site.
Provide a copy of the Winstone Wallboards Ltd maintenance requirements to the owner.

6.6 James Hardie Eaves & Soffits

6.6.1 Scope

Supply and install the specified James Hardie products as a fibre-cement sheet lining material to the eaves and soffits identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with James Hardie Eaves And Soffits Installation Manual (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

6.6.2 Eaves & Soffit Lining

HardieFlex Eaves Lining - 4.5mm. 4.5mm thick fibre-cement sheet lining with an un-sanded surface finish. The sheets are to be finished with a paint system. Installed in accordance with the James Hardie Eaves And Soffits Installation Manual to the locations shown on the drawings.

6.6.3 Co-operation

Co-ordinate with other trades to ensure that the panels correctly allow for fascia and wall cladding installation and associated flashings etc., and that services penetrations are correctly handled to maintain full weathertightness and sheet integrity.

Ensure that other trades are aware of the James Hardie Safe Working Practices.

6.6.4 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements. The fascia and framing shall be in true alignment, complete and suitable for the sheets, and maximum moisture content as per NZS 3602. Ensure that the framing is true in line with no projections due to structural and bracing bracketry etc. Ensure that any hold-downs from the roof framing to the wall framing are correctly installed.

Check that the building underlay or rigid air barrier to the wall framing has been installed in full accordance with the manufacturer's requirements and the drawings. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flashings etc that will enable the sheets and all accessories to be installed.

6.6.5 Flexible Sealant

Flexible silicone sealant to be SIKA Silaflex MS. Use to seal the sheets and accessories in accordance with the sealant manufacturer's recommendations and to James Hardie requirements. Ensure sealant compatibility with selected finish.

6.6.6 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with James Hardie Eaves And Soffits Installation Manual and other relevant product manufacturers' recommendations.

6.6.7 Delivery & Handling

Carry all sheets on edge. Stack sheets flat on a level platform off the ground ie. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm crs maximum). Keep sheets and accessories dry at all times. Avoid damage to sheet edges, ends, and surfaces. Keep uPVC flashings etc. out of direct sunlight, and store all accessories on flat and avoid damage. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Installation Manual, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished sheets or accessories.

6.6.8 Installation

HardieFlex Eaves Lining joints to be formed with uPVC jointers.

6.6.9 Fixings

Fix HardieFlex Sheet 4.5mm sheets with galvanised nails in accordance with James Hardie requirements.

6.6.10 Completion

Ensure that the sheets have been fixed correctly, that all joints and accessories have been completed correctly, and that all penetrations have been taped correctly. Check that no damage has occurred to any installed sheet element or associated component, replace as necessary. Ensure that the sheets are painted within 90 days of the sheet installation, complete with all accessories and flashings. Hand over a copy of the latest edition of the James Hardie HardieFlex Eaves Lining Product Warranty to the client. Hand over a copy of the latest James Hardie Eaves And Soffits Installation Manual to the client for their maintenance information.

6.7 Wall & Roof Underlays, Netting & Mesh

6.7.1 Scope

Supply and install the selected Paul Industries Underlays, Netting and Mesh to the locations identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with Paul Industries Ltd technical information and installation requirements (check www.paulindustries.co.nz, or call 0800 330 320 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Paul Industries Wall & Roof Underlays, Netting & Mesh.

6.7.2 Wall Underlay

Fastwrap Wall Underlay. Light weight, fire retardant, absorbent and breathable, non-woven polypropylene wall underlay. UV stabilised, anti-microbial and will not rot.
In Low, Medium, High, and Very High NZS 3604 Wind Zone situations, Fastwrap Wall Underlay shall be installed over timber or steel wall framing as a wall underlay, in accordance with the manufacturer's requirements and BRANZ Appraisal No.615 (2008) and as shown on the drawings, with absorbent and non-absorbent direct-fixed wall claddings, or with absorbent and non-absorbent wall claddings over a 20mm drained cavity, and with masonry veneer in accordance with SNZ HB 4236.
In NZS 3604 Extra High Wind Zone situations, Fastwrap Wall Underlay shall be installed directly over a rigid air barrier, in accordance with NZBC E2/AS1 9.1.7.2, to the manufacturer's requirements and BRANZ Appraisal No.615 (2008) and as shown on the drawings, with absorbent and non-absorbent wall claddings over a 20mm drained cavity, and with masonry veneer in accordance with SNZ HB 4236.
Do not leave Fastwrap Wall Underlay exposed for more than 42 days before covering with the wall cladding.

Location:

6.7.3 Roof Underlay

Fastwrap FlameSpec SS. Self-supporting, fire retardant, absorbent and breathable, synthetic non-woven polyolefin roof underlay. Water resistant and anti-microbial and will not rot.
Installed over timber or steel roof framing as a roof underlay in accordance with the manufacturer's requirements and as shown on the drawings.
Fastwrap FlameSpec SS is suitable for use on roof slopes 3° and over, installed directly under direct-fixed roof claddings, or directly under roof cavity battens or tile battens, in accordance with Paul Industries requirements and BRANZ Appraisal No.715 (2011).
Fastwrap FlameSpec SS must installed in a manner that prevents ponding of water, and shall supported on safety mesh or netting, as specified, when installed on roof slopes less that 8° pitch.
When installed on roof slopes 8° and over, Fastwrap FlameSpec SS must span no more than 1200mm between supports. Do not install Fastwrap FlameSpec SS on roof slopes less than 3°.
Do not leave Fastwrap FlameSpec SS exposed for more than 7 days before covering with the roof cladding.

Location:

6.7.4 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 to install Paul Industries Wall & Roof Underlays and Nettings as required.

6.7.5 Workmanship

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

All installation work shall be carried out by experienced and competent tradesmen, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements and as noted and detailed on the drawings.

6.7.6 Delivery & Handling

Store underlay rolls on ends, undercover on a flat, clean and dry surface. Keep underlays, netting and mesh products clean and dry and protected from damage and contamination while stored. Handle products in accordance with the manufacturer's requirements.

6.7.7 Preparation

Check that steel framing has been completed as shown on the drawings and inspected and approved by the BCA, complies with NASH3405, or the NZBC for specific design, and is in accordance with Paul Industries requirements. Ensure that the framing is securely fixed, true to line and plane, is plumb and level where required, and is trimmed at edges, openings and penetrations as required, and that there are no projections due to structural bracing and bracketry etc.

6.7.8 Wall Underlay Installation

Fastwrap Synthetic Wall Underlay shall be installed, printed face out, to the exterior face of the wall framing, run horizontally, starting from the bottom edge and finishing at the top edge, extending 35mm or as detailed below the bottom plate or floor structure, and lapped such that any water will be shed to the outside of the underlay with minimum 150mm horizontal laps and minimum 150mm vertical joint laps made over a stud, and kept taut without sagging or bulging.
Fix at maximum 300mm centres, with 6mm - 8mm stainless steel staples or 20mm large-head galvanised clouts, self-drilling screws or proprietary underlay fixings. Provide additional fasteners fixed through 19mm wide polythene embossed tape around framed openings before cutting Fastwrap at openings. Cut window and door openings just prior to joinery installation; cut underlay at 45º angle away from each corner and return full framing depth and fasten to inside of frame. Install flexible flashing tape with minimum 50mm lap over the face of the underlay at window and door opening corners and along sill trimmers and returned up 100mm minimum.

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

Finish Fastwrap underlay at edges as detailed. Install all necessary flexible flashing tapes to openings, around pipes, ducts and other services penetrating the underlay, parapet and balustrade junctions, along head flashings and inter-storey flashings when installed, as required to seal the underlay in accordance with Paul Industries requirements and as shown on the drawings.

6.7.9 Roof Underlay Installation

Fastwrap FlameSpec SS Roof Underlay shall be installed over the specified support netting/mesh, run horizontally across or vertically up the roof slope, starting from the gutter/lowest point up to the ridge/highest point, overhanging fascia boards 20mm - 25mm , with minimum 150mm wide horizontal and vertical laps, lapped such that any water will be shed to the outside of the underlay, and sufficiently tensioned without sagging. End laps must be made over framing and be minimum 150mm wide. For roof slopes between 3° and 8°, Fastwrap FlameSpec SS must only be run horizontally.
Fix 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 Fastwrap FlameSpec SS underlay over the anti-ponding board and specified support netting/strapping, and fix at maximum 300mm centres to the rafters/trusses before the tile battens are installed.

Finish Fastwrap FlameSpec SS 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 Paul Industries requirements and as detailed. Fastwrap FlameSpec SS must be separated from chimneys and flues in accordance with the requirements of the NZBC C1-C6 Acceptable Solutions.

6.7.10 Completion

Check that all underlays and accessories have been installed correctly. Check that the underlay is properly supported with all edges, joins and ends correctly finished, and that window and door openings and penetrating pipes are correctly flashed prior to closing off with claddings. Check underlays for tears and punctures and other damage - repair or replace as necessary in accordance with the manufacturer's requirements. Remove rubbish from the site.

Issue to the Owner a copy of the manufacturer's product warranties for the installed underlays, netting and/or mesh.

6.8 Axent Fascia

6.8.1 Scope

Supply and install James Hardie Axent Fascia 180mm boards as a fibre-cement board cladding material to the eaves identified on the drawings, complete with all accessories. The fascia and barge boards are to be finished with a paint system. All aspects of this work shall be in complete accordance with the James Hardie Axent Fascia Installation Manual (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

6.8.2 Co-operation

Co-ordinate with other trades to ensure that appropriate clearances are allowed from roofing products, associated flashings, rainwater goods etc. Confirm roofing build-up to ensure sufficient clearance for anti-ponding boards and that the boards will receive the soffit linings correctly.

Ensure that other trades are aware of the James Hardie Safe Working Practices.

6.8.3 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements. Rafters and framing shall be plumb and in true alignment, complete and suitable for the boards, and maximum moisture content as per NZS 3602. Ensure that the rafters and framing are true in line with no projections due to structural and bracing bracketry etc.

6.8.4 Sealant

Flexible silicone sealant to be SIKA AT Facade. Use to seal the fascia and barge boards, and accessories in accordance with the sealant manufacturer’s recommendations and to James Hardie requirements. Ensure sealant compatibility with selected finish.

6.8.5 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with James Hardie Axent Fascia Installation Manual and other relevant product manufacturers' recommendations.

6.8.6 Delivery & Handling

Carry all boards on edge. Stack boards flat on a level platform off the ground ie. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm crs maximum). Keep boards and accessories dry at all times. Avoid damage to board edges, ends, and surfaces. Keep uPVC flashings etc out of direct sunlight, and store all accessories on flat and avoid damage to any. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Installation Manual, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished fascia and barge boards or accessories.

6.8.7 Installation

Install the fascia and barge boards to the framing in accordance with the Installation Manual. Fascia and barge end joints are to be formed on solid blocking with a tongue & groove joint and sealant. Ensure that all cut edges of boards are primed prior to installation with Dulux Primacryl, Resene Quick Dry, or similar.

6.8.8 Fixings

Fix boards with galvanised nails in accordance with James Hardie requirements.

6.8.9 Completion

Ensure that the fascia and barge boards have been fixed correctly, and that all vertical joints have been completed correctly. Check that no damage has occurred to any installed fascia and barge board replace as necessary. Ensure that the fascia and barge boards are painted within 90 days of the fascia and barge installation, complete with all accessories and flashings. Hand over a copy of the latest edition of the James Hardie Axent Fascia Product Warranty to the client.

