



SPECIFICATIONS BUILDING CONSENT FOR **STAGE 5** VANGUARD DRIVE

Enterprise Homes – February 2017



Boffa Miskell



cosgroves

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Enterprise Homes Ltd

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

Stage 5 Vanguard Drive

Lot 16-23 [TYPE H K L and M]
64 & 74 Vanguard Drive
Hei Hei
Christchurch

Issued for Tender/Consent
7th March 2018

3558 - 3561

PROJECT OVERVIEW

WARNING!

This project is close to HIGH VOLTAGE POWER LINES! On site you must consult the Site Plan, Health & Safety plans and supporting documents for safe working distances and hazard identification.

If you have questions ASK Nick: 021678276

Scope

8x two storied Residential Units in Stage 5 Lots 16-23 of 64 & 74 Vanguard Drive. Type H K L and M.

Address

Site Address	64 & 74 Vanguard Drive
Suburb	Hei Hei
City	Christchurch
Lot #	52 / Proposed Lots 16-23 Type H K L and M
DP #	492015

Site Conditions

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

Related Parties

Subdivision & Land Use Resource Consent Applicant

Eliot Sinclair Ltd., Bruce Sinclair

Geotech, Structural & Bracing Engineer

Subdivision & Land Use Resource Consent Applicant, Bruce Yu & Associates

Fire Engineer

Cosgroves Ltd

Urban Architect

Boffa Miskell, Tim Church

Landscape Architect

Boffa Miskell, Kylie Boyven

Pre Application Meeting PRE40003584

Christchurch City Council, Johan Dalkie - Senior Consent Officer

Pre Application Meeting PRE40003285

Christchurch City Council, Ruth Markham-Short - Senior Planner

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1 PRELIMINARIES & GENERAL

1.1 Project Overview

1.1.1 Contract Documents

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

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

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

1.1.2 Site

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

1.1.3 Adjacent Owners

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

1.1.4 Protection

Take all appropriate precautions to protect all third party property, services, etc., and indemnify the Principal against any claims arising from the construction operations. Any damage to third party property caused by construction activities or failure to protect shall be rectified as soon as possible by the person causing the damage, or by appropriately qualified trades-persons employed by the person responsible for the damage if necessary.

Suspend operations during weather which would affect the quality of work in progress. Secure the works as soon as possible against adverse weather, dust and vandals. Avoid structural damage that is caused by overloading.

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

1.1.5 Responsibility

The Contractor will be held responsible for the full period of 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.

1.1.6 Specification

This Specification covers contract administration, standards, materials quality, workmanship and the scope of works only: the exact nature of the works and all specialist items, descriptions, etc., are contained on the drawings, which also take full precedence.

All clauses in all specification sections apply to their full extent and meaning to the entire Contract. Trade sections and paragraphs have been introduced into this specification for reference only and it shall not be construed that each trade section is a complete segregation of the materials and labour of that trade. The onus is on all trades to be conversant with any and all clauses which in any way affect their work.

(Be aware that the 'scope' noted in the 'Project Overview', and scope and general extent clauses within this specification, are included to provide a general indication only and must NOT be interpreted as schedules of quantities - the exact nature and extent of all aspects of the works are shown on the drawings).

1.1.7 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), British Standards (BS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in these Contract Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue, and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.

Where Standards have a number of Divisions, e.g. AS/NZS 3500.1, AS/NZS 3500.2, etc., each of the Divisions relevant to this project is deemed to form part of this specification.

Retain current copies of significant cited documents and manufacturer's technical literature on the site.

1.1.8 Authorities and Charges

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

The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the Contractor as quickly as possible after they are issued by the Territorial Authority. Note: It is an offence under the Building Act to carry out work not in accordance with a Building Consent.

Should the Building Consent be subject to any conditions which modify the requirements of the Contract Documents in any way, the Architect/Designer reserves the right to negotiate any or all of these modifying conditions with the Building Consent Authority. If after these negotiations additional work is required, it will be handled as a Variation to the Contract.

1.1.9 Code Compliance Certificate

The Principal will apply for the Code Compliance Certificate (CCC) and any other licenses or approvals for the building to be used. 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.

1.1.10 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.

1.1.11 Documents Interpretation

Except where they are clearly to the contrary, all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes. Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.

The word 'provide' and the word 'fix' used separately in the Documents shall be taken to mean 'provide and fix' unless otherwise stated.

When the term 'allow' occurs in the Documents, except with reference to Monetary Allowances, the cost of the item shall be at the risk of the Contractor.

The terms 'approved', 'directed', and 'selected' when used in the Documents refers to the approval, direction or selection of or by the Architect/Designer. Please give adequate notice of when these decisions are required. 'Architect/Designer' shall mean the Architect or Designer, their representative or any Consulting Engineer engaged by the Architect/Designer.

1.1.12 Work Shown and Mentioned

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

1.1.13 Site Safety

Comply with 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.

1.1.14 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.

Take great care to excavate/cut up to the boundary, but not over.

2.3.2 Scope

This section covers:

Removal of vegetation

Excavation of topsoil and stockpiling and final distribution (and new topsoil)

Excavation as required for foundations, slabs, and drive

Supply, placing and compaction of hardfill basecourse and sand blinding

Supply and placing of any site concrete required

Preparation for, and installation of exposed aggregate paving

Lawn supply and installation

Grass for disturbed areas around the works areas

2.3.3 Waahi Tapu

During excavation, should a waahi tapu or other cultural site be unearthed the contractor shall cease operations, inform the local Iwi, inform the NZ Historic Places Trust and apply for an appropriate authority if required, and, take appropriate action, after discussion with the NZHPT, TA and Iwi to remedy any damage and/or to restore the site.

Note that in accordance with the Historic Places Act 1993, where an archaeological site is present (or uncovered), an authority from the NZ Historic Places Trust is required if the site is to be modified in any way.

2.4 Excavation & Filling

2.4.1 Excavation

Excavation work shall be carried out in accordance with the OSH 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.

Plan the excavation carefully to ensure that stockpiles will not interfere with concrete construction, to stockpile just sufficient material for the filling, backfilling and reshaping required later, and to avoid overlaying areas outside the works area with material.

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.

From the excavated material select the most appropriate material for compacted filling and stockpile it in appropriate positions sufficient for filling and backfilling (but NOT for hardfilling).

Remove all surplus material from the site as soon as it is excavated, taking care to avoid damaging the footpath or streets or spilling material on to them.

Keep excavations free of water - remove foundation trench material which becomes water-softened.

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.

2.4.2 Excavation Completion

As soon as excavation and filling is complete and before any concrete is placed or other work proceeded with the foundation material will be inspected by the Engineer, and any necessary changes to foundation widths or details will be directed.

2.4.3 Filling

Filling with salvaged material (of appropriate moisture content) shall be compacted in 150mm layers with mechanical rammers, to 95% relative compaction. All work generally in accordance with the provisions of NZS 4431.

On completion clean up the stockpile areas and the site.

2.4.4 Hardfill & Blinding

Hardfill under slabs on grade shall be 150mm of standard TNZ AP40 basecourse free of clay or organic matter compacted to 95% relative compaction in accordance with NZS 4402 Test 4.1.1.

Blind hardfill under all slabs to a minimum 20mm thickness with clean damp sand.

2.5 Drives, Paths & Paving

2.5.1 Cars Area

To the cars area identified on the setout plan, and soon after the excavation work is completed and approved, install an 80mm layer of no fines drainage chips or roading reject 20mm chips, and partly compact this layer into the sand subsoils. Finish the edge of the chips to reasonably smooth lines (where drawn), but without any permanent edging.

2.5.2 Driveway

Check that the excavated surface is accurately to the gradients and levels required and then install 100mm of standard basecourse M4 compacted to 95% relative compaction, and cover this with a 30mm depth of 20mm no-fines chips.

2.5.3 Insitu Concrete Paving

Steel trowel finish to a true surface and immediately spread an even layer of the finishing aggregate and press it into the surface. Lightly spray the top surface with a cure retarder and, when the cement has fully bound the aggregate, sweep and wash the top surface to expose it. Ensure the finishing aggregate is spread before the initial set of the concrete to obtain a good bond - to achieve this it may be necessary to finish the slab progressively.

A very well-bonded and well cleaned finished surface with clean straight edges is required. To this end the operative carrying out the exposed aggregate paving must be experienced in work of this nature – if so requested provide two or three location references where his earlier similar work may be inspected.

2.5.4 Asphalt

Check the setout, gradients, alignments and compaction of the hardfill. Sweep surplus fine hardfill material off the surface.

Apply approved long term weedkiller to the compacted hardfill surface, with the application exactly to the Manufacturers Recommendations. Apply a tack priming coat of bituminous emulsion at the rate of 1sq.m/litre onto the prepared hardfill - mask adjacent surfaces as required, and completely

remove any accidental marks. Install Mix 5 hotmix asphaltic concrete, with minimum compacted thickness 40mm to the full area.

Workmanship shall be to Transit Specification P9. Spread and thoroughly roll to a smooth, even surface that is evenly graded with true alignments and smooth transitions and has no local pondings. Finish with clean lines. Clean up thoroughly on completion and competently make good any damage to adjacent surfaces.

2.5.5 Paving Preparation

To all hard landscaping areas check that all topsoil and soft material has been removed.

Check setout and gradients of landscaping profiling, and check kerbs etc. are accurate and properly cured.

It is suggested that the hardfilling is carried out as soon as the excavation is completed, to avoid a quagmire during use by construction activities, and that hardfilling is made good (and up to full compaction required) as necessary just prior to finish paving.

2.5.6 Vehicle Crossing

The contractor shall arrange for the construction of a new 6m wide vehicle crossing (complete with adjacent kerb and channel reinstatement and making good etc.) to replace the existing crossing, all in compliance with ACC rules.

The consent for and adjustment to the existing road edge planter kerbing will be arranged separately by the Principal.

2.6 Landscaping

2.6.1 Topsoil

On completion of all exterior works supply top grade (but not sterilised) topsoil and spread to 150mm lightly compacted thickness or to meet the Engineer's FGL in subdivision application. Also note the ~2.0m high temporary or permanent fence to be erected on all sides of the project after building has started to help ensure the safety of the public. This is to be removed once the house is at a lock-up stage.

2.6.2 Grass

On completion of all other exterior works supply and install Readylawn or equal instant turf to the full area shown & planting as per the Landscape Plan submitted as part of the land use consent.

Check topsoil levels and gradients, ensure correct bonding between the topsoil and the underside of the instant turf, and all other installation including rolling, fertilising, watering, mowing, etc. shall be exactly as recommended by the supplier.

Finish to clean lines and neat edges.

3 CONCRETE

3.1 Preliminary

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

3.2 Compliance

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

Comply with all relevant provisions and recommendations of:

3101.1&2:2006(NZS)	Concrete Structures Standard
3104:2003(NZS)	Specification for concrete production
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
3114:1987(NZS)	Specification for concrete surface finishes
3121:1986(NZS)	Specification for 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
4455.1:2008(AS/NZS)	Masonry units, pavers, flags and segmental retaining wall units - Masonry units
4671:2001(AS/NZS)	Steel reinforcing materials

3.3 Materials

3.3.1 Damp Proof Membrane

Polythene damp proof membrane shall be 0.25mm thick and shall be continuous under slabs on grade or fill and under foundations. All joints lapped 200mm and continuously sealed with pressure sensitive tape. Tape seal around penetrations. Inspect immediately before pouring concrete and repair any holes or other damage.

3.3.2 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)

See Structural Engineers details

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.

3.3.3 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 - 50mm where poured on ground, 40mm where exposed to weather, 30mm elsewhere.
- Walls - 40mm where exposed or against ground, 30mm elsewhere.

3.4 Workmanship

3.4.1 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.

3.4.2 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.

Formwork suitable for required F2 finish to exposed locations for subsequent plastering.

Formwork suitable for required F2 finish to exposed locations for subsequent rendering.

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.

3.4.3 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.

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.

3.4.4 Surface Finishes

General floor slabs - U3 finish.

Exposed locations for subsequent rendering - F2.

3.4.5 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:

3404.1&2:1997(NZS)	Steel Structures Standard
4680:2006(AS/NZS)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 1554.1	Metal-arc welding of steel structures
BS 4360	Weldable structural steels
BS 4848	Hot rolled structural steel sections BS
6497	Powder organic coatings for steel
NZS 4701	Metal arc welding of steel structures
NZS 4711	Qualifications tests for metal-arc welders
NZS 4781	Welding and cutting safety

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

4.5 Coating

4.5.1 Galvanising

Overlapping surfaces shall be fully sealed all round by welding before galvanising. Check welds are clean and smooth, with all weld residue removed. Position vent holes to hollow sections to approval. Galvanise to AS/NZS 4860, average coating mass of 390g/m² for items less than 3mm thick, 500g/m² for items between 3mm and 6mm, and 600g/m² for items thicker than 6mm.

Finished surfaces shall have all spikes removed and all edges shall be free from lumps and runs. Touch up any erection damage to galvanised surfaces with an approved product. Galvanised surfaces subsequently painted shall be primed with an approved product.

4.5.2 Priming

Degrease surface with suitable solvent where required. Power hand tools clean to Swedish Standard 05 59 00 St2. Two coat approved rust inhibitor to 150 micron dry thickness. Make good any priming damaged during erection. Priming to cast in steel only to 50mm into concrete, beyond this leave the steel bare for concrete adhesion.

4.5.3 Painting

All structural steel which is not to be treated otherwise shall be primed before delivery to the site.

Prepare steelwork for painting by removing weld splatter, grinding off all sharp edges, thoroughly washing with water to remove weld flux residue and dirt, and degreasing with a solvent cleaner, kerosene shall NOT be used. After drying, the steelwork shall be thoroughly power wire brush cleaned and primed with approved primer exactly in accordance with the manufacturers recommendations.

Site touch-up all damaged paintwork, bolts and welds with primer. All paint shall be applied by brushing on to clean, dry surfaces free from rust, scale and grease.

4.5.4 Powder Coating

Degrease surface with suitable solvent where required. Power hand tools clean to Swedish Standard 05 59 00 St2. Application and curing all exactly to the powder manufacturers recommendations. Finished film thickness minimum 80 microns to all primary surfaces. Coatings shall be capable of in-situ repair if this proves necessary.

5 BLOCKWORK

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 be by or under the direct supervision of a Registered Mason certified by NZ Masonry Trades Registration Board.

All walls shall be true to line, level and plumb, and with perpendes '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.

All blockwork shall be struck flush to provide an even surface for subsequently plastering.

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

The bottom course of blocks shall be inverted open end bond beams to provide full length clean out duct. Clean out ports shall be formed by neatly sawing out a 100 wide x 200 high section of shell at each vertical rod. Sprinkle sand on the scabbled surface inside the first course to facilitate removal of mortar droppings.

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 WATERPROOFING

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:

3604:2011(NZS)	Timber-framed buildings
NZBC B2	Durability
NZBC E3	Internal Moisture

6.3 Membrane Tanking & Damp Proofing

6.3.1 Scope

Supply and install the specified below-ground membrane tanking and damp-proofing, complete with all components and accessories, to the locations shown on the drawings. All aspects of this work shall be in strict accordance with the manufacturer's technical guidelines, installation specifications and details, other relevant product manufacturers' recommendations, and as shown on the drawings.

6.3.2 Membrane System

Under-slab Damp Proof Membrane

Under-slab Damp Proof Membrane.

250 micron thick (0.25mm), tear resistant, polyethylene film sheet. Installed over nominal 10mm (max. 25mm) thick compacted sand blinding layer, over a properly prepared base course, as a moisture vapour barrier under concrete slabs on-ground (prior to concreting), in accordance with the manufacturer's requirements and as shown on the drawings.

Manufacturer, brand name & type:

Location:

Self-Adhesive Membrane Tanking System

Self-Adhesive Membrane Tanking System.

A flexible self-adhesive waterproofing sheet membrane, installed as a waterproof tanking system to properly prepared concrete/concrete block substrates, either fully (shallow depth) or partly below ground where there IS RISK of hydrostatic water pressure, in accordance with the manufacturer's requirements and as shown on the drawings.

Fabricated from high density polyethylene film and a self adhesive bitumen/polymer compound.

Manufacturer, brand name & type:

Membrane thickness:

Primer:

Location:

6.3.3 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 below-ground membrane tanking and membrane damp proofing as required.

6.3.4 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 contractors, authorised by the manufacturer, familiar with the specified products and installation techniques, to fully comply with all of the manufacturer's warranty requirements in accordance with the manufacturer's installation requirements and as noted and detailed on the drawings.

6.3.5 Delivery & Handling

Store products off the ground on a flat surface undercover, keep materials dry and out of direct sunlight, and protect from damage and freezing conditions. Do not use damaged or faulty products, or products beyond the designated shelf life. Handle materials and products in accordance with the manufacturer's recommendations.

6.3.6 Preparation

Under-Slab Basecourse

Check that the under-slab basecourse has been correctly laid and compacted as specified, and that the surface has been prepared, rolled to a smooth flat surface to the required levels, to the manufacturer's requirements and as shown on the drawings. Ensure that any required sand blinding is free of aggregate, sharp protrusions, hollows, and any ponded water prior to laying the under-slab membrane.

6.3.7 Installation

Under-slab Damp Proof Membrane

Install the specified under-slab damp proof membrane, including membrane laying, jointing, and sealing, etc., in accordance with the manufacturer's specifications, and as shown on the drawings. Membrane laid over sand blinding, with joints lapped minimum 150mm and sealed with 50mm wide PVC adhesive tape, neatly finished straight and parallel.

All pipe, duct, and other services penetrations PVC tape sealed. Consult the manufacturer regarding any detail where a standard detail does not exist.

Protect installed membrane as required, avoid puncturing or damaging the membrane during installation; tape repair damaged DPM as soon as it occurs, and inspect DPM for damage prior to pouring and repair as necessary.