7 ROOFING

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
1170.3:2003(AS/NZS)	Structural design actions - Snow and ice actions
1397:1993(AS/NZS)	Steel sheet and strip - hot-dipped, zinc-coated or aluminium/zinc-coated
1562.2:1999(AS/NZS)	Design and installation of sheet roof and wall cladding - Corrugated fibre-reinforced cement
1562.3:1996(AS/NZS)	Design and installation of sheet roof and wall cladding - Plastic
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
4200.1:1994(AS/NZS)	Pliable building membranes and underlays - Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4389:2015(AS/NZS)	Roof safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NZBC B2	Durability
NZBC E2	External moisture
NZBC E2/AS1	External Moisture
NZBC E3	Internal Moisture
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 2.2
NZS 3441	Zinc coated steel coil

7.3 Workmanship

7.3.1 Guarantees

The whole of the roof covering work shall be complete in all respects and absolutely watertight. Commencement of roofing works by any Subcontractor indicates their full agreement to and acceptance of an unwritten guarantee to maintain the whole of their work in a satisfactory and watertight condition, and to arrange and pay for any damage consequential upon the failure of their

materials or workmanship, for the periods stated below, irrespective of the 90 day general maintenance period.

- Membrane roofer - ten years from completion.
- Galvanised steel roofer - two years after completion.
- Aluminium roofer - ten years after completion.
- Acrylic/f.glass roofer - ten years after completion.

7.3.2 Co-operation

Co-operate with other trades to ensure that framed roofing substrates have appropriate spacings, alignments and fixings, and to ensure that sheet roofing substrates have the correct edge and central fixings, appropriate alignments and gradients, edge priming if necessary, and are completely clean.

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

7.3.3 Alternatives

Alternatives or substitutions are not permitted to any specified product or system in the Roofer section.

7.4 Rainwater Goods

7.4.1 Prefinished Steel Rainwater Goods

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

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

7.5 Dimond Profiled Metal Roofing

7.5.1 Scope

Supply and install the specified Dimond Profiled Metal Roofing to the locations identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with the Dimond Roofing & Cladding Systems Manual and other relevant Dimond technical literature (check www.dimond.co.nz, or call 0800 346 663 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Dimond Profiled Metal Roofing.

7.5.2 Dimond Roofing Profile

Dimond 'Topspan'. High rib roofing profile; 53mm deep; 225mm crest pitch; 37mm wide crest; 127mm wide pan; 970mm sheet width; 900mm effective cover.

Manufactured from the material type, thickness and finish as specified below.
The minimum roof pitch for Topspan is 3° (approx 1:20). Sheets shall be continuous from ridge to gutter; where a step is designed into the roof, sheets shall be continuous from ridge to step and step to gutter. Sheet ends must be stop-ended under flashings, and must be lipped into gutters on roofs sloped below 8°.
Installed in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Installed location:

7.5.3 Material Type, Thickness & Finish

Dimond 'Topspan' profiled metal roofing shall be manufactured from COLORSTEEL® Endura - 0.55mm BMT. Pre-painted hot-dipped galvanised zinc coated steel coil conforming with AS/NZS 2728.

Colour:

7.5.4 Components & Accessories

Galvanised Hexagonal Wire Netting - Underlay Support. Refer to separate specification section for wire netting underlay support specification and requirements.

Roofing Underlay. Refer to separate specification section for roof underlay specifications and requirements.

Roofing Fasteners. Roofing fastener type and durability shall comply with AS 3566 Class 4 or Class 5, as appropriate, and be no less than the durability of the material being fixed.
Fastener type and placement (frequency) shall be appropriate for the environmental conditions and the specified roofing profile and material and the supporting structure material; all in accordance with the NZMRM Code of Practice and the Dimond Roofing & Cladding Systems Manual.

Roof Flashings. Roof flashings shall be fabricated from the same material and coating as the roofing 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 roofing sheets, and notched when installed across the roofing profile or provided with a soft edge - in accordance with Dimond requirements.
Flashings, flashing fastenings and fastening frequency shall be in accordance with the Dimond Roofing & Cladding Systems Manual - in particular Table 2.1.0 Effective Minimum Cover of Flashing Over Roof Sheet - 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 roofing profile. Installed to the details shown on the drawings and in accordance with Dimond recommendations.

Roofing Sealant. Use only neutral-curing silicone sealant, compatible with the specified roofing and flashing materials and finishes, that is suitable for the required application and use in accordance with the sealant manufacturer's instructions and to Dimond 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. Dektite® or similar approved EPDM or silicone-polymer proprietary flexible collar flashings for weatherproofing roof-penetrating pipes/flues/ducts. Sized to suit the applicable pipe/flue/duct, and installed in strict accordance with the manufacturer's requirements and the NZMRM Code of Practice. Use only high-temperature silicone (not EPDM) collar flashings for heated flues and pipes with temperature range between 60°C - 200°C.

7.5.5 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.
Co-operate with other trades to ensure that framed roof members and/or roof substrates are in accordance with the drawings and design documentation.
Co-ordinate to ensure that all roof members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly installed.
Co-ordinate with the rainwater system installer, and generally with other trades as required, to install Dimond Profiled Metal Roofing.
Ensure that each section of roof is waterproofed as soon as possible after preparatory work is complete; allow to carry out the works in several operations if necessary to comply with this condition.

7.5.6 Workmanship

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

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques and certified to install Dimond Profiled Metal Roofing, to fully comply with all warranty requirements in accordance with the manufacturer's requirements. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

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

Always maintain isolation of dissimilar materials in accordance with the Dimond Roofing & Cladding Systems Manual. Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto, galvanised or Zincalume® materials.

7.5.7 Delivery & Handling

Store Dimond profiled metal roofing, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the Dimond Roofing & Cladding Systems Manual. 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.

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

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

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

7.5.8 Preparation

Roof Structure - Inspect the roof structure prior to installation of the roofing and check all aspects of preparatory works, including but not limited to:
Check that the purlins 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 properly dressed back and adhered to a solid substrate along the roof edge as shown on the 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 backing required for fully supported roofing is complete and securely fixed in accordance with the drawings.
Check that timber framing has a maximum moisture content of 20% at the time of roofing installation.

7.5.9 Installation

Install Dimond Profiled Metal Roofing in accordance with the Dimond Roofing & Cladding Systems Manual and as shown on the drawings.
As shown on the drawings, confirm any specific roofing detailing requirements prior to installation.

Accurately set-out Dimond Profiled Metal Roofing sheets exactly square to the building axis and with sheets lapped away from the prevailing wind; maintain this accurate set-out throughout installation.

Check for and eliminate any creep and/or spread of sheets during installation.

7.5.10 Fixing

Crest-fix Dimond 'Topspan' profiled roofing, manufactured from COLORSTEEL® Endura, to steel purlins/framing (up to 3.0mm thick) with minimum AS 3566 Corrosion Class 4, 14g-10 x 95mm, Hex. Head with Seal, Metal Tek Screws; to NZMRM Code of Practice requirements and in accordance with the Dimond Roofing & Cladding Technical information on the Dimond website. All primary fasteners shall achieve minimum 10mm penetration through steel purlins. Where cavity battens, sarking or insulation is installed over the purlins/framing, increase the screw length by the thickness of the batten/sarking/insulation accordingly.

7.5.11 Completion

Check that the Dimond Profiled Metal 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.
Sweep down the completed roof and clean out spouting, gutters and rainwater pipes.

Leave all of this work complete and weathertight and to the required standard in accordance with the NZMRM Code of Practice and the Dimond Roofing & Cladding Systems Manual.
Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the Dimond maintenance requirements upon completion of the contract works.

Provide the roofing material manufacturer's/supplier's 'Product Warranty' for the installed roofing product on the Dimond Standard Warranty Form. Warrant this work under normal conditions and use against failure of coating and for weatherproofing by material penetration. Commence the warranty from the date of practical completion of the contract works.
Factory applied coatings; the warranty period is determined by the specified product and the site location and environment - contact Dimond to evaluate the warranty conditions.

Provide the installer's 'Installation Warranty' on the installer's Standard Warranty Form. Warrant this work under normal environmental conditions and use against weatherproofing failure. Commence the warranty from the date of practical completion of the contract works.

7.6 Dimond Profiled Metal Wall Cladding

7.6.1 Scope

Supply and install the specified Dimond Profiled Metal Wall Cladding to the locations identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with the Dimond Roofing & Cladding Systems Manual and other relevant Dimond technical literature (check www.dimond.co.nz, or call 0800 346 663 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Dimond Profiled Metal Wall Cladding.

7.6.2 Dimond Cladding Profile

Dimond 'Dimondclad Rib50'. Reversed low-rib trapezoidal profile; 15mm deep; 86mm crest pitch; 52mm wide crest; 20mm wide pan; 810mm sheet width; 779mm effective cover.
Manufactured from the material type, thickness and finish as specified below.
Installed as vertical and/or horizontal profiled metal wall cladding in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Installed location:

7.6.3 Material Type, Thickness & Finish

Dimond 'Dimondclad Rib50' profiled metal wall cladding shall be manufactured from COLORSTEEL® Endura - 0.4mm BMT. Pre-painted hot-dipped galvanised zinc coated steel coil conforming with AS/NZS 2728.

Colour:

7.6.4 Components & Accessories

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 the Dimond Roofing & Cladding Systems Manual.

Metal Flashings. 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 Dimond requirements.
Flashings, flashing fastenings and fastening frequency shall be in accordance with the Dimond Roofing & Cladding Systems Manual 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.

Rivet Fastenings. Rivets shall be sealed aluminium, 4.8mm diameter.

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 Dimond recommendations.

Compressible Foam Sealing Tape. Self-adhering, compressible foam sealing tape for sealing metal flashings and generally as required in accordance with Dimond recommendations and as shown on the drawings.

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 Dimond 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.

7.6.5 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.
Co-ordinate with other trades to ensure that the Dimond Profiled Metal Wall Cladding correctly allows for joinery installation, the location of pipes, outlets, meter boards and other fixtures and fittings installed by others, and to install Dimond Profiled Metal Wall Cladding as required.

7.6.6 Workmanship

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

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques and certified to install Dimond Profiled Metal Wall Cladding, to fully comply with all warranty requirements in accordance with the manufacturer's requirements. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

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

Always maintain isolation of dissimilar materials in accordance with the Dimond Roofing & Cladding Systems Manual. Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto, galvanised or Zincalume® materials.

7.6.7 Delivery & Handling

Store Dimond profiled metal wall cladding, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the Dimond Roofing & Cladding Systems Manual. 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.

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.

7.6.8 Preparation

Vertically Orientated Dimond Profiled Metal Wall Cladding - direct-fixed to timber framing and within the scope of NZBC E2/AS1, check all aspects of preparatory works, including but not limited to:
Check that the timber wall framing complies with NZS 3604, or is in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with Dimond requirements.
Check that the framing has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres, is plumb and in true alignment, includes all blocking required for fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 20% at the time of cladding installation.
Check that the specified absorbent breather type building underlay (to NZS 2295) has been installed in accordance with NZBC requirements and the manufacturer's recommendations, and 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.
Check that any rigid air barrier to unlined gables and external garage walls is installed with an absorbent flexible underlay in accordance with E2/AS1 Table 23 and the manufacturer's recommendations.
Ensure that a suitable separation barrier is in place as per the NZMRM Code of Practice where incompatible materials are in contact.
Check that the ground levels are sloping away from the building so that there will be no ponding water against the building, and that the ground will be remain clear of the cladding by at least 100mm at all times in accordance with E2/AS1.