6.3.8 Completion

Check that the tanking system has been installed correctly, and that all system accessories are correctly installed and finished. Check membrane for damage and punctures, repair or replace as necessary.

Complete all tanking leak free and watertight in accordance with the manufacturer's requirements in preparation for backfilling against protected wall membranes and/or for concreting over under-slab membranes.

Completely clean the works area and remove all rubbish and waste material from the site.

All drainage coils, and backfilling etc. installed by others in accordance with the manufacturer's recommendations and as specified and shown on the drawings.

Issue to the Owner a copy of any necessary maintenance requirements and the system product and installation warranties.

6.4 Internal Wet Area Waterproofing

6.4.1 Scope

Supply and install the specified Internal Wet Area Waterproofing System, to the locations shown on the drawings, complete with all accessories. All aspects of this work shall be in strict accordance with the manufacturer's technical guidelines, installation specifications and details, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Internal Wet Area Waterproofing System.

6.4.2 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 the specified Internal Wet Area Waterproofing System as required.

6.4.3 Workmanship

All installation work shall be carried out by experienced contractors, authorised by the manufacturer, familiar with the specified products and installation techniques, to fully comply with all of the manufacturer's warranty requirements in accordance with the manufacturer's installation requirements and as noted and detailed on the drawings.

6.4.4 Delivery & Handling

Store products off the ground on a flat surface undercover, keep materials dry and out of direct sunlight, and protect from damage. Do not use damaged or faulty products, or products beyond the designated shelf life. Handle materials and products in accordance with the manufacturer's recommendations.

6.4.5 Substrate

Check that the internal wet area substrate and any channel drains are to the falls and levels as shown on the drawings, and that any floor waste and drain outlets are correctly installed.

Check that crack control and movement joints are incorporated to the locations as shown on the drawings, and are constructed as recommended by the manufacturer - do not bridge or cover them with the waterproofing.

Ensure the substrate is clean and free of oil, grease, and other contaminants, and is smooth with any defects filled to an even surface prior to installation.

Ensure the concrete substrate surface is U3 finished to NZS 3114 (by steel trowel) and to the manufacturer's recommendations, that it has cured for at least 28 days, that the relative humidity of the concrete is 75% or less, and that it is surface dry at the time of waterproofing.

Grind off any high spots on the concrete slab, FLC (proprietary levelling compound) repair flush with feathered edges any low spots or damaged areas then grind smooth. Lightly grind or shot blast any surface glazed to the extent that may compromise bonding.

Location:

Check that the plywood has been laid with staggered joints, and is supported on framing at maximum 400mm centres in each direction, that the plywood is 17mm minimum thickness, is CD grade (C face up), is H3 CCA treated (LOSP treated plywood must NOT be used), is installed and fixed exactly to the ply manufacturer's and membrane manufacturer's recommendations, and has a maximum moisture content of 20% at the time of installation.

Plywood must be fixed with countersunk head, 10g x 50 mm stainless steel screws at maximum 150mm centres along edges and maximum 200mm centres through the body of the sheets.

Plywood manufacturer, brand name & type:

Location:

Ensure the fibre cement compressed sheets are installed and fixed exactly to the sheet manufacturer's and waterproofing manufacturer's recommendations, and as shown on the drawings. Fibre cement must be fixed using a suitable glue adhesive and with countersunk head stainless steel screws at centres recommended by the sheet manufacturer.

Check that all fastenings are countersunk below the surface. All indentations flush filled with a manufacturer approved compound.

Fibre cement manufacturer, brand name & type:

Location:

Check that the plasterboard has been installed in accordance with the manufacturer's recommendations.

Check that fixings do not protrude above the plasterboard surface, and that sheet joints have been correctly stopped.

Plasterboard manufacturer, brand name & type:

Location:

6.4.6 Waterproofing System

Liquid Applied Membrane System: A surface applied, modified polyurethane, high-build acrylic, flexible waterproof membrane, suitable for commercial and residential internal wet area floor and wall applications that will be tiled or otherwise protected from foot traffic. Installed as a liquid applied under tile internal wet area waterproofing system in accordance with the manufacturer's requirements, NZBC E3, AS 3740, and as shown on the drawings.

Manufacturer & brand name: Ardex Waterproofing membrane as required

6.4.7 Primer

Apply the primer to properly prepared substrates for optimum waterproofing adhesion in accordance with the manufacturer's requirements. Use primers recommended by the waterproofing manufacturer only.

Limit priming to no more than can be covered by the waterproofing membrane in one working day or as recommended by the manufacturer, and allow the primer to properly dry before applying the waterproof membrane.

Protect the primed surface from contamination and damage until the waterproofing application is complete.

Manufacturer & brand name: Ardex

6.4.8 Installation

Install the under-tile membrane waterproofing system, including surface priming, membrane application, jointing, flashing and sealing etc., and system-supplied accessories in strict accordance with the manufacturer's installation requirements and details, and as shown on the drawings. Application and workmanship shall be in accordance with AS/NZS 4858:2004 and AS 3740:2004.

Substrates shall be free of dust, grease, wax, oil, dirt, loose plaster, laitance, curing compounds, paint and other contaminants likely to prevent proper bonding, and shall be structurally sound, securely fastened and properly supported to eliminate any movement which may cause cracking. New concrete should be sufficiently aged for a minimum of 4 to 6 weeks. Allow proprietary floor levelling compounds and screeds to cure in accordance with the manufacturer's recommendations prior to application.

Seal substrate corner junctions and substrate joints and fixings and visible cracks, with a suitable sealant. Prepare all substrate floor/wall junctions and sheet joints with a system-approved pressure sensitive bond breaker tape. Prime all surfaces with the specified system primer.

Apply the specified liquid applied membrane undiluted on to a dry and primed substrate uniformly by brush or roller in accordance with the manufacturer's instructions.

Finish the membrane at control joints, floor wastes and drain outlets to the manufacturer's requirements. Consult the manufacturer regarding any detail where a standard system detail does not exist.

Allow to membrane dry in accordance with the manufacturer's requirements. Where required; carry out a full flood test prior to tiling. Protect the installed membrane as required; avoid puncturing or damaging when exposed - repair as necessary

6.4.9 Completion

Check that the internal wet area waterproofing system has been installed correctly, and that any system accessories are correctly installed and finished. Check for damage, repair or replace as necessary.

Leave the completed waterproofing system leak free and watertight.

Leave the working area clean and tidy ready for tiling, remove rubbish from site.

Advise the Main Contractor to protect the completed works from damage until tiling is completed.

Issue to the Owner a copy of the product and installation warranty for the completed works.

7 CARPENTRY

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
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
2588:1998(AS/NZS)	Gypsum plasterboard
2589:2007(AS/NZS)	Gypsum linings - Application and finishing
2785:2000(AS/NZS)	Suspended ceilings - Design and installation
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
4219:2009(NZS)	Seismic performance of engineering systems in buildings
NZBC E2	External moisture

7.3 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.

7.4 Timber Framing

7.4.1 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.

7.4.2 Workmanship

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

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

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

Co-ordinate with other trades to install timber framing as required.

7.4.3 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 use 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 dawning, 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.

Timber Re-treatment

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

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.

7.4.4 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.

7.4.5 Floor Framing

Unless specified or shown otherwise, timber floor joists shall be to the dimensions and spacings given in NZS 3604 Table 7.1.

Floor joists shall be laid on edge true to line and level, have a minimum support bearing of 32mm (except when cantilevered), and so that any crook will straighten under load.

Floor joists shall be jointed over supports (except when cantilevered beyond the support) in accordance with NZS 3604 7.1.1.7.

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

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

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

Load bearing walls parallel to joists shall be supported by double joists centred maximum 200mm from the centre of a pile row running parallel with the joists.

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

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

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

7.4.6 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.

Ribbon Boards

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

7.4.7 Roof Framing

Rafters

All rafters (including hip, valley and jack rafters) shall be to the dimensions, spacings, pitch, and layout shown on the drawings.

Rafters shall be aligned and paired at the required spacings to ridge boards, ridge beams, hip rafters and valley rafters, and as shown on the drawings, and installed parallel, true to line, pitch and plane, and fixed in accordance with NZS 3604 Table 10.1.

Any required jointing of rafters shall be made over supports shown on the drawings only.

Unless shown otherwise, rafter seating to top plates, beams, and lintels shall have a minimum bearing of 32mm without reducing the rafter depth to less than 65mm, or 80%, at the birds mouth.

Extend rafter ends to form eaves as detailed on the drawings and in accordance with NZS 3604 10.2.1.14.

Fly rafters and outriggers installed to form gable verges as detailed on the drawings and in accordance with NZS 10.2.1.15.3

Dummy Rafters

Dummy rafters shall be to the dimensions and spacings shown on the drawings, and installed over roof sarking directly over rafters as detailed, and fixed in accordance with NZS 3604 Table 10.13.

Ridge Boards

Ridge boards shall be to the dimensions and locations shown on the drawings, and installed true to line and level.

Valley Boards

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

Purlins

Purlins shall be to the dimensions and spacings shown on the drawings and as required by the cladding material, and fixed to rafters and/or trusses in accordance with NZS 3604 Table 10.10, or 10.11, or clause 10.2.1.15.1(b).

Purlins on their flat shall be continuous over a minimum of two spans.

Provide all necessary blocking and lateral support to purlins laid on edge in accordance with NZS 3604 10.2.1.16.6, and as detailed.

Extend purlins to form gable verges as detailed and in accordance with NZS 3604 10.2.1.15.

Roof Trusses

Roof trusses shall be Specific Engineering Design (SED) in accordance with NZBC B1/VM1 and manufactured by an accredited fabricator, and shall comply with all aspects of NZS 3604 10.2.2. Roof trusses shall be fabricated to meet the specific design requirements of the roof including, but not limited to; roof layout, pitch, and details, in accordance with the drawings and specification.

Roof trusses shall be supported and fixed to the truss fabricator's specifications but shall be no less than that required by NZS 3604 Tables 10.14 and 10.15. Roof trusses shall be braced as shown on the drawings and in accordance with NZS 3604 10.3.

Roof Bracing

Roof bracing (where applicable) shall be as shown on the truss plan and in accordance with NZS 3604 10.3 and 10.4 as necessary.

7.4.8 Ceiling Framing

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

7.5 GIB® Plasterboard Sheets

7.5.1 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.

7.5.2 Components

To the timber framed areas noted as 'Bracing' on the drawings, shall additionally comply with all relevant aspects of the GIB EzyBrace® Systems 2011 literature and GIB Ezybrace® software 2011 to the specified bracing unit rating, complete with all system accessories, [BRANZ Appraisal No.294 \(2011\)](#) and other relevant product manufacturers' recommendations.

7.5.3 GIB Plasterboard

GIB® Standard plasterboard, 10mm thick.

Location:

GIB® Standard plasterboard, 13mm thick.

Location:

GIB Braceline® / GIB Noiseline® plasterboard, 10mm thick.

Location:

GIB Fyrelime® plasterboard, 16mm thick.

Location:

7.5.4 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.

GIBFix® One. Use to adhere the sheets to the timber framing and battens in accordance with Winstone Wallboards Ltd requirements.

7.5.5 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.

7.5.6 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.

7.5.7 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.

7.5.8 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.

7.5.9 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.

7.5.10 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.

7.5.11 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.

7.6 GIB® Rondo® Metal Batten Systems

7.6.1 Scope

Supply and install the selected GIB® Rondo® Metal Batten Systems to the locations identified on the drawings, complete with all accessories. All aspects of this work shall be in complete accordance with the GIB® Rondo® Metal Batten Systems 'System and Installation Manual' (check www.gib.co.nz, or call 0800 100 442 for the latest edition), other relevant product manufacturers' recommendations and as shown on the drawings.

No substitutions are permitted for GIB® Rondo® Metal Batten Systems.

Refer to separate section for ceiling and/or wall linings fixed to GIB® Rondo® Metal Battens.

7.6.2 GIB® Rondo® Metal Batten System

GIB® Rondo® 310 Ceiling Batten System

GIB® Rondo® 310 Ceiling Batten System. Incorporating 35mm deep, concealed metal ceiling battens that are either fastened with proprietary metal support clips (recommended) to the support frame or fixed directly to the support frame.

Suitable for 10mm,13mm,16mm and 19mm thick GIB® plasterboard ceiling linings for residential and commercial applications. Plasterboard ceiling linings are generally screw-fixed directly to the underside of the ceiling battens. Maximum 130mm clearance from the underside of the support frame (joist/rafter) to the top of the ceiling batten.

GIB® Rondo® 311 or 313 clips can be installed to provide additional restraint and accurate batten alignment when the battens are direct-fixed to the support frame. Use GIB Quiet Clip® for GIB® noise Control Systems.

When installed as a ceiling diaphragm, the battens must be fixed directly to the support framing. If GIB® clips are used then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

Install with all specified components and accessories in accordance with the manufacturer's requirements to the locations, layout, levels and details shown on the drawings.

Where electrical earthing of GIB® Rondo® 310 Ceiling Batten System is required, the electrical earthing shall be carried out (by others) by a qualified electrician in accordance with the electrical standards and regulations.

Location:

7.6.3 System Components

GIB® Rondo® 310 Batten. 35mm deep, galvanised, lightweight mild steel furring channel. Installed as a component of the GIB® Rondo® 310 Ceiling Batten System.

7.6.4 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 ensure that the GIB® Rondo® Metal Batten System correctly allows for ceiling lining installation, and for the locations of recessed lights and other fittings installed by others, and to install GIB® Rondo® Metal Batten Systems as required.

7.6.5 Workmanship

Installation work shall be carried out by qualified and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the GIB® Rondo® Metal Batten Systems System and Installation Manual, to the relevant requirements of AS/NZS 2785, and as shown on the drawings.

All cutting, jointing and fixing techniques of the system components shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient, robust and installation.

7.6.6 Deliver & Handling

Store GIB® Rondo® Metal Batten System componentry under cover, off the floor, on a flat, level surface. Keep components dry, and protect from damage, moisture and contamination. Do not use damaged or defective componentry.

Handle components in accordance with the manufacturer's guidelines and in a manner that prevents damage to the product.

7.6.7 Preparation

The building must be fully enclosed, weathertight and suitably dry before installation commences.

Check that all preliminary and preparatory building works have been completed to specification and as shown on the drawings.

Check that any required building services installations, including electrical, plumbing, mechanical, fire, or other service located behind the batten line, have been completed.

7.6.8 Installation

GIB® Rondo® 310 Ceiling Batten System. Suitable for 13mm thick, single layer, internal plasterboard ceiling linings for residential applications.

Battens spaced at 600mm centres. Maximum batten span: 1200mm for multi-span battens; maximum 900mm for single-span (non-jointed) battens and for garage ceilings.

Confirm the ceiling lining fixing and installation requirements prior to installing GIB® Rondo® 310 Metal Ceiling Battens. Make allowance for the lining thickness when establishing the finished batten datum level.

For Multi-span Battens: set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 1200mm, to the areas, levels and details shown on the drawings.

For Single-span Battens (non-jointed): set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 900mm.

As specified, screw-fix the specified perimeter angles and/or channels to the walls true to line and level.

Fix GIB® Rondo® batten clips along the batten lines, 900mm or 1200mm apart (as above), to the support framing at the required height/level.

Securely fasten the clips in place so that the battens are fixed at the correct datum level and are parallel, straight and true to line. Support batten ends on perimeter angle or channel. Alternatively; cut, fold and fix the batten end to the top plate.

Batten clip fixings and set-out shall be to the manufacturer's installation requirements for the clip type, batten type and batten set-out.

Use full length battens. Where jointing is necessary, joint battens using the manufacturer's proprietary batten jointer for the batten type.

Do not fix batten clips directly to H3.2 CCA, CuAz or ACQ treated timber, fully separate with DPC or other approved material.

Where required, provide additional battens for ceiling-mounted fixtures and fittings at the set-out shown on the drawings.

When installed as a ceiling diaphragm the battens must be fixed directly to the support framing. If GIB® clips are used then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

7.6.9 Completion

Carry out a final inspection immediately after installation.

Check that the GIB Rondo Metal Batten System has been installed correctly in accordance with the manufacturer's Systems & Installation Manual and as shown on the drawings, and that ceiling and/or wall installations are accurately aligned true to line, level (and/or plumb) and plane.

Check for damaged and defective work - replace or repair as necessary.

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

Provide all necessary Producer Statements.

7.7 Scyon Linea Weatherboard

7.7.1 Scope

Supply and install Linea 150mm Weatherboards as a fibre-cement weatherboard cladding material to the walls identified on the drawings, complete with all accessories. The Linea Weatherboards are to be finished with a paint system. All aspects of this work shall be in complete accordance with Linea Weatherboard Technical Specification (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition), Linea BRANZ Appraisals, and other relevant product manufacturers' recommendations.

7.7.2 Co-operation

Co-ordinate with other trades to ensure that appropriate clearances are allowed from roofing products and associated flashings etc, that the panels correctly allow for door and window installation, and that services penetrations are correctly handled to maintain full weathertightness and panel integrity.

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

7.7.3 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.

Framing shall be plumb and in true alignment, complete and suitable for the weatherboards, 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 the bottom plate hold-downs are correctly installed.

Check that the building underlay or rigid air barrier has been installed in full accordance with the manufacturer's requirements and the drawings, and completely finished to all penetrations including doors, windows, services, etc. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flashings etc that will enable the weatherboards and all accessories to be installed.

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 remain clear of the weatherboards by at least 100mm at all times in accordance with E2/AS1.

7.7.4 Sealants

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

7.7.5 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with Linea Weatherboards Technical Specification and other relevant product manufacturers' recommendations.

7.7.6 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 c/s 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. 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 weatherboards or accessories.