7.6.9 Installation

Install Dimond Profiled Metal Wall Cladding in accordance with the Dimond Roofing & Cladding Systems Manual and as shown on the drawings.
As shown on the drawings, confirm the layout and location of all control joints; the layout of the cavity battens; and any specific cladding detailing requirements prior to installation.

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 walls and around corners; with side-laps of vertically orientated sheets directed away from the prevailing wind and/or line of sight; to straight, true and accurately aligned lines in both directions - vertical and horizontal. Check for and eliminate any creep and/or spread of sheets during installation.

7.6.10 Fixing

Pan-fix Dimond 'Dimondclad Rib50' profiled metal cladding, manufactured from COLORSTEEL® Endura, direct-fixed to timber framing, with M6 x 50mm HG-Z4, RoofZip Hex. Head with Seal, Self-drilling Screws; to NZMRM Code of Practice requirements and in accordance with the Dimond Roofing & Cladding Technical information on the Dimond website. All primary fasteners shall achieve minimum 30mm embedment into structural timber. Where a rigid underlay, sarking or insulation is installed over the support framing, increase the screw length by the thickness of the rigid underlay/sarking/insulation accordingly. Pre-painted screws shall be factory pre-painted for an accurate colour match.

7.6.11 Completion

Check that the Dimond Profiled Metal Wall Cladding and associated components and flashings have been installed and finished correctly.
Check for defective work, damage and surface marking - replace and/or repair as necessary.
Ensure that the work of other trades does not reduce the cladding-to-ground, deck or roof clearances that are required by the NZ Building Code.

Leave all of this work complete and weathertight and to the required standard in accordance with the NZMRM Code of Practice and the Dimond Roofing & Cladding Systems Manual.
Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the Dimond maintenance requirements upon completion of the contract works.

Provide the cladding material manufacturer's/supplier's 'Product Warranty' for the installed metal cladding product on the Dimond Standard Warranty Form. Warrant this work under normal conditions and use against failure of coating and for weatherproofing by material penetration. Commence the warranty from the date of practical completion of the contract works.
Factory applied coatings; the warranty period is determined by the specified product and the site location and environment - contact Dimond to evaluate the warranty conditions.

Provide the installer's 'Installation Warranty' on the installer's Standard Warranty Form. Warrant this work under normal environmental conditions and use against weatherproofing failure. Commence the warranty from the date of practical completion of the contract works.

8 ALUMINIUM JOINERY

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:

1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
2208:1996(AS/NZS)	Safety glazing materials in buildings
4211:2008(NZS)	Specification for performance of windows
4223.3:1999(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
AS/NZS 1231	Aluminium, anodic coatings
AS/NZS 1865	Drawn aluminium rod, bar and strip
AS/NZS 1866	Aluminium / alloys - extruded sections
AS/NZS 4666:2012	Insulating glass units

8.3 Aluminium Windows & Doors

8.3.1 Alternatives

No specific supplier is nominated, although a list of acceptable brands is given below. The Contractor shall state with his tender which brand he is using.

Thermal performance (NZBC H1/AS1) must be as required to meet the Designer's Thermal Evaluation.

APL Brands:
-Altherm
-First
-Vantage
-Smartwood
-Metro Series
-Thermal Heart
-Architectural Series
-Commercial

ASL Brands:
-Elite
-Fairview

-Residential
-Evolution
-Architectural
-Commercial

Fletcher Aluminium Brands:
-Pacific Residential
-Pacific Thermal
-Pacific Architectural
-Atlantic High Performance
-ALTI
-Nubulite
-Rylock

Nalco Brands:
-Nulook
-Bradnams

8.3.2 Installation Type

Timber Frame Installation - Cavity Construction
All windows (and aluminium frame external doors) installation work shall be exactly in accordance with NZBC E2/AS1, the Windows Association's Windows Installation System (WANZ:WIS), and details on the drawings or supplied by the windows manufacturer.
Check framing alignment, and that window openings are square and the correct size for fitting tolerances.
Prepare framing openings by neatly cutting the building wrap at 45º into the corners, turning wrap through the frame depth and fixing to the inside face, flashing the bottom corners with moulded plastic and over-flashing the full sill and 200mm up the jambs with the specified flexible flashing tape, stapled to hold the stretched external corners. At head corners install flashing tape 200mm each way from the corners.

Install the WANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2, to provide continuous support to the window unit. Install the head cavity closer, positioned to provide a 15mm drip edge to the cladding.

Set shims or pack as necessary and install the frames exactly true and square, blocked-up off the support bar as required. Use appropriate separators between aluminium and other materials, and fix securely with due regard for any anticipated movements and for linings, trim etc.

Install the head flashing, extending 35mm up behind the cladding (and in turn over-flashed with an additional piece of wrap cover extended up under the wrap or flashing or eaves above), sloping at 15º down to the exterior, and turning down to cover the top of the aluminium frame by at least 10mm, before finishing with a 5mm 45º 'kick out'. Upstand the head flashing ends as detailed. Install jamb flashings/ sealant or scribers as detailed.

After frames installation install closed cell backing rods as required and expanding foam air-seal the gap between framing and liners.

8.3.3 Interior Finish

Architraved.

8.3.4 Reveal

Timber reveals for paint finish with all sides primed.

8.3.5 Glass Platform

Double Glazed.

8.3.6 Finish

Powder Coated Aluminium - Matt

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

8.3.7 Hardware

Black Hardware.

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

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

8.3.8 Workmanship

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

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

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

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

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

Flashings as detailed will be supplied. Flashing materials will be compatible with the windows.

8.3.9 Delivery and Installation

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

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

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

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

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

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

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

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

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

9 GLAZING

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:

1170.0:2002SUPP1(AS/NZS) A1	Structural design actions - General principles - Commentary: Amendment 1
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
2208:1996(AS/NZS)	Safety glazing materials in buildings
3604:2011(NZS)	Timber-framed buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.3:1999(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4223.SUPP1:2008(NZS)	Code of practice for glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
4232.2:1988(NZS)	Performance criteria for fire resisting enclosures - Part 2: Fire resisting glazing systems
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

9.3 Non-Structural Glazing

9.3.1 Scope

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

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

9.3.3 Workmanship

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

9.3.4 Glass Type

Tinted Float Glass: Tinted annealed float glass, in accordance with NZS 4223, to the locations identified on the drawings.

Manufacturer, brand name & type:

Obscure and Patterned Glass: Surface patterned glass and obscured glass, in accordance with NZS 4223, to the locations identified on the drawings.

Manufacturer, brand name & type:

Toughened Safety Glass: Toughened Grade 'A' Safety Glass, in accordance with AS/NZS 2208 and NZS 4223, to the locations identified on the drawings. All cutting and drilling and other processing requirements shall be done prior to toughening. Install safety glass in accordance with the manufacturer's recommendations and NZS 4223.

Manufacturer, brand name & type:

Mirrored Safety Glass: Clear Grade 'A' Safety Glass, in accordance with AS/NZS 2208, with reflective silvered coating and manufacturer applied protective backing.

Manufacturer, brand name & type:

9.3.5 Insulating Glass Units

Insulating Glass Units. Sealed, gas filled, insulating glass units manufactured and installed in accordance with AS/NZS 4666, and the Insulating Glass Manufacturers' Association recommendations, to the locations identified on the drawings.
Manufacturer, brand name & type:
External Glass, type & thickness:
Space width and Gas:
Internal Glass, type & thickness:

9.3.6 Components & Accessories

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

9.3.7 Installation

Aluminium, Double Glazed (IGU's)
Install Insulated Glass Units into aluminium frames in accordance with the glazing manufacturer's recommendations and NZS 4223, and as detailed.

9.3.8 Frameless Doors & Screens

Frameless glass doors and screens shall be safety glass in accordance with NZS 4223.3.
Frameless glass doors and screen panels cut to the dimensions shown on the drawings, and factory pre-drilled and cut as required for all necessary fixings, brackets, cleats, hinges, locks, latches, closers and other hardware or fixtures, and edge finished as specified, prior to installation. Install frameless glass doors and screen panels to the layout and details shown on the drawings and in accordance with any proprietary fixing manufacturer's requirements. Glass screen panels set straight, true to line and plumb. Panel joints plumb and parallel as detailed. Fixings, clamps, brackets, and hardware etc. neatly set-out and aligned as detailed.

9.3.9 Mirrors

Frameless mirrors to the dimensions noted on the drawings, all edges finished as specified. Screw fix to the locations shown on the drawings, through pre-drilled holes, with countersunk screws, neoprene spacing washers, and chrome plated dome caps in accordance with the manufacturer's recommendations.

9.3.10 Edge Finishing

Flat and polished exposed edges to all frameless glass doors and screens, and where noted on the drawings.

Flat polished edges to frameless mirrors.

9.3.11 Completion

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

10 INSULATION

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:

3604:2011(NZS)	Timber-framed 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
4859.1:2002(AS/NZS)	Materials for the thermal insulation of buildings - General criteria and technical provisions

10.3 Thermal Insulation

10.3.1 Scope

Supply and install the selected products as thermal insulation to the specified R-values, complete with all accessories, to the floors, walls, ceilings, roofs, and other thermally insulated building elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the product manufacturer's technical literature and installation requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

10.3.2 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 all thermal insulation as required.

10.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements, and as noted and detailed on the drawings.
Store and handle products in accordance with the manufacturer's recommendations, keep dry and protect from damage. Do not compress fibre insulation bales. Do not use damaged or defective insulation products and accessories.
The building must be completely enclosed and water tight before installation commences with the exception of roof insulation when installed with roofing. Ensure the moisture content of timber

framing is no greater than 18% prior to installing insulation to timber framed elements. Always maintain the full insulation thickness to ensure the required thermal values are achieved. Do not install insulation pads or blankets into closed cavities that are less than the stated insulation nominal thickness.

10.3.4 Product

Glass Fibre Pads
Glass fibre thermal insulating pads.

Manufacturer, brand name & type: Pink Batts
Thickness & R-Value: 115mm thick R3.2
Location: Skillion Roof

Manufacturer, brand name & type: Pink Batts
Thickness & R-Value: 45mm thick R1.3
Location: Exterior Walls

10.3.5 Installation

Ceiling Insulation, Skillion Roof - Glass Fibre Pad
Install glass fibre insulation pads, complete with accessories, oversized and friction fitted between the rafters and behind the ceiling battens in accordance with the manufacturer's installation recommendations. Maintain a minimum 25mm clearance between the top of the insulation and the roof underlay. Leave no gaps along the insulation pad edges and joints, and at the roof/wall junction - cover at least 50% of the exterior top plate width (except where obstructed by other framing, e.g. ceiling joists). Separate ceiling insulation 200mm from recessed light fittings and other recessed electrical fittings; refer to the drawings for containment requirements around recessed electrical fittings.

10.3.6 Completion

Check that all insulation has been installed correctly and is correctly supported and that all edges, joins and ends are fully closed without gaps. Check for damage and faults and repair or replace as necessary. Collect and remove from site all rubbish and waste material.
Issue to the Owner a copy of any product maintenance requirements and a copy of the Thermal Insulation Product and Installation Warranties for the completed works.

11 PAINTING & DECORATING

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.