7.7.7 Installation

Fix uPVC vent strip through the building underlay or rigid air barrier. Ensure that the openings in the vent strip are kept clear and unobstructed at all times. Fix H3.1 timber cavity battens through the building underlay or rigid air barrier to the framing. Install the weatherboards through the cavity battens and building underlay or rigid air barrier to the framing in accordance with the Technical Specification and [BRANZ Appraisal No.447 \(2010\)](#), complete with all accessories eg. corner mouldings, cant strip, sealant, soakers, etc. Weatherboard end joints are to be formed off framing with a tongue & groove joint and sealant.

Ensure that all cut edges of weatherboards are primed prior to installation with Dulux Primacryl, Resene Quick Dry, or similar. Ensure that the bottom edge of the weatherboard overhangs below the bottom plate by 50mm, and is clear of the ground surface by at least 100mm; the finished ground clearance shall be in accordance with E2/AS1. Install flexible flashing tape to all junctions and

penetrations (including cables etc), with the addition of a pipe bandage for pipes to maintain weathertightness and air pressure resistance, and seal around.

7.7.8 Fixings

Fix timber cavity battens and other accessories with galvanised nails in accordance with James Hardie requirements.

Fix weatherboards and accessories with galvanised nails using the concealed nailing method in accordance with James Hardie requirements.

Fix soakers with nails in accordance with James Hardie requirements.

Optional face nail as required in accordance with James Hardie requirements.

Fix corners and vertical edges of openings with galvanised nails using the face nailing method in accordance with James Hardie requirements.

7.7.9 Completion

Ensure that the Linea Weatherboards have been fixed correctly, that all vertical joints and accessories have been completed correctly, and that all penetrations have been taped correctly. Check that no damage has occurred to any installed weatherboard element or associated component, replace as necessary. Check that no dirt has been mounded up within 175mm of the weatherboards, and maintain the clearance. Ensure that the weatherboards 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 Linea Weatherboard Product Warranty to the client. Hand over a copy of the latest Linea Weatherboard Maintenance Schedule to the client.

8 PLASTERWORK

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:

2589:2007(AS/NZS)	Gypsum linings - Application and finishing
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3103:1991(NZS)	Specification for sands for mortars and plasters
3121:1986(NZS)	Specification for water and aggregate for concrete
3604:2011(NZS)	Timber-framed buildings
3640:2003(NZS)	Chemical preservation of round and sawn timber
4251.1:2007(NZS)	Solid plastering - Cement plasters for walls, ceilings and soffits
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
4680:2006(AS/NZS)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

8.3 Plasterboard Finish

8.3.1 Scope

Plasterboard linings shall be finished to the specified finish level.

8.3.2 Plasterboard Finish Level

Level 3 Finish, in accordance with AS/NZS 2589. As a plasterboard finish in areas that do not require decoration (hidden and visually non-critical surfaces).

All joints and interior angles shall have paper jointing tape embedded in jointing compound and at least one coat of jointing compound applied over all joints and fastener heads.

Jointing and finishing compounds shall be applied and finished smooth in accordance with the manufacturer's requirements.

Location: See Manager & Site Supervisor

Level 4 Finish, in accordance with AS/NZS 2589. Unless specified otherwise, all decorated plasterboard shall be finished to Level 4 Finish.

All joints and interior angles shall have jointing tape embedded in jointing compound and minimum of two separate coats of jointing compound applied over all joints, angles, fastener heads and accessories.

Jointing and finishing compounds shall be applied and finished evenly and free of ridges and tool marks in preparation for decoration in accordance with the manufacturer's requirements. Agree in writing with the Decorator that a Level 4 Finish has been achieved when complete and before decorating commences.

Location: See Manager & Site Supervisor

Level 5 Finish, in accordance with AS/NZS 2589. As a plasterboard finish for surfaces to be painted with gloss or semi-gloss paint, or where critical lighting conditions occur on flat or low sheen painted surfaces.

All joints and interior angles shall have jointing tape embedded in jointing compound and minimum of two separate coats of jointing compound applied over all joints, angles, fastener heads and accessories.

Jointing and finishing compounds shall be applied and finished evenly and free of ridges and tool marks in preparation for decoration in accordance with the manufacturer's requirements. Agree in writing with the Decorator that a Level 5 Finish has been achieved when complete and before decorating commences.

Location: See Manager & Site Supervisor

8.3.3 Jointing Tape

Plasterboard sheet joints shall be reinforced with a suitable fibreglass jointing tape compatible with the jointing and finishing compounds.

Manufacturer, brand name & type:

8.3.4 Workmanship

Plasterboard finishing work shall be carried out by experienced applicators familiar with the application and finishing techniques and materials specified and in accordance with the manufacturer's requirements.

Plasterboard linings shall be finished to the specified finish level in accordance with AS/NZS 2589. Make all necessary arrangements for the quality assessment of plasterboard finishes prior to commencing decorating.

Protect surrounding surfaces from jointing compound splashes and sanding dust.

Handle and store plasterboard finishing materials and accessories in accordance with the manufacturer's requirements. Keep products dry and protect from damage. Do not use damaged or faulty products or products beyond their expiry date.

Dry powder compounds mixed to the manufacturer's instructions.

8.3.5 Installation

Ensure that plasterboard sheets have been installed correctly to the sheet manufacturer's requirements, that they are clean and dry, and that fixing heads are correctly set.

Install all necessary metal beads and trim to corners and edges and metal control joints as required and as shown on the drawings.

Apply jointing and finishing compounds to the required build and specified finish level in accordance

with the manufacturer's instructions. Reinforce joints with the selected jointing tape. Where required sand top coats smooth and even with fine sandpaper, as recommended by the manufacturer, when completely dry.

8.3.6 Completion

Ensure that the plasterboard sheets have been finished correctly to the specified finish level. Check for damage and repair as necessary. Ensure that assessment of the plasterboard finish level has been carried out and that agreement that the finish level is acceptable for subsequent decorating has been provided.

Clean up thoroughly on completion and remove all waste and rubbish from site.

8.4 Stucco Plaster Cladding

8.4.1 Scope

Clad-X Cladding System:

1 GENERAL DESCRIPTION

Clad-X AAC wall panel system is an exterior wall cladding system that provides light weight, high quality, and highly durable cladding solutions perfectly suited to the needs of residential housing and light commercial buildings. With the exterior coating solutions provided by the Wattyl Granosite reinforced exterior plaster system, Clad-X AAC wall panel system is a sensitive cladding system on the New Zealand market.

This technical manual document outlines the typical installation and application of the Clad-X AAC Wall Panel system, if specifiers require additional or modified details please contact Clad-X.

Clad-X AAC Wall Panel is an exterior wall panel which is made from 50mm Autoclaved Aerated Concrete (AAC) masonry panel with corrosion protected vertical/horizontal steel reinforcing suitable for exterior cladding of residential housing and light commercial buildings. AAC panels are coated with the Wattyl Granosite reinforced plaster system to produce the selected texture finish.

Clad-X AAC wall panel properties:

Dry Density: 520kg/m³*

Compressive Strength 4.0 MPa*

Dry Shrinkage Value: 0.015%*

Water Absorption: up to 36% (by volume) *

Dry mass of 50mm Clad-x panel: 31 kg/m² coating and substrate, considered a medium weight cladding in terms of NZS 3604

Windzone: up to Very High wind zones defined in NZS 3604

*note: the information is supplied by manufacturer.

2 COMPLIANCE WITH THE BUILDING CODE

2.1 COMPLIANCE OF SCOPE

The Clad-X AAC Wall Panel System complies with the following clauses of the New Zealand Enterprise Homes Ltd Stage 1a Vanguard Drive Issued for Tender/Consent

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Building Code:

B1 - Structure

B2 - Durability

E2 - External Moisture

F2 - Hazardous Building Materials

2.2 B1 STRUCTURE

Clad-X AAC wall panel system installed as per this manual is able to withstand up to VH wind zone described in NZS 3604:2011.

2.3 B2 DURABILITY

Clad-X wall panel fixing's used in accordance with this manual will meet the requirements of NZBC Clause B2.

The nominal 20mm or 40mm cavities are provided to:

- Allow moisture to run down the inside of the Clad-X AAC panel and escape through the vents/vermin tray without bridging the cavity.
- Provide sufficient air space permitting air to circulate within the cavity and dry the AAC wall panels.

2.4 E2 EXTERNAL MOISTURE

The Watty! Granosite plaster system used on Clad-X AAC wall panel system contributes to the requirements of NZBC E2 relating to the resistance of water penetration, provides the integrity of the specified external system is maintained.

2.5 F2 HAZARDOUS BUILDING MATERIALS

In reference to NZBC Clause F2 regarding Hazardous Building Materials, Clad-X AAC wall panels are non-hazardous, all safety precautions adhered to are provided in this technical manual.

3 LIMITATIONS & CONSIDERATION

3.1 LIMITATIONS

Clad-X AAC wall panel cladding system is applied to residential housing and light commercial buildings complying with NZS 3604 or NASH 3405. If specifiers require additional or modified details please contact Clad-X.

3.2 CONSIDERATIONS

Clad-X AAC panels must be installed by trained installers as per the details shown in this manual to ensure the quality of the cladding system. They must not be installed in any situation where they will come into contact with the ground, and cannot be used as retaining walls.

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Clad-X AAC panels are Autoclaved Aerated Concrete, same with all concrete and fiber cement products, the dust produced when cutting or grinding them contains crystalline silica, is irritating to the eyes, skin and respiratory system. Inhalation of this dust can cause irreversible damage to health. Wear suitable protective clothing and gloves at all times. When cutting, drilling or grinding panels do so in an open air environment or areas that are well ventilated and wear approved safety glasses and dust mask.

All aspects of cutting, drilling or grinding must comply with the latest regulations of the Occupational Safety and Health division of the labour department.

Clad-X AAC panels should be stored on site on the pallets which they were delivered on and kept covered & free of dampness until required. Care should be taken to limit damage to edges or corners when handling.

Any damage incurred to the coating or the AAC panels must be addressed immediately. The panel is not to be left exposed through damage to the coating.

The Watty! Granosite plaster system must be maintained annually, to ensure the integrity of the whole system. (Refer to Watty! Granosite Maintenance Schedule)

3.3 CONSTRUCTION REQUIREMENTS

Steel and timber framed wall studs should be placed at not more than 600mm crs. Framing strength must comply with relevant NZ Standards for general framing construction suitability for the building.

Steel and timber framed walls are to be braced in accordance with wall claddings shown in NZS 3604: 2011 and are to be based on the combined weight of the AAC panel and the coating system used.

Prior to installation of Clad-X AAC panels and battens. The wall underlay/ building paper compliant with NZBC E2/AS1 table 23 must be fixed to the exterior wall framing and dressed into all openings with flexible flashing tape. Ensure wrap is continuous around corners, installed horizontally, and has its edges and laps taped.

Internal and external corners as per details following, if the distance between corners exceeds 8.0 meters, then extra control joints at a maximum of 8.0m centers are formed as per details.

Responsibility for the locations of these control joints is with the designer.

3.4 CONSTRUCTION GUIDANCE

3.4.1 Pre-installation check: ensure the builder has completed items set out in the pre-cladding check list. (See section 7 for details)

3.4.2 Installation:

- Cavity battens: the EPS 20 x 40 (or 40 x 40) cavity battens are attached to the framing element using PB Nailbond adhesive or nails, the typical batten layout refer to the detail drawing 1.

- Cutting: AAC panels are cut using a metal cutting blade. Zinc rich primer compliant with AS/NZS 2311:2009 is to be applied to all exposed reinforcing in the panels.

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- Fixing: AAC panels are fixed using min. 14x100 bugle head type 17 class 4 screws which are to be embedded 10mm max. A minimum of 6 screws are required per AAC panel. Where 40mm cavity is used, min. 14x120 bugle head type 17 class 4 screws shall be used.

- Laying: Once the cavity batten are fixed to the studs, fix the bottom row of Clad-X AAC panel, AAC panels are placed in a stretcher bond pattern as per the typical layout detail on drawing 2. Any imperfections on the face of the panels and the screws hole can be repaired and filled with the panel adhesive MCB A20, which is a rigid, high strength cement based adhesive.

- Corners: at this point check the level and alignment of the panels, all internal & external corners shall be installed as per detailed in drawing 10&11. Corners should be placed with an overhang to line up flush with the connecting corner panel while making sure the control joint can be achieved.

- Flashings: Ensure all flashings have been placed correctly as per the details in this manual, cut the panels to suit the openings.

- Plastering & coating: Ensure the panels are dry, clean and free of any dirt, dust or foreign matter before carrying out any plastering work, Watty Granosite plaster system is the only approved system for application over the Clad-X AAC panel system, and it must be applied by LBP. For more information, see the manufacturer's specifications.

4 LISTS OF NOMINATED COMPONENTS

Panel Size: 2200mm x 600mm x 50mm

Batten: 20 x 40mm EPS cavity batten, 40 x 40mm EPS cavity batten

Screws: min. 14 x 100 bugle head galvanized screws; class 4 type 17 for 20mm cavity
min. 14 x 120 bugle head galvanized screws; class 4 type 17 for 40mm cavity
all screws shall comply with compliance document E2/AS1 table 20.

Panel adhesive: MCB A20, high strength cement based adhesive

Sealants: BOSTIK SAFE-TECH (BRANZ approved)

Anti-corrosion paint: Zinc Rich primer compliant with AS/NZS 2311:2009

Vents: 30x30mm Clad-X vent

Tapes: Approved flexible flashing tape (refer to a product that complies with the performance requirements of the NZBC)

Adhesive: PB NailBond Sika

Flashings: Clad-X PVC sill flashing

Powder coated aluminum head flashing (installed by others)

Clad-X PVC jamb flashing

Clad-X PVC corner soaker

Clad-X PVC base cap flashing

Plaster system: First Coat: Grano Adhesive Mortar Coarse @ 5mm (mesh embedded)

Second Coat: Grano Adhesive Mortar Coarse @ 2mm

*Third Coat: GranoSponge 1mm @1mm

Primer: GranoPrime

Coatings: GranoImpact x 2 coats

Others: Granobond Keycoat

Notes: * Different textures are available, more details refer to Wattyl

website: www.wattyl.co.nz.

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5 MAINTENANCE AND WARRANTY

5.1 MAINTENANCE

The Wattyl Granosite plaster system should be regularly cleaned, at least annually, with chemical / detergent wash. Have the entire coated area inspected by a person with sufficient experience to identify any maintenance requirements to ensure weathertightness. Undertake all necessary repairs immediately. For more information, please refer to Wattyl Maintenance Schedule.

Inspections of the complete cladding surface must be carried out at least annually at the end of summer. Because of settling after disturbances to the ground during construction, and the slow moisture-loss shrinkage of concrete slabs, it is recommended that six-monthly inspections be made for the first three years.

Any cracks or damaged areas, including flashings and seals that have deteriorated, must be repaired immediately to ensure the integrity of the building envelope is maintained.

Any damage to the substrate must be repaired in accordance with the substrate manufacturer's instructions followed by re-plastering and recoating to the same standard as the original Granosite Plaster System installation.

If chemical free framing timber has been used, it is imperative that the maintenance of the cladding system is followed rigorously to ensure the minimum moisture ingress takes place to prevent expensive and extensive structural repair work.

As part of the Warranty conditions the finish coat(s) will need to be re-applied between years seven and eight as specified by Wattyl (NZ) Ltd. For exposed locations washing and re-painting

may be required more frequently.

For hard to remove stains, refer to the Wattyl Granosite stain removal guide.

Failure to correctly maintain the system may void any long term warranties offered with the system. Also refer to Pre-plaster & Pre-clad checklists in supporting documents

5.2 WARRANTY

Clad-X Panel and associate materials, when installed as per this manual, are guaranteed for a minimum life period of 15 years (from date of completion).

The Wattyl Granosite plaster system is guaranteed a period of 15 years (from date of completion) to perform and meet the requirements of NZBC, where all material components of the plaster system have been prepared and installed in accordance with this manual, technical specifications and carried out by trained contractor, and where the system has been properly maintained.

For more condition and details please refer to Wattyl website. Also refer to Pre-plaster & Pre-clad checklists in supporting documents

8.4.2 Co-operation

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

Co-ordinate with other trades the locations of control joints, and pipes, outlets, cables, meter boards and other fittings installed by others, and to install stucco plaster cladding as required.

8.4.3 Workmanship

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

All 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 and finishing techniques, in accordance with NZS 4251.1, and to the layout and details shown on the drawings.

Protect all surrounding surfaces and work from plaster droppings and splashes as necessary, and protect plasterwork from exposure to sun, wind and rain, and from damage from other works as the works progress and until fully cured and complete. Conform to NZS 4251.1 guidelines regarding restrictions of plastering in cold and hot conditions.

Prepare a sample panel for approval if requested.

Store materials undercover and off the ground on pallets or gluts, and kept dry and protected from contamination and damage.

Do not use contaminated, damaged or faulty materials and products, or products beyond their expiry date.

8.4.4 Preparation

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

Check that the timber wall framing complies with NZS 3604, has studs at maximum 600mm centres and dwangs at maximum 800mm centres, is plumb and in true alignment, includes all blocking

required for cavity battens, and fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 18% at the time of cladding installation.

Check that the building wrap as specified 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.

Where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed to the wrap, to keep bulk insulation from pushing the wrap into the cavity.

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

Timber frame + cavity battens + AAC

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

Check that the timber wall framing complies with NZS 3604, has studs at maximum 600mm centres and dwangs at maximum 800mm centres, is plumb and in true alignment, includes all blocking required for cavity battens, and fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 18% at the time of cladding installation.

Check that the building wrap as specified 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.

Where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed to the wrap, to keep bulk insulation from pushing the wrap into the cavity.

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

8.4.5 Cavity Battens

50 x 20mm Class S or H extruded polystyrene cavity battens.