11.3 Resene Exterior Surfaces

11.3.1 Cementitious Surfaces

Waterborne Gloss
Resene One-Line Spec. No. 1e 1.1
Surface prep: D83
For thin plaster - Resene Limelock D809, waterborne cure/seal
1st coat: For sound cementitious surfaces - Resene Concrete Primer D405, waterborne primer; or
For powdery surfaces - Resene Sureseal D42NEC, solventborne sealer
2nd coat: Resene Hi-Glo D31, waterborne gloss
3rd coat: Resene Hi-Glo D31, waterborne gloss
4th coat: Resene Multishield+ D54a, waterborne glaze (optional)

Colour:
Location:

Waterborne Semi Gloss
Resene One-Line Spec. No. 1e 1.2
Surface prep: D83
For thin plaster - Resene Limelock D809, waterborne cure/seal
1st coat: For sound cementitious surfaces - Resene Concrete Primer D405, waterborne primer; or
For powdery surfaces - Resene Sureseal D42NEC, solventborne sealer
Self priming - Resene Sonyx 101 D30, waterborne semi-gloss
2nd coat: Resene Sonyx 101 D30, waterborne semi-gloss
3rd coat: Resene Sonyx 101 D30, waterborne semi-gloss
4th coat: Resene Multishield+ D54a, waterborne glaze (optional)

Colour:
Location:

Waterborne Satin
Resene One-Line Spec. No. 1e 1.3
Surface prep: D83

For thin plaster - Resene Limelock D809, waterborne cure/seal
1st coat: For sound cementitious surfaces - Resene Concrete Primer D405, waterborne primer; or
For powdery surface - Resene Sureseal D42, solventborne sealer
Self priming - Resene Lumbersider D34, waterborne satin
2nd coat: Resene Lumbersider D34, waterborne satin
3rd coat: Resene Lumbersider D34, waterborne satin
4th coat: Resene Multishield+ D54a, waterborne glaze (optional)

Colour:
Location:

11.3.2 Timber Joinery

Waterborne Gloss
Resene One-Line Spec. No. 3e 1.1
Surface prep: D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer
2nd coat: Resene Enamacryl D309, waterborne gloss enamel
3rd coat: Resene Enamacryl D309, waterborne gloss enamel

Waterborne Semi-Gloss
Resene One-Line Spec. No. 3e 1.2
Surface prep: D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer
2nd coat: Resene Lustacryl D310, waterborne semi-gloss enamel
3rd coat: Resene Lustacryl D310, waterborne semi-gloss enamel

11.3.3 Galvanised Steel & Zincalume

Waterborne Semi-Gloss
Resene One-Line Spec. No. 5e 1.2
Surface prep: D89
1st coat: For new work - Resene Galvo-Prime D402, waterborne galvanised iron primer; or
For repaint - Resene Galvo One D41, solventborne galvanised iron primer
2nd coat: Resene Sonyx 101 D30, waterborne semi-gloss
3rd coat: Resene Sonyx 101 D30, waterborne semi-gloss

11.4 Resene Interior Surfaces

11.4.1 Cementitious Surfaces

Waterborne Gloss
Resene One-Line Spec. No. 1i 1.1
Surface prep: Resene D83
For thin plaster - Resene Limelock D809, waterborne cure/seal

1st coat: For sound cementitious surfaces - Resene Concrete Primer D405, waterborne primer; or
For powdery surfaces - Resene Sureseal D42, solventborne sealer
2nd coat: Resene Enamacryl D309, waterborne gloss
3rd coat: Resene Enamacryl D309, waterborne gloss

Colour:
Location:

Waterborne Semi-Gloss
Resene One-Line Spec. No. 1i 1.2
Surface prep: Resene D83
For thin plaster - Resene Limelock D809, waterborne cure/seal
1st coat: For sound cementitious surfaces - Resene Concrete Primer D405, waterborne primer; or
For powdery surfaces - Resene Sureseal D42, solventborne sealer
Self priming - Resene Lustacryl D310, waterborne semi-gloss enamel
2nd coat: Resene Lustacryl D310, waterborne semi-gloss enamel
3rd coat: Resene Lustacryl D310, waterborne semi-gloss enamel

11.4.2 Timber

Waterborne Gloss
Resene One-Line Spec. No. 2i 1.1
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For hardboard only - Resene Sureseal D42, solventborne sealer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
2nd coat: Resene Enamacryl D309, waterborne gloss enamel
3rd coat: Resene Enamacryl D309, waterborne gloss enamel

Waterborne Semi-Gloss
Resene One-Line Spec. No. 2i 1.2
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For hardboard only - Resene Sureseal D42, solventborne sealer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
2nd coat: Resene Lustacryl D310, waterborne semi-gloss enamel
3rd coat: Resene Lustacryl D310, waterborne semi-gloss enamel

Waterborne Satin
Resene One-Line Spec. No. 2i 1.3
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For hardboard only - Resene Sureseal D42, solventborne sealer; or

For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
Self priming - Resene Lumbersider D34, waterborne satin
2nd coat: Resene Lumbersider D34, waterborne satin
3rd coat: Resene Lumbersider D34, waterborne satin

Waterborne Low Sheen
Resene One-Line Spec. No. 2i 1.4 ZS
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For hardboard only - Resene Sureseal D42, solventborne sealer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
Self priming - Resene Zylone Sheen or Resene Zylone Sheen VOC Free D302, waterborne low sheen
2nd coat: Resene Zylone Sheen or Resene Zylone Sheen VOC Free D302, waterborne low sheen
3rd coat: Resene Zylone Sheen or Resene Zylone Sheen VOC Free D302, waterborne low sheen.

11.4.3 Timber Joinery

Waterborne Gloss
Resene One-Line Spec. No. 3i 1.1
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45; waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
2nd coat: Resene Enamacryl D309, waterborne gloss enamel
3rd coat: Resene Enamacryl D309, waterborne gloss enamel

Waterborne Semi-Gloss
Resene One-Line Spec. No. 3i 1.2
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
2nd coat: Resene Lustacryl D310, waterborne semi-gloss enamel
3rd coat: Resene Lustacryl D310, waterborne semi-gloss enamel

Waterborne Low Sheen
Resene One-Line Spec. No. 3i 1.4
Surface prep: Resene D82; and Resene TimberLock D48, solventborne preserver/conditioner
1st coat: For normal recommended system - Resene Quick Dry D45, waterborne primer/undercoat; or
For timber that stains - Resene Wood Primer D40, solventborne primer; or
For painting over varnish - Resene Waterborne Smooth Surface Sealer D47a, waterborne sealer
2nd coat: Resene SpaceCote Low Sheen D311, waterborne low sheen enamel
3rd coat: Resene SpaceCote Low Sheen D311, waterborne low sheen enamel

11.5 Resene Painting General

11.5.1 Scope

Supply and apply the selected Resene coating systems to the surfaces identified on the drawings and as noted in the Resene Interior/Exterior/Protective Finishes schedules within this specification. All aspects of this work shall be in accordance with the Resene One-Line Specifications, Product Data Manual, and Putting Your Safety First (check 0800 RESENE for the latest editions), and other relevant product manufacturer's recommendations.

11.5.2 Warranties & Requirements

The Manufacturer/Supplier is to warrant this work under normal conditions of use against failure referring to the Resene Promise of Quality in the Resene One-Line specifications and product data manual.

Substitutions are NOT permitted to any specified Resene coating system, or associated components and products. Do not combine paints from different manufacturers in a paint system.

If in the applicator's own expertise and judgement an amendment to this specification is required, or where a substrate preparation, or required painting system is not covered in this specification, this shall be brought to the attention of the contract administrator and any amendment agreed before work proceeds any further.

11.5.3 Qualifications

Painters to be experienced competent workers, familiar with the materials and the techniques specified and with the Resene coating systems and be members of the Master Painters New Zealand Association Inc.

The applicator is to have the necessary skill, experience and equipment to undertake the work. The applicator remains responsible for ensuring proper completion of the work.

11.5.4 Samples

Prepare samples of the finished work, including the specified preparation. Obtain approval in writing of the appearance before proceeding. Use the Resene Architectural Sample Box as a basis of standard where appropriate.

Control reference: Check colours to Resene colour samples prior to application and keep the Resene colour samples on site as a control reference. Colour matches are not permitted as they will differ in appearance, durability and performance to the original selected colour over the life of the coating. Samples of Resene colours may be ordered online or by calling 0800 RESENE (737 363). Use the Resene Architectural Sample Box as a basis of standard where appropriate.

Before any work commences painters should verify, with the Architect/Designer or specifying authority, that their paint matches a previously supplied standard card or panel. Differently coloured paints will vary in price, opacity and durability. Resene normally only specify two coats of colour but with certain colours, such as yellows and oranges, three coats may be needed.

Prepare samples of the finished work including the specified preparation. Make arrangements for the supervision of the relevant stages. Obtain written approval before proceeding.

Supervised control samples may, after written approval, be used for comparative testing of dry film thicknesses of the complete coating systems.

11.5.5 Health & Safety

Refer to and comply with the requirements of the Health and Safety in Employment Act 1992 including the obligation to:

Eliminate hazards and if hazards cannot be eliminated or isolated, then minimise the hazards in this work by using the proper equipment and techniques as required by the MPNZA Painters hazard handbook and Resene Putting your safety first handbook.

Supply protective clothing and equipment.

Inform the contractor as well as the employees and others on site of those hazards and put in place procedures for dealing with emergencies.

Obtain from Resene (phone 0800 RESENE, or www.resene.co.nz) the safety data sheet for each product used and comply with the required safety procedures. Keep sheets on site.

11.5.6 Inspections

Permit representatives of Resene to inspect the work in progress and to take samples of their products from site if requested. Resene will take care when inspecting the work, but does not accept any responsibility for the proper completion of the work before or after such inspection.

Inspection of the whole of the work at each of the stages may be made. Agree on a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

11.5.7 Materials

Materials Generally

Do not combine paints from different manufacturer's in a paint system.

Use only Resene products (which are guaranteed for consistency and performance under ISO 9001 and APAS) prepared, mixed and applied as directed in the Resene One-Line Specifications and Product Data Manual. This specification has been written using where practical and available both low/no VOC and Environmental Choice approved products.

Exposed Dark Colours

Darker colours in areas of high sun exposure place significant stress on the coating and substrate. Resene 'CoolColour' technology reduces heat absorption of a wide range of colours. Contact your local Resene Representative or visit www.resene.co.nz for more information or visit

www.resene.co.nz/coolcolour. View a list of Resene colours that can be made using Resene CoolColour technology at www.resene.co.nz/colourlibrary.

Thinners & Additives

Use only if and when expressly directed by Resene for their particular product in a particular application. Always wear gloves when handling any solvents including turpentine as harmful chemicals may be absorbed into the body through the skin.

11.5.8 Conditions

To conform to required trade practice, which shall be deemed to include those methods, practices and techniques contained in the Master Painters New Zealand Association Inc. Specification manual.

Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

The descriptions of areas in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain written instructions before proceeding.

Do not paint hinges or hardware that cannot be removed. Before commencing work carefully remove hardware, fixtures and fittings, set aside where they cannot be damaged or misplaced and replace on completion.

Supply, lay and fix dropsheets, coverings and masking necessary to protect adjoining, fixtures, fittings and spaces from paint drops, spots, spray and damage.

11.5.9 Preparation

Refer to the Resene One-Line specifications and product data manual for surface preparation sheets (or obtain them by phoning 0800 RESENE, or at www.resene.co.nz) listed in the materials systems schedule clauses. Carry out the preparatory work required by them for each of the substrates.