Cavity batten fixings: minimum 60x2.8mm hot-dipped galvanized flat head nails at 300mm maximum centres, and minimum 35mm penetration into timber framing in accordance with NZS 4251.1. or as specified in the CladX Supporting documents

8.4.6 Vented Cavity Closure Material

PVC cavity closure.

8.4.7 Plaster Material

Overview

The excellent performance of all WATTYL® coatings and coating systems is dependant upon correct surface preparation, application and curing as outlined in WATTYL PAINTWORKS® Specifications, Technical Data Sheets and this document. In accepting a WATTYL® coating specification, you acknowledge the following conditions of specification and the effect that failure to adhere to these conditions may have on any warranties offered in respect of the coating system performance.

Where any conflicts exist between the information in this document and any WATTYL PAINTWORKS® Specification or Technical Data Sheet, the Specification or Technical Data Sheet shall take precedence.

Surface Preparation

All surfaces should be prepared in accordance with the recommendations detailed on each WATTYL

PAINTWORKS® Specification and/or WATTYL PAINTWORKS® Technical Data Sheet. If unique circumstances exist, contact WATTYL® for further advice.

Applicators of texture coatings The person who applies a WATTYL GRANOSITE® coating system (hereafter referred to as the 'Applicator') shall be one who has undergone training by WATTYL® and who is currently recognised by WATTYL® as an "Applicator skilled in the application of WATTYL GRANOSITE® products and systems". If the Applicator has not undergone training and/or is not recognised as being skilled in the application of WATTYL GRANOSITE® products, WATTYL® reserves the right to void all manufacturers warranties on the performance of the coating system beyond those warranties required by law.

Quality Assurance System

The person/s to whom the Applicator is contracted (hereafter called the 'Main Contractor'), shall ensure that the Applicator implements the appropriate quality assurance system for the surface preparation, application of coatings, curing, handling, storage and protection of all WATTYL® products.

Records

The Applicator shall prepare records of weather conditions and product use. When the job has been completed the Applicator shall hand over these records to the appropriate parties. The Applicator should record the ambient temperature, surface temperature, relative humidity and dew point at regular intervals on a daily basis. The Applicator should record the product batch numbers of each coating and the location where that coating was applied and the date and time each item was coated.

Coating system specification

Each WATTYL PAINTWORKS® Specification contains a detailed description of a particular system. Listed are products, coverage rates, number of coats, order of application, recoat times etc. It is the responsibility of the Main Contractor to ensure that all parties have a full understanding of what the

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specification requires. All technical questions should be directed to WATTYL®'s Technical Services Department on 0800 735 551.

Product substitution

All coating materials used for a project must comply with the WATTYL PAINTWORKS® specification/s nominated unless otherwise approved by the Main Contractor or other authorising body. WATTYL® will not take responsibility for difficulties caused by the use of substituted products in a system.

Provision of materials on site

All materials comprising the coating system as specified in the clause "coating system specification", shall be delivered to site with all container seals and product identification intact, no earlier than nine months before application. It is the responsibility of the Main Contractor and the Applicator to ensure that all products are fully protected from frost, damp and excessive heat, whilst on site. Refer to the WATTYL PAINTWORKS® Technical Data Sheet for specific storage guidelines for each product.

Material Safety Data Sheets

The Applicator shall obtain copies of all relevant Material Safety Data Sheets (MSDS). Local health and safety regulations shall be followed at all times in addition to any specific precautions outlined in the MSDS for each product. Specific attention must be paid to any warning and instruction labels either on the product container or in the WATTYL PAINTWORKS® Technical Data Sheet or MSDS.

The Applicator shall be responsible for implementing all safety requirements.

Condition of the substrate

It shall be the responsibility of the Main Contractor to ensure the substrate to which the coating system is to be applied is of a fit standard to permit the desired finish. For pre-cast and off-form concrete, this minimum standard shall be considered as the equivalent of that laid down in AS3610:1995 – Formwork for Concrete. For brickwork this minimum standard shall be considered as the equivalent of that laid down in AS3700:2001-Masonry Structures. If the natural joint in the brickwork or blockwork is to be featured, joint finishing shall be grooved (not pointed or raked) to a depth that shall not exceed 5mm. If the natural joint pattern is not to appear, brickwork or blockwork must be fair-faced and flush-jointed. For rendered surfaces, this minimum standard shall be considered as the equivalent of that laid down in British Standards BS 5492:1990 – “Internal Rendered Finishes” and BS 5262:1991 – “External Rendered Finishes”.

All sheet materials such as plasterboard, waterproof plywood, Fibre Cement Sheet and Autoclaved Aerated Concrete (AAC) shall be installed or reinstated in the manner regarded as proper practice by the relevant industry association or made good to the equivalent of that standard. Fresh cementitious substrates should be left a minimum of 28 days before coating. There must be less than 15% moisture Wood Equivalent in the surface at the time of application to ensure optimum coating performance. In addition to the standards referenced above and information contained in WATTYL PAINTWORKS® Specifications and Technical Data Sheets, compliance with guidelines in AS/NZS 2311:2000 – Guide to Enterprise Homes Ltd Stage 1a Vanguard Drive Issued for Tender/Consent

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the painting of buildings, shall also be deemed to form part of these conditions of specification. Where conflicts occur between published standards and the information contained in WATTYL PAINTWORKS® Specifications and Technical Data Sheets, the WATTYL® Specifications and TDS shall take precedence.

All substrates shall be free of dirt, grease, loose or flaking paint, scaling and laitance, efflorescence, mould, fungi, stains, rust, form oil, mastic compound or any other foreign matter. It shall not be subjected to continual wetting or hydrostatic pressure. The Applicator shall, at the time of preparing the Applied Site Sample (see below), advise the Main Contractor if the substrate is of sufficient standard to

achieve the desired finish. Commencement of product application by the Applicator will be deemed as acceptance of the substrate as being of a sufficient standard for the selected coating system. It is the ultimate responsibility of the Main Contractor to make good any substrate not finished to the above standards.

Provision of Applied Site Sample/s and Reference Area for Texture Coatings In the interests of quality control, the Applicator shall prepare one or several Applied Site Samples, which shall be as near as practicable to any Project Sample produced during the specification stage. The Applied Site Sample shall be of not less than four square metres and shall be applied to such areas of substrate as to encompass all the variations to be encountered in the coating of the substrate in it's entirety. It shall present the colour & texture and minimum dry film thickness of the completed coating, and once approved by the Main Contractor shall be regarded as the Reference Area by which the finished job is judged subject to the permissible variations as specified in clause headed “Standard of finished work/permissible variations”.

The Applied Site Sample shall be applied no later than one month after sufficient of the substrate has been constructed and made good to provide the range of variations of substrate condition (including construction and expansion joints, tie holes, contours, contaminations, laitance, leaking, misalignment, shrinkage, form-marks, damp, blooming, patching or any other) that are likely to be

encountered during the coating of the substrate in its entirety. The Main Contractor shall advise the Applicator when this stage has been reached and shall permit him access to the site to prepare the Applied Site Sample. Provision shall be made to cover all costs of labour and materials entailed in the preparation of the Applied Site Sample.

Weather Restrictions

All products within the specified system shall not be applied to wet surfaces. All WATTYL PAINTWORKS® systems shall be applied to substrates containing less than 15% moisture wood equivalent. WATTYL® products shall be applied in dry atmospheric conditions above 10°C and below 35°C.

Application

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The performance of a WATTYL® coating system is reliant upon correct application. It is the responsibility of the Applicator to ensure that all products within a system are applied in accordance with the WATTYL PAINTWORKS® Specification and the relevant Technical Data Sheet for each product. This will include but is not limited to (a) application of all coats within the specified system, (b) correct film builds, (c) correct order of application and (d) adherence to specified recoat times.

Application equipment

All application equipment shall be of a standard appropriate for the work and workmanship required.

Colour

It is the responsibility of the Applicator to check the colour of each container of material provided, against the approved Project Sample or other approved colour reference sample, BEFORE commencing application. Where more than one container of material is to be used for the final coat, all containers should be checked for accurate colour and then boxed together to ensure overall consistency.

Adequate material should be ordered to site to allow completion of an entire level or sectioned area. For texture coatings, where the area requiring coating exceeds 1500sqm, factory tinted batches of the final coat should be ordered to ensure product & colour consistency. The exterior durability of colours varies and not all colours within the WATTYL® system are recommended for outdoor use. Please consult with WATTYL® Technical Services for clarification.

The combination of dark colours and extreme sun exposure can lead to both coating and substrate failure. Careful consideration must be given to the selection of substrate, colour and exposure to ensure a satisfactory outcome. Colours of Light Reflectance Values (LRV) of less than 40% on fibre cement substrates and less than 35% on polystyrene boards or to polystyrene block permanent formwork

substrates may result in unacceptable thermal movement and should not be used. Expansion joints and day work joints All expansion joints must be sealed or filled after the coating has been applied. If the joint is sealed or filled first, the coating shall not be applied over such joints. Care must be taken when joints are sealed or filled not to stain or interfere with the final coating. The day work joints of the coating shall be established by consultation between the Main Contractor and the Applicator.