Handle cautiously lead-based paint and asbestos, if present, as outlined in the preamble of the Resene One-Line specifications and product data manual and the Putting your safety first brochure.

Remove and/or repair sharp edges, cracks and holes if present, as outlined in the preamble of the Resene One-Line specifications and product data manual.

Elastomeric sealants, if used, should not be painted. The paint film will not match the flexibility of the sealant and may severely limit its effectiveness.

If any substrate or surface, that even with the preparation work called for in this section, cannot be brought up to a standard that will allow painting or clear finishing of the required standard then do not proceed until remedial work is carried out.

Make good cracks, holes, indented and damaged surfaces. Use suitable gap fillers to match the surface being prepared. Any special priming requirements of the fillers must be satisfied. Allow to dry or set before sanding back level with the surface. Prime or seal timber before using putty.

Exterior and wet areas: Use only Portland cement base or water-insoluble organic base gap fillers.

Carry out this work under cover in a suitable environment with suitable lighting. Store items, both before and after coating, in a clean, dry area protected from the weather and mechanical damage, properly stacked and spaced to allow air circulation and to prevent sticking.

Pre-treat any cut surfaces of preservative treated timber before priming. Ensure L.O.S.P. treated joinery has dried sufficiently to lose solvent odour. Pre-treat bare timber with Resene TimberLock (see Data Sheet D48) to improve the durability of subsequent coats. Liberally coat end grain, allow to soak in and then recoat.

Where off-site coatings are specified they must be applied to surfaces including those concealed when incorporated into the building.

Apply primer to suit the coating system to surfaces which will be concealed when incorporated into the building.

Prime or seal and paint bottom edges of external doors before hanging.

Stained, varnished, or painted joinery to have the first two coats, or the primer and one undercoat, applied to rebates and beads before glazing.

According to the putty manufacturer's instructions allow putty to set, then prime with Resene Wood Primer (see Data Sheet D40). Fully protect the putty by completing the Resene coating system as soon as it is sufficiently firm.

11.5.10 Application

Comply with the Resene One-Line specifications and product data manual data sheets and the additional requirements of this work section.

Ensure large wall areas that require more than one container of paint per coat, have enough paint boxed (mixed) together to complete the final coat. This will not apply if a single factory batch of paint, rather than shop tinted paint, is applied.

Although generally supplied ready-mixed, thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

Defer painting of exterior surfaces until weather conditions are favourable - warm dry days without frost or heavy dews. Avoid painting in direct sunlight any surfaces that absorb heat excessively. As far as possible apply paint in the temperature range 15°C to 25°C. If temperatures fall outside the range of 10°C and 35°C do not paint unless paints with the necessary temperature tolerance have been specified. Do not apply solvent borne paint if moisture is present on the surface.

Painting work to generally follow the following sequences:
- Complete surface preparation before commencing painting.
- Apply primers, sealers, stains, undercoats, paints and clear coatings in the sequences laid down by Resene.
- Allow the full drying time between coats laid down by Resene.
- Do not expose primers, undercoats and intermediate coats beyond Resene's recommendations before applying the next coat.
- Finish broad areas before painting trim.
- Ensure batch numbers of tins are matched for whole areas.
- Internally, paint ceilings before walls and walls before joinery, trim and other items.

Select brush, roller, or pad and apply coatings to the requirements of Resene to obtain a smooth, even coating of the specified thickness, uniform gloss and colour.

Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Complete by removing dust immediately before applying the next coat.

Correct defective work immediately and recoat as required, following precisely the Resene system being applied.

Each coat of paint and the completed paint system to have the following qualities and properties:

- Uniform finish, colour, texture, sheen and hiding power and the proper number of coats applied.
- No blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering.
- Proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application.

11.5.11 Completion

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at the completion of the building works. Clean glass inside and out to a shining finish. Use the Resene Washwise on site 'paint equipment clean-up water' reclamation system to minimise the environmental impact of cleaning paint application tools.

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

Replace hardware without damage to it or the adjoining surface and leave hardware properly fitted and in working order.

Note: The use and disposal of paint and thinners represents a significant environmental hazard. Ensure all paint and thinners are disposed of in the following manner:
- When requested hand over part used paint containers to client for maintenance touch ups.

- Recycle leftover paint at a Resene ColorShop as part of the Resene "Paintwise programme". Contact your local Resene ColorShop for details or view information online at www.resene.co.nz/paintwise.htm.
- Donate left over paint to local community groups.
- Solvent based paints, paint thinners, turpentine, mineral spirits and solvents require special disposal procedures. Do not pour down sewer or storm water drains, sinks or into the ground. If they cannot be recycled they must be disposed of in a refuse dump licensed to take toxic waste.

11.5.12 Maintenance

Good maintenance of coating systems involves a routine of regular cleaning as well as regular inspections. Regular inspections of the coating systems are recommended to identify breakdown, accidental damage to or undesirable deterioration of the paint.

Refer the Resene Caring for your paint finish brochure and the Resene website, www.resene.co.nz/comn/services/maintenance.htm.

12 FLOOR COVERINGS

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:

1884:2013(NZS AS)	Floor coverings - Resilient sheet and tiles - Installation practices
2455.1:2007(AS/NZS) A1	Textile floor coverings - Installation practice - General
2455.2:2007(AS/NZS)	Textile floor coverings - Installation practice - Carpet tiles
3661.2:1994(AS/NZS)	Slip resistance of pedestrian surfaces - Part 2: Guide to the reduction of slip hazards
4586:2004(AS/NZS)	Slip resistance classification of new pedestrian surface materials
NZBC D1	Access Routes

12.3 Carpet & Resilient Floor Coverings

12.3.1 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.

12.3.2 Floor Coverings

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.

Vinyl Sheet - Homogeneous

Homogeneous vinyl sheet flooring; polyurethane (PUR) reinforced, to the specified product, thickness, and colour and pattern. Installed in accordance with the manufacturer's requirements and AS/NZS 1884 and AS/NZS 4586 to the locations and layout shown on the drawings.

12.3.3 Underlays

Carpet Underlay - Stretch-in Carpet Applications

Stretch-in application carpet underlay; to the specified product, material, thickness, weight, and grade. Installed as an underlay for conventional stretch-in carpet applications in accordance with the manufacturer's requirements and to the locations and details shown on the drawings.

Manufacturer, brand name:
Material:
Thickness & weight kg/m2:
Grade:
Fixing method:
Substrate:
Location:

12.3.4 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.

12.3.5 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.
Co-ordinate with other trades as required to install the specified floor coverings and accessories.

12.3.6 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.

12.3.7 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 15^{o}C room temperature.

12.3.8 Substrate Preparation

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.

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:

12.3.9 Installation

Carpet Floor Coverings - Conventional Stretch-in

Install by conventional stretch-in 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 the carpet underlay and carpet floor coverings to properly condition in accordance with the manufacturers' 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 underlay and carpet floor coverings over expansion joints - use only the specified expansion joint cover strip and neatly finish the underlay and carpet flooring in accordance with the cover strip manufacturer's requirements.

Install edge grippers and lay the carpet underlay at right angles to the direction of the carpet floor covering with joints no less than 300mm from any seam in the carpet. Staple or adhesive fix underlay to substrates in accordance with the manufacturer's recommendations.

Carpet flooring installed flat and taut and evenly tensioned both ways by power stretching sequence. All seams and cross joins to be close-fitting and fused together with hot melt tape. Cut and properly prepare cross joins to ensure accurate pattern alignment.
Accurately install stair tread nosings and lay pre-cut carpet pieces to each stair tread and riser and finish neatly into or under the 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.

12.3.10 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.

13 PLUMBING

13.1 Preliminary

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

13.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2009(AS/NZS)	PVC-U pipes and fittings for drain, waste and vent application
1477:2006(AS/NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1596:2014(AS/NZS)	The storage and handling of LP Gas
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3000:2007(AS/NZS)	Electrical installations (known as the Australia/New Zealand Wiring Rules)
3500.1:2015(AS/NZS)	Plumbing and drainage - Part 1: Water services
3500.2:2015(AS/NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.3:2015(AS/NZS)	Plumbing and drainage - Part 3: Stormwater drainage
3500.4:2003(AS/NZS)	Plumbing and drainage - Part 4: Heated water services
3500.5:2012(AS/NZS)	Plumbing and drainage - Part 5: Housing installations
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)

4606.1:1989(NZS)	Storage water heaters - General requirements
4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems
4613:1986(NZS)	Domestic solar water heaters
4614:1986(NZS)	Installation of domestic solar water heating systems
4617:1989(NZS)	Tempering (3-port mixing) valves
4692.1:2005(AS/NZS)	Electric water heaters - Energy consumption, performance and general requirements
4766:2006(AS/NZS)	Polyethylene storage tanks for water and chemicals
5601.1:2010(AS|NZS)	Gas Installations - Part 1: General Installations
5601.1:2013(AS|NZS)	Gas installations - Part 1: General installations
7602:1977(NZS)	Specification for polyethylene pipe (Type 5) for cold water services
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
7646:1978(NZS)	Specification for polyethylene pipes and fittings for gas reticulation
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC G11	Gas as an Energy Source
NZBC G12	Water Supplies
NZBC G13	Foul Water

13.3 General

Carry out all works necessary to leave the water, waste, vent and soil systems serving the sanitary fittings and the plumbing hardware shown on the drawings or specified below in correct working order complete with all ancillary systems (safetrays, floor drains, overflows, relief valves, etc.) required, and with all normal incidentals customarily installed by this trade.

Comply with the Building Code, Territorial Authority By-laws and statutory authority Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange for all tests and pay all fees and customary charges in connection with the required works.

13.4 Workmanship

13.4.1 Co-operation

Co-operate with all other trades. Attend upon Concretor, Drainlayer and Carpenter to set out the exact positions of pipe runs before adjacent work is put in hand, and to ensure that all pipes, sleeves, fixings, flashings etc. are correctly incorporated into the structure as construction proceeds.

13.4.2 Workmanship

All plumbing work shall be carried out by, or under the direct control of, properly qualified tradesmen, and shall be to recognised high standards.

Observe best local trade practice to avoid problems which arise from freezing winter conditions.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

Weatherseal wherever pipes, screws, bolts or other fastenings penetrate an external surface, and particularly roofing; seal with gaskets, flashings (and overflashings if necessary) or mastic as appropriate - any damage that results from failure of such seals will be made good at the Plumber's expense.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Plumber's expense.

13.4.3 Pipework

Joints between pipes of different materials shall always be to the approval of the TA Plumbing Inspector.

Pipework set-out neatly with a minimum number of bends, and more or less parallel to and at right angles to structural elements - avoid diagonal piping.

All internal pipework shall be concealed except where otherwise is either shown or approved. Exposed pipework shall be accurately and neatly run. Arrange all pipework (and particularly traps) in a manner which will allow maximum future accessibility for repairs or maintenance. Arrange for access panels to any primary maintenance positions, and install conveniently located isolating valves for each group of fittings. Wingbacks securely and squarely fixed. Crox unions usually acceptable only at the final connection to fittings. Install white plastic flanges where pipes penetrate linings in visible locations.

Where pipes are covered with nail fixed linings and trim ensure that their positions are marked on the linings to minimise the risk of subsequent nailings penetrating the pipe. Any such damage shall be rectified immediately, with all consequential damage made good.

Set pipework out in straight runs to even gradients. Fix all pipes to the structure sufficiently to fully support and to prevent sagging or vibration. Clips and saddles shall be the same material as the pipe. Exterior pipes on stand-off brackets. Fixings to the exterior or damp locations shall all be hot dip galvanized unless otherwise noted. Sleeves for pipes or drains penetrating concrete or masonry shall be uPVC, 20mm minimum larger internal diameter than the external diameter of the pipe, finished flush with concrete or masonry, and packed and mastic sealed.

Close open ends of the systems during construction to prevent the entry of foreign matter.

13.4.4 Temperature Movement

All work shall respect in full all probable thermal movements - layouts, fixings and jointings shall be arranged to allow thermal movement without risk of prejudice to watertight conditions, or risk of damage from straining of the pipes which will generate failures.
In particular, observe best local trade practice to avoid problems arising from freezing conditions.

13.4.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

13.4.6 Fire Wall/Ceiling Penetrations

Ensure that where drainage pipe work penetrate through fire rated floor or wall areas that these penetrations are stopped with intumescent foaming sealant for joints up to 10mm, and with intumescent stopping putty where the gap exceeds 10mm. Where required fit approved intumescent type fire collars to pipes located such that the fire rating of the wall or ceiling is maintained.

13.4.7 Testing

All plumbing services shall be completed in stages which will allow for proper testing under normal working pressures prior to the application of insulation, concealment or other enclosure. Testing of piped water services shall be by hydrostatic testing in accordance with AS/NZS 3500.1 and shall not show any leakage when subjected to a hydrostatic pressure of 1500kPa for a period of not less than 30 minutes. All leaks remedied and retested. On completion the whole of the plumbing services to be subjected to full operational tests in the presence of the plumbing inspector, with any defects revealed in these tests properly remedied.

13.4.8 Warranties

Warranty cards and manufacturer's guarantees for all items supplied and installed by this trade shall be correctly filled in and handed over at Practical Completion.

13.5 Materials

13.5.1 Materials

Materials shall be delivered with packaging and labeling intact. Incidentals (jointing compounds, PTFE tape, seals, washers, silfos, solvent cements, etc.) shall be completely appropriate for the application involved. The use of imperfect items or items damaged in any way is always subject to approval.

13.5.2 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

13.5.3 Materials Separation

Separate dissimilar metals in any circumstances which could produce contact or electrolytic action by a water film, with thick plastic tape, bituminous felt or other inert material. Pipes in contact with or built into concrete or masonry shall be fully spiral wrapped in Denso tape or equal.

13.6 Systems

13.6.1 Wastes & Vents

All traps sized to AS 3500.2. Wastes and vents all uPVC. Wastes shall be to AS 3500.2 falls as a minimum. Vents shall be generally as indicated, but avoid where permissible in compliance with AS 3500.2, or shall be combined above the flood level of the fittings.

Fit bird proof domes to all vents.

13.6.2 Cold Water System

Supply From Existing Toby

All cold water supply pipework shall be polybutylene, arranged and fixed so that all joints are in a fully 'relaxed' condition, without any stress or tension.
Lay on a 20mm main from the existing toby along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, protection, backfilling, signal strip etc. to comply with all Supply Authority requirements). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessibly positioned cleanable in-line sediment and dirt filter.
Primary distribution from the water filter shall be in 20mm piping, reducing to 12mm for the final feed to individual items. Install conveniently located isolating valves to turn off each group of fittings, and install a small isolating valve alongside each toilet cistern not integrally fitted with one. (Note that these isolating valves and the hosecocks are not covered by the Plumbing Hardware Prime Cost Sum).

13.6.3 Hot Water System

Electric Storage, Mains Supply, Low Pressure Hot Water Cylinder

Supply the electric storage mains supply low pressure hot water cylinder noted on the drawings and install it where shown. Install the cylinder on a safetray, with its drain discharging in a visible location.
Install pressure reducing valves, open ended vent pipes, flow control valves, line strainers, and non-return/isolating valves as required to leave the hot water system in full design operational order.
Install a tempering valve for each cylinder to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 55°C.
Pressure reducing valves shall be compatible with the mains supply pressure.
Pressure relief discharges shall be open ended copper and to the exterior in approved positions.
Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.
Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the showers temperature and pressure remain as even as possible.
Irrespective of whether a mixing device is installed, the storage water heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.

13.7 Elements

13.7.1 Sanitary Fittings

Supply and fix all of the sanitary fittings as scheduled on the drawings. All fittings checked on delivery for 'perfect' condition, and all fittings plain white. Supply and fix all normal accessories that are not usually supplied with the fitting.
The Plumber is responsible for fittings from delivery until Practical Completion of the contract.

Refer to Enlarged floor plans for fittings and fixtures

13.7.2 Plumbing Hardware

There is no prime cost sum allowance. All plumbing finishing hardware is specified on the drawings.

13.7.3 Flashings

Ridges, hips, barges, valleys, aprons etc. flashings all supplied and installed by the Roofer. Metal windows flashings (those installed during windows installation ONLY) will be supplied by the windows subcontractor and installed by the Carpenter. All other flashings including wall penetration flashings, soakers, etc. that are required to leave the building completely water and weathertight are the Plumber's responsibility.

All flashings shall be machine folded to profiles as shown or required, incorporating capillary breaks where appropriate, shall be formed in one piece where possible, and lead or other soft edged where required. Stop ends, external angles, junctions etc. soldered or sealed and blind riveted as appropriate.

All flashings shall be either 0.55mm Colorsteel VP or 1mm powder coated aluminium as and where identified on the drawings, refer to the Architect for direction where unclear.

13.7.4 Appliances

All appliances are exactly identified on the drawings notes. Main Contractor will establish, in consultation with the Plumber and Electrician, which of them will be supplied by each of these trades.

Correspondance with the future tenant in regards to what they will be supplying

13.8 Rheem Domestic Gas Water Heaters

13.8.1 Scope

Supply, install and commission the selected Rheem Domestic Gas Water Heaters to the locations shown on the drawings, complete with all necessary fittings and accessories for proper operation and functionality. All aspects of this work shall be in strict accordance with Rheem technical literature and installation requirements (check www.rheem.co.nz, or call 0800 657 336 for the latest editions), other relevant product manufacturers' recommendations, with all relevant Standards, Regulations and Acts, and the Plumbing specification, and as shown on the drawings.

No substitutions are permitted for Rheem Domestic Gas Water Heaters.

13.8.2 Continuous Flow Water Heaters

Rheem 874627LPZ Continuous Flow Gas Water Heater. 27L/minute flow rate. ULPG energy supply. Suitable for outdoor installations only. 205MJ/hour gas consumption. 2.75kPa ULPG minimum gas supply pressure.
Minimum 140kPa - maximum 1000kPa water supply pressure. 2.0L/min minimum flow rate.
24kg approximate weight when empty. Frost protection as standard.

Location:

13.8.3 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 prior to installation.
Co-ordinate with all trades to install Rheem Domestic Gas Water Heaters and accessories as required.

13.8.4 Workmanship

Rheem Domestic Gas Water Heater installation shall be carried out by experienced tradesmen, familiar with the specified products and installation techniques, under the direct supervision of a NZ certified Registered Plumber and Gas Fitter, in accordance with the manufacturer's instructions and with the requirements of AS/NZS 3500.4, AS/NZS 5601.1 (2010), AS/NZS 3000, NZBC G12, and with all local codes and regulatory authority requirements.

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.

Adequately protect all surrounding work surfaces during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Plumber's expense.

13.8.5 Delivery & Handling

Store Rheem Domestic Gas Water Heaters and accessories under cover on a flat surface in accordance with the manufacturer's recommendations. Keep products clean and dry, and protect from damage and contamination. Do not use damaged or defective products. Handle Rheem products in accordance with the manufacturer's recommendations.

13.8.6 Installation

Install the selected Rheem Continuous Flow Water Heaters, complete with accessories, to the location shown on the drawings in accordance with the Rheem Installation Instructions and complying with the New Zealand Building Code and relevant standards.

Ensure that the required clearances are provided for the installation and the servicing and removal of the water heaters and accessories, and that the water heater information label / rating plate can be viewed and read when installed.
Ensure that the plumbing pipework is correctly sized and that a gate valve or ball valve is installed on the cold water line to the water heater installation - a non-return valve or stop valve must NOT be installed. All pipe connections must be correctly aligned with water heaters. Pipework insulation on the cold water and/or hot water lines must extend to and/or from the water heater inlet and/or

outlet - externally exposed pipework insulation must be weatherproof and UV resistant.
Continuous flow water heaters must be installed vertically upright with water, gas and power connections pointing downwards. Securely fix the water heater to the wall or support frame using stainless steel screw fastenings.

Connect Rheem Continuous Flow Water Heaters to the mains pressure hot and cold water system, complete with accessories, to achieve the required operation performance and functionality.

Connect Rheem Continuous Flow Water Heaters to gas supply pipes in accordance with the Rheem Installation Instructions and AS/NZS 5601.1 (2010). Ensure that the gas supply pipe to the water heater is correctly sized and that an isolating valve and connection union are installed on the gas supply pipe. Gas pipework must be cleared of foreign matter before being connected to the water heater and must be purged before operating the water heater. Isolate the water heater from the gas supply pipe before pressure testing the gas supply system.

Rheem Continuous Flow Water Heater electrical connections must be made in complete accordance with AS/NZS 3000 and the Rheem Installation Instructions and connected to the switched power outlet shown on the drawings. Where required - install and connect water heater controllers to the location shown on the drawing in accordance with the manufacturer's instructions. For dual water heater installations - install Rheem EZ-Link System electronic controls.

Flue indoor gas water heaters with Rheem Coaxial Flue System to the layout and details shown on the drawings in accordance with AS/NZS 5601.1 (2010) and Rheem Installation Instructions - includes condensate drain lines and traps. Weatherproof flue assemblies to exterior wall cladding and/or roofing as shown on the drawings and in accordance with Rheem requirements.

Commission Rheem Continuous Flow Water Heaters in accordance with the manufacturer's instructions to the required operation performance and functionality.

13.8.7 Completion

Check that the Rheem Domestic Gas Water Heaters have been installed correctly and have been commissioned and are operating at the required performance and functionality. Check that pipework connections are leak free. Check that the water heater is properly restrained against earthquake forces.
Check for damage, defects, faults and leaks and replace/repair as necessary.
Leave the works area clean and free of rubbish. Remove rubbish and waste material from the site.

Issue to the Owner a copy of the Rheem Domestic Gas Water Heater maintenance requirements and a copy of the Rheem Warranty for the installed water heaters.

Issue all As-Built Documentation required to the relevant parties.

14 DRAINLAYING

14.1 Preliminary

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

14.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2009(AS/NZS)	PVC-U pipes and fittings for drain, waste and vent application
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.2:2015(AS/NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.3:2015(AS/NZS)	Plumbing and drainage - Part 3: Stormwater drainage
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
AS/NZS 1547:2012	On-site domestic wastewater management
BS 5572	Code of practice for sanitary pipework
NZBC G13	Foul Water

14.3 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.

14.4 Workmanship

14.4.1 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.

14.4.2 Co-operation

Cooperate with all trades and attend upon the Concretor and Plumber to set out exact pipe runs before any adjacent work is put in hand and ensure that all sleeves etc. are correctly incorporated as work proceeds.

14.4.3 Materials

All pipes and other materials shall comply with the appropriate Standards, and shall be protected from damage of any kind until installation is complete. All incidentals appropriate for the applications involved. Concrete shall be 17.5MPa and as specified under Concretor, Mortar shall be as specified in Blocklayer.

14.4.4 Workmanship

All drainlaying shall be carried out by, or under direct control of, properly qualified tradesmen, and shall be to recognised high standards. Ensure cast-in items are installed when required so that no delay is caused by this trade. Adequately protect all adjacent surfaces - clean down to remove dirt etc., and any damage shall be made good by the appropriate trade at the Drainlayer's expense.

On completion of drainlaying clean up full area affected by this trade to the condition it was in before drainlaying commenced.

Site is to be returned as close as possible to its present condition on completion of the contract.

14.4.5 Excavation

As required for sewer and stormwater. Check for other service lines before excavation - the Drainlayer is responsible for making good any damage. Trenches true to line and with even gradients between gullies, soil stack terminations or downpipes, etc.

Keep the bottom of trenches clear of loose material. All pipes shall be laid in appropriate bedding material, compacted as required. Shore trenches if required to suit ground conditions. Backfilling shall be by this trade, to the standards required in Siteworks.

14.5 Elements

14.5.1 Drainlaying

Commence drainlaying at the low end of even fall sections of drains and proceed in a continuous sequence to the fittings connections.

Sumps, gullies, etc. solidly bedded. Lay 110mm uPVC drains to connect gullies, sumps, stacks, and downpipes through to the street edge connections.

Every junction and bend shall be an inspection position. Temporarily seal the open ends of incomplete drains to prevent entry of foreign matter. Make appropriate provision for any anticipated differential settlement. Place signal strip above all drains.

Ensure that stormwater drains are very accurately positioned so that downpipes can drop directly into them, without offsets.

14.5.2 Soakage Pits

The existing SW to be connected into existing SW system - confirm if satisfactory on site.

14.5.3 Testing

The sewer and stormwater systems shall both be fully tested to the approval of the Territorial Authority Inspector before being covered in. If any defects show rectify and then fully retest.

14.5.4 As Built Drawings

During drainlaying plot the location of all bends and changes in direction and all cleaning access positions. Locate each item by two diagonal measures from structure corners, etc. and record on a blank plan copy (supplied by Architect/Designer when requested).

Note that Practical Completion of the contract will not be certified until this as-built drawing has been produced (made available to the Contractor in time for the Code Compliance Certificate application.

15 ELECTRICAL

15.1 Preliminary

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

15.2 Compliance

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

Comply with all relevant provisions and recommendations of:

2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:1995(AS/NZS)	Emergency evacuation lighting for buildings - Inspection and maintenance
3000:2007(AS/NZS)	Electrical installations (known as the Australia/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
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60335.2.30:2009(AS/NZS)	Household and similar electrical appliances - Safety - Particular requirements for room heaters
60335.2.35:2004(AS/NZS)	Household and similar electrical appliances - Safety - Particular requirements for instantaneous water heaters
60598.2.2:2001(AS/NZS)	Luminaires - Particular requirements - Recessed luminaires
60598.2.22:2005(AS/NZS)	Luminaires - Particular requirements - Luminaires for emergency lighting
6104:1981(NZS)	Specification for emergency electricity supply in buildings
AS/NZS 2053	Specification for unplasticized PVC conduit and fittings for electrical wiring
AS/NZS 3012	Electrical installations - Construction and demolition sites
AS/NZS 3085	Telecommunications installations
AS/NZS 3191	PVC insulated flexible cords
AS/NZS 3439	Electrical switchgear and controlgear
AS/NZS 60227	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Flexible cables (cords)
AS/NZS 60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Circuit-breakers for a.c. and d.c. operation
AS/NZS 61009	Residual current operated circuitbreakers with integral overcurrent protection for household and similar uses (RCBOs)
NZECP 54	Recessed luminaires

NZS 1989 Plugs and socket outlets

15.3 Workmanship

15.3.1 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 in accordance with NZECP 11 (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 future tenant; 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 noted otherwise

-1000mm for lighting switches;
-2000mm for wall mounted lights;
-2100mm for the bayonet of pendant lights;
-300mm for power points, except at benches.

-Floor mounted positions are crucial and are to be directed by Tenant by positions of shelving on site.

(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.

15.3.2 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.

15.3.3 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.

15.3.4 Wiring

Joints within cable runs will not normally be accepted. TPS cable shall be adequately supported, and clipped at regular intervals. At terminations all strands of conductors shall be fully secured in a terminal block or clamped under a screw head washer; do not cut away any strands. Wiring which terminates in enclosed fittings and/or where subject to heat liable to cause deterioration, shall be high temperature type, with the tails made off with heat resisting sleeves, to protect the permanent wiring.

Wire lights in 1.5mm 3 core - 7.5 amps loading max per circuit (allow for 100w to all light fittings unless identified otherwise).
Wire power outlets in 2.5mm 3 core - 7 maximum GPO singles or doubles per circuit. Assess power outlets for specific equipment and allow accordingly.

Conceal all wiring except as noted on drawings or below. All wiring cast into concrete shall be run in conduit pipes. All cables shall be stranded (single core is unacceptable).

Wire more or less parallel to and at right angles to the structural elements - avoid any diagonal wiring. Layout of the principal distribution wiring shall be to approval. Position all wires to minimise the risk of damage from subsequent nailing of linings etc.

Generally, do not run TPS horizontally within timber walls except in the area up to 300mm above floor. Wire in the ceiling framing and drop vertically to outlets and switches.

Do not run TPS horizontally within partitions except in the area up to 300mm above floor. Wire in the ceiling void and drop vertically to outlets and switches. Principal wiring in the ceiling void shall be supported on adequate catenaries.

Wire exterior lighting in screened cable.

Where cables pass through fire rated walls or floors use a fire barrier or fire rated sealing compound to seal the space after installation of the cables.

15.4 Materials & Control

15.4.1 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.

15.4.2 Switchboard

The main switchboard and the subboard(s) shall be appropriate sized standard PDL DBF series boards installed fully recessed where shown and at 2m to the top of the boards. Install appropriate sized MCB's for all circuits, including a minimum of two power and one lighting RCDs as required to cover all outlets to each board. Submain(s) from the main switchboard to the subboard(s) shall be neutral screened 16mm or 2 x 16mm as appropriate, run along the routes indicated / as approved. Pay particular attention to spreading the distribution of the various probable loadings evenly across the phases to obtain an optimum balance of the system.

15.5 Systems

15.5.1 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.

15.5.2 Mains

Install a neutral screened 3 x 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 3 x 16mm main plus controllers etc. to the main switchboard.

15.6 Elements

15.6.1 Appliances

All appliances are exactly identified on the drawings notes. Main Contractor will establish, in consultation with the Plumber and Electrician, which of them will be supplied by each of these trades.

The Electrician shall supply appliances that are his responsibility, install them exactly in accordance with their manufacturer’s instructions, and protect them until completion.

15.6.2 Light Fittings

All light fittings are identified as to type on the drawing, and will be supplied by the Principal. Take delivery, install in accordance with any directions supplied and protect until Practical Completion.

15.6.3 Tele Communications

Workmanship shall be recognised best trade practice, and in accordance with the manufacturers' recommendations. All work shall be by competent and experienced operatives.

15.6.4 Other Wired Services

Co-operate with all other trades to ensure that the following services are installed complete and in accordance with their manufacturer’s recommendations with all normal or necessary incidentals and with all wiring concealed.

-SKY TV.
-Stereo Unit.
-Central Vacuum System.
-Garage door operating mechanisms.
-Gas hot water supply unit installed complete by the Plumber - supply electrical feed and connect.
-Wall mounted fan heaters.
-Front door bell as noted - supply and install.
-Kitchen, laundry and wet areas air exhaust fans and ducting as noted - supply and install.
-Cupboard heaters - supply and install.
-Infrared / movement / daylight sensor switches as noted.
-Under-tile electric heating to the bathroom and shower room complete with thermostat control installed where shown. Supply and install (immediately prior to tiles installation) exactly to the suppliers recommendations.
-Heated towel rails to bathroom and shower room.
-Spa pool equipment will be installed complete by the Plumber. Supply power through weather proof connection, with an isolating switch.
-Hot water cylinders installed complete by the Plumber. Supply and connect.
-The lap pool electrical equipment will be installed complete and wired from the splitter box (by a Registered Electrician) by the Pool Installer. Main contract Electrician shall verify that all aspects of this work comply with all relevant main contract requirements.
-Septic tank pumps feed in conduit from an isolating switch.
-Heat pump
-Supply a Heavy Duty TV Aerial (suitable for TV1, 2, and 3, Sky, and all local and community TV stations) and install on the roof ridges where directed, stayed against wind, and with all connections compatible with the roofing and waterproof. Feed to the outlets shown with the complete system exactly to aerial suppliers recommendations.
-Heating.
-Install ceiling fans with variable speed controllers supplied by owner.

StoClear Coating Systems

Clear Coating Systems for Concrete Construction

StoClear Coating Systems

Protecting masonry construction designed to be seen

Growth on a solid foundation
The range has been thoroughly researched and developed in Europe to meet the demands of minimalistic architecture that highlights natural masonry surfaces. The focus is on quality, suitability and longevity using a combination of Silane and Clear Coating Technology to protect natural masonry surfaces.

S-Protect Silanes take us into the complex field of building protection using invisible treatments that penetrate to provide durability and resistance to masonry surfaces without having adverse effects on the function or changes in the aesthetics of the building materials.

StoProtect Clear Coatings have been developed to protect and waterproof masonry surfaces that are naturally porous by filling the pores and voids with a clear elastomeric film to repel rain driven water.
In combination or separately the perfect solution for almost every masonry requirement can be realized - a solution which makes successful long-term protection possible.

People and architecture, Sto provides the link
Architecture plays an important role in our lives. It lends urban and rural landscapes character, and should ideally be embedded in an intact environment. For us, "Building with conscience" means enhancing functionality and aesthetics on a sustainable basis and creating an environment in which people feel at one with their surroundings. Apart from researching, developing and marketing Sto products, systems and services, we also attach great importance to optimising the value added process for trades people, architects and building owners alike.

We respect the interests of people and nature at all times
In order to define and implement its ecological targets, Sto has developed a system of environmental management conforming to international standards. This relates to the entire process chain - from the procurement of the raw product, to production, packaging and logistics. Sto make a clear contribution towards improving and preserving the quality of the environment.

S-Protect. A Global Success Story
Sto as a brand has gained and excellent reputation in the field of building protection. Exceptional product performance, reliable service, quantifiable returns, and long-term results are the basis of our success.StoProtect as a system for masonry block has out performed many other clear coatings in New Zealand and now that clear coatings are required to comply to CCANZ CP 01: 2014. The number of competitors with complaint products backed by warrantees has shrunk.

S-Protect Systems are designed to protect a wide range of solid masonry materials such as precast and in situ concrete as well as historic buildings. The Sydney Opera House, the Louvre in Paris and the Hang-zhou Bay Bridge (longest bridge in the world - China), Novotel Auckland Airport are just a few projects. Not all of our success is that visible to the public, but the all treatments have one object in common: Benefits exceed costs.

StoClear Coating Systems

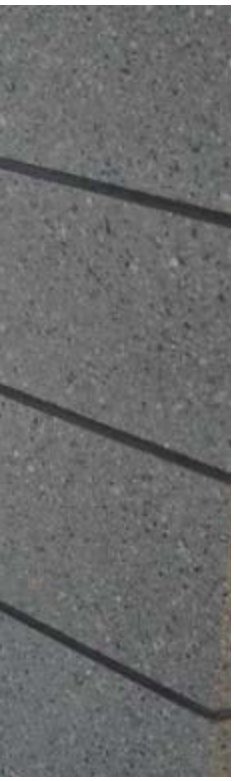
Weathertight solutions

Protecting Your Assets

The use of watertight concrete which is impervious to the passage of water necessitates specific design criteria - CCANZ CP 01: 2014 requires;

- Concrete must comply with NZS 3104 Clause 2. 10.2
- Minimum strength of 50MPa after 28 days
- With a water/ cementitious ratio less than 0.50 by weight
- Have a permeability reducing admix as per AS 1478.1 Appendix F
- Be designed to prevent cracking in service
- Must pass an AVPV test on hardened concrete in accordance with section CC ANZ CP 01: 2014 4.5.1.

The invasive nature of moisture can be detrimental to concrete by allowing water and dissolved contaminants to penetrate through the pores and shrinkage fractures resulting in initial problems such as interior dampness or water ingress that can escalate to corrosion of the reinforcing steel, salt burst, or freeze-thaw damage. By preventing water ingress the longevity of the concrete is protected and expensive renovation work is avoided.



S-Protect water repellent products are used to treat dense concrete such as precast providing a water repellant barrier to liquid water while maintaining the concrete's natural vapour permeability. The S-Protect BHN Silane molecules are particularly small in comparison to other treatments and with a low viscosity but high concentration of active ingredients penetrate deeply into the concrete substrate rendering it hydrophobic. This deep penetration also provides protection against UV light degradation and mechanical wear that often destroy other treatments such as Silicones and Siloxanes based solutions that do not penetrate as deeply and are often weakened by environmental stress after a few years.

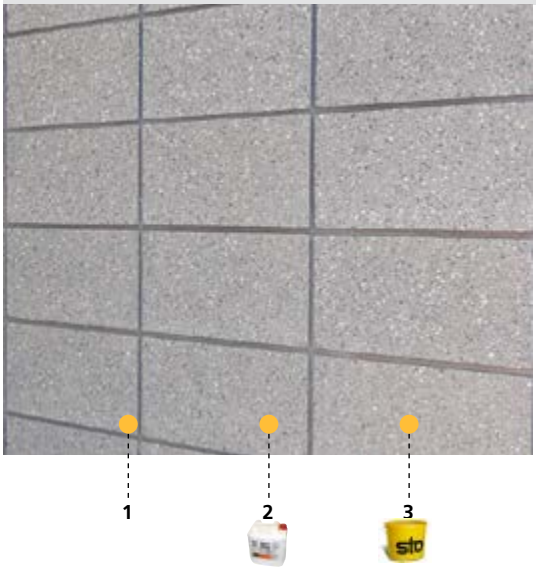
StoProtect is formulated for concrete masonry blocks as a film-forming clear coating to coat the porous block faces and mortar joints to provide an elastomeric coating system to resist mortar joint fractures that can occur during the block curing process especially on stack bonded blocks.

S-Protect Anti Graffiti system is a clear matt water based coating that can be used to guard against graffiti attack. The two pack reactive formula provides a hard, durable barrier that can be easily cleaned using S-Protect Sensitive or Hi Strength cleaners to remove graffiti attacks.

StoClear Coating Systems

Natural concrete protection.

StoProtect Clear Coating System for Concrete Blocks



Perfect interaction

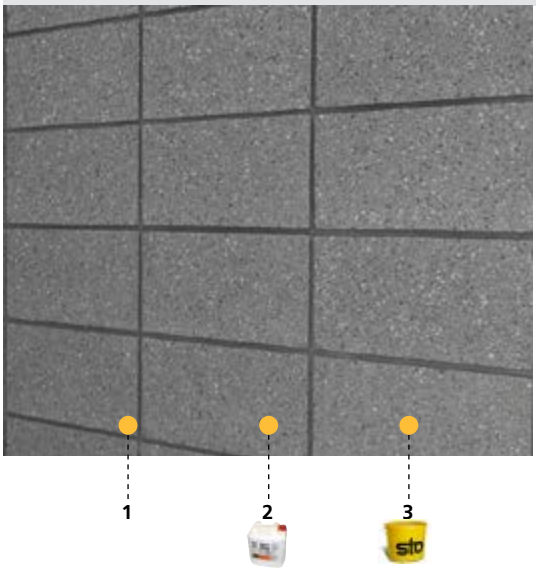
1 **Architectural & Natural Concrete Block Construction**
Clean, dry & stable masonry concrete block surfaces

2 **S-Protect WS405**
European manufactured water repellant silane sealer.

3 **StoProtect Transparent**
European manufactured durable, UV resistant waterproof coating.

- Compliant with CCANZ CP 01:2014
- Waterproof Coating
- Natural Finish
- Easy to maintain
- Ten Year Warranty

StoProtect Clear Coating System for Concrete & Brick Veneer



Perfect interaction

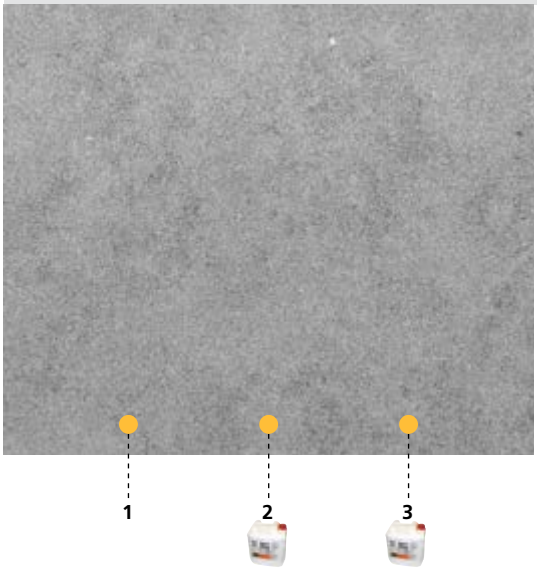
1 **Architectural Concrete & Brick Veneer Construction**
Clean, dry & stable masonry concrete surfaces

2 **S-Protect WS405**
European manufactured water repellant silane sealer.

3 **StoProtect Transparent**
European manufactured durable, UV resistant waterproof coating.

- Compliant with CCANZ CP 01:2014
- Waterproof Coating
- Natural Finish
- Easy to maintain
- Ten Year Warranty

S-Protect Silane Protection for Precast, In situ Concrete & Brick Construction

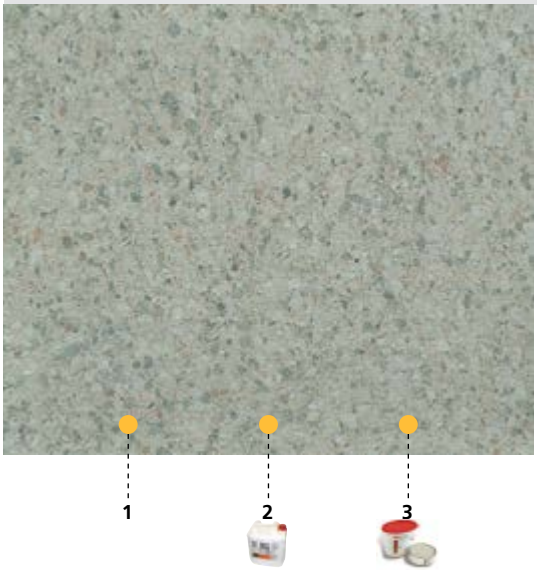


Perfect interaction

1 **Concrete Precast, Tilt Panel or In situ & Masonry Brick**
Clean, dry & stable concrete ans masonry surfaces.
2 **S-Protect BHN**
European invisible water repellant, impregnation silane treatment with 98% concentration of active ingredients.
3 **S-Protect SC Stay Clean**
European manufactured invisible surface treatment to repel liquids and water immediately with most contaminates washing off naturally.

- Highly reactive with masonry surfaces
- Invisible stay dry treatment
- Hairline fracture protection
- Naturally self cleaning
- Five Year Warranty

StoPur WV200 Transparent System for Precast Concrete

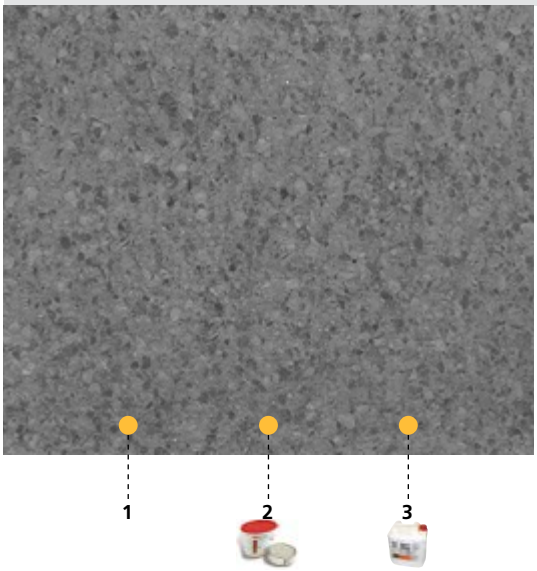


Perfect interaction

1 **Architectural Precast Concrete**
Clean, dry & stable concrete surfaces.
2 **S-Protect BHN**
European invisible water repellant 98% concentrate, impregnation silane treatment.
3 **StoProtect**
Effective cleaning solutions to safely remove graffiti.

- Hard serviceable coating
- Natural Finish
- Available in StoPur WV100 for a dark wet look gloss
- Easy to maintain
- Seven Year Warranty

S-Protect Anti Graffiti Coating System



Perfect interaction

1 **Wide Range of Substrates**
Clean, dry & stable surfaces.
2 **S-Protect Anti-Graffiti Coating**
Durable water based reactive Anti-Graffiti clear matt coating.
3 **S-Protect Sensitive & Hi Strength Cleaners**

- Natural Finish
- Hard wearing protection
- Keeps surfaces clean
- Easy to maintain

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MACDONALD
INDUSTRIES LIMITED

Wilkins Top Access Double Check Valve Assembly 950XLT Series 20-50mm

Product Code: 950XLT

Overview

When double check valve assemblies are installed in valve boxes, it is advantageous to have top access to the check valves and test cocks. The Wilkins 950XLT embodies these advantages. Both check valve access covers and test cocks are angled upward for easy access during testing and repair. Designed for backflow protection where a health hazard does not exist, the 950XLT is perferct for residential, commercial, industrial and irrigation applications requiring a valve box installed double check.

PRODUCT FEATURES

- Available in 20mm, 25mm, 32mm, 40mm and 50mm.
- Top entry double check valve assembly consisting of two independently operated, spring loaded center guided check valves.
- Complete with two full port resilient seated ball valves for shut off and three resilient seated ball valve test cocks.
- Both check valves and test cocks are designed at an inclined angle upward for easy access during repair, maintenance and testing.
- Bronze body construction.
- Test cocks provided with threaded plugs.
- Noryl replacable seats and silicone rubber check washers.
- Entire unit servicable in line.
- Temperature range 1-82 degrees C (33-180 degrees F).

- Maximum pressure 1225kpa (175psi).
- With BSP threaded connections.

Models

950XLT - Standard model c/w ball valves

950LXLT - Less shut-off valves

950XLTS - Supplied with strainer

950XLTF - Supplied with integrated filter in inlet ball valve

Page: http://www.macdonaldindustries.co.nz/wilkins-top-access-double-check-valve-assembly-950xlt-series-20-50mm