Protection of adjoining surfaces during application It shall be the responsibility of the Applicator to provide standard protection to all surfaces adjacent to the areas being coated and to remove this protection on the completion of the application.

Standard of finished work/permissible variations

As near as practicable, the finished coating shall match the approved Applied Site Sample in terms of colour, texture and uniformity. In judging permissibility of variations, due regard shall be taken of texture variations caused by variation of substrate and illusion of variation that can arise from uneven Enterprise Homes Ltd Stage 1a Vanguard Drive Issued for Tender/Consent

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or unusual illumination (e.g low angle lighting that highlights surface imperfections).

Inspection WATTYL® is not required in any way to conduct on site inspections of WATTYL® coating systems. However, at WATTYL®'s discretion and with the approval of the Main Contractor, WATTYL® may provide a representative to site, to inspect the quality of surface preparation and/or application of WATTYL® coating systems. Any such inspection is in no way an indication of WATTYL®'s acceptance of (a) the standard of workmanship of the Main Contractor or Applicator or (b) the adherence to the specified coating system or the conditions of specification. If as a result of any inspection, WATTYL® becomes aware of any issue that may affect the performance of the coating system as specified, WATTYL® shall promptly advise the Main Contractor and Applicator.

Cleanliness

On completion the Applicator shall restore the site to an agreed standard removing all empty cans and other debris arising from their work.

Post-application care of the coating

It shall be the responsibility of the Main Contractor to provide adequate protection to the coating against freezing for not less than 48 hours after application; against direct impingement of water or other liquids for not less than 48 hours after application; and against abrasive contact for not less than 7 days after application. WATTYL® reserves the right to void all performance warranties, other than those required by law, if this post-application coating protection is not provided. The times listed above are minimums for all coatings. Please check individual data sheets for each product in a system.

Disclaimer

WATTYL® recommends that :

You review the Technical Data Sheets (TDS) and Material Safety Data Sheets (MSDS) before you use or handle any products

The products be used only in accordance with the information provided by WATTYL®

The product/s be transported, stored and handled in accordance with the information on the MSDS and relevant TDS

You thoroughly test the product, using the recommended application method on a sample of intended substrate, before using the product

The information in this document and Technical Data Sheets was prepared using information gathered during product development. While WATTYL®

endeavours to update this information and maintain the accuracy and currency of its contents,

WATTYL® cannot guarantee that the information provided

is wholly comprehensive.

WATTYL® recommends that you conduct such additional investigations as may be necessary to satisfy yourself of the accuracy, currency and comprehensiveness of the information on which you rely in using and handling the product/s. If you require further information please contact your nearest WATTYL® office on 0800 735 551.

To the full extent permitted by law, WATTYL®'s liability for breach of a condition or warranty implied into the contract for sale between WATTYL® and you

by law is limited at WATTYL®'s selection to (a) the replacement of product/s or (b) payment of the

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cost of replacing the product/s.

Standards

Standards that are mentioned in this document and/or may be of assistance in the specification and application of paint systems include but are not

limited to:

AS/NZS 2310 – Glossary of paint and painting terms AS/NZS 2311 – Guide to the painting of buildings

AS/NZS 1530 – Methods for Fire Tests on Building Materials, Components, and Structures.

AS3730 – Guide to the properties of paints for buildings AS/NZS 2633 – Guide to the specification of colours

AS/NZS 2700 – Colours for general purposes AS/NZS 4548 – Guide to long-life coatings for concrete and masonry

AS3610 – Formwork for Concrete AS3700 – Masonry Structures

BS 5492 – Internal Rendered Finishes BS 5262 – External Rendered Finishes

8.4.8 Plaster Finish

Sponge Finish; cement based plaster applied to a uniform thickness, trowel applied, floated with a wooden float and lightly finished with a close cellular sponge, in accordance with NZS 4251.1.

8.4.9 Installation

Install and fix the cavity battens directly over studs into the timber framing as noted to the required layout.

Carefully set-out and fix the rigid backing sheets over the cavity battens to the timber studs through the cavity battens, level along the base line minimum 50mm, or as detailed, below the bottom plate or floor structure.

Keep rigid backing sheets protected from distortion from exposure to rain and moisture until overlaid with the slip layer.

Install all necessary galvanised metal beads and edge trim as required and as shown on the drawings. Install slip layer underlay, reinforcing spacers, and galvanised metal reinforcing in accordance with NZS 4251.1, and as detailed, in preparation for plastering.

All flashings around windows, doors and other openings, at corners and control joints, inter storey and soffit junctions, and pipe penetrations, shall all be carefully constructed, fixed, sealed and finished to the details shown on the drawings. Confirm the location of all control joints before commencing installation.

8.4.10 Completion

Check that all plaster has been correctly applied and finished, and is cured to the required strength. Check that all surfaces, edges, corners, rebates, angles, reveals, and drips are true to line, plumb, level, and to the details shown on the drawings and to the tolerances of NZS 4251.1. Check that all control joints and expansion joints are sealed and completed correctly.

Check for damage and faults and replace or repair as necessary.

Leave all surrounding surfaces and works clean and free of contamination. Remove all rubbish and excess materials from the site.

Issue to the owner a copy of the maintenance requirements and all necessary warranties for the completed works.

9 ROOFING

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:

1397:1993(AS/NZS)	Steel sheet and strip - hot-dipped, zinc-coated or aluminium/zinc-coated
1562.1(AS)	Design and installation of sheet roof and wall cladding - Metal
2295:2006(NZS)	Pliable, permeable building underlays
3604:2011(NZS)	Timber-framed buildings

9.3 COLORSTEEL®

9.3.1 Scope

Supply the selected Colorsteel roofing and install on the areas identified on the Roof Plan. All aspects of the work shall be in complete accordance with NZ Steel 'Installers Guide' (check 0800 100 523 for the latest edition) and any other relevant Product Manufacturers Recommendations.

9.3.2 Product

COLORSTEEL® Endura™.

Colour: see '4 page specifications'

9.3.3 Profile

Corrugated 0.40 BMT x G550.

Location: see '4 page specifications'

9.3.4 Qualifications

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

9.3.5 Co-operation

Co-operate with other trades to ensure that roof framing has appropriate spacings, alignments and fixings, and is in accordance with NZS3604, and coordinate to ensure that all timber members

required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly in place.

Note and co-ordinate with the installer of the rainwater system specified above. Handle roofing without scratching, distortion or other damage, store on even bearers, and keep dry until installed. 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.

9.3.6 Installation

Set-out the roofing sheets exactly square to building axis and maintain this accurate setout throughout the works, and set-out to lap sheets away from the prevailing wind.

Install the underlay running up and down the slope with minimum 300mm side laps. Do NOT install any fixings to the underlay (to avoid dissimilar metals/electrolysis) - install the underlay length by length as the roofing proceeds and ensure it is taut and evenly lapped when the roofing screws are installed.

9.3.7 Fixings

Screw fix, screws to comply with AS3566 (Self-drilling construction screws) Class 3 or 4. (Do NOT use stainless steel screws). Use only low carbon (

9.3.8 Flashings

Ridges, hips, and barge flashings etc. shall all be matching Colorsteel, and as detailed. Soft zinc flashing edges very neatly dressed down where required, plumbing penetrations custom flexible rubber flashed (fully sealed), and instruct the Plumber that no copper (or brass) pipes are to discharge on to the roof.

9.3.9 Protection

Protect the coated surface from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf and pop-rivet shanks as the work proceeds (at least daily, and keep them and other rubbish out of the spoutings). Remove trade debris from the roof and from the site progressively, and on completion leave the roof and rainwater system completely clean.

Do not use black lead pencils for marking Colorsteel - permanent marking may result. Observe NZ Steel's recommendations where flues discharge above roofs, and for the installation of solar heating panels. Do NOT weld Colorsteel. NO abrasive disc cutters, no soldering, no lead head nails or lead edged flashings, no touch-up paints, and do not slide tools down the roof.

9.3.10 Maintenance

Advise owner to minimize walking on the roof, and to use soft-sole shoes during maintenance access. Advise owner re maintenance of unwashed surfaces, and to light detergent wash the whole roof every three to five years. Advise owner that any leaf build-up gutter protection system that traps water will invalidate the roofing warranty.

10 ALUMINIUM JOINERY

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:

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

10.3 Aluminium Windows & Doors

10.3.1 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

10.3.2 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 45° 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 15° down to the exterior, and turning down to cover the top of the aluminium frame by at least 10mm, before finishing with a 5mm 45° 'kick out'. Upstand the head flashing ends as detailed. Install jamb flashings/ sealant or scribes as detailed.

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

10.3.3 Interior Finish

GIB Groove.

10.3.4 Reveal

Timber reveals for paint finish with all sides primed.

10.3.5 Glass Platform

Single Glazed.

Double Glazed.

10.3.6 Finish

Powder Coated Aluminium - Matt

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

10.3.7 Hardware

Hardware colour matched to Aluminium Joinery.

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.

10.3.8 Workmanship

These windows will be manufactured 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.

10.3.9 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.

11 INSULATION

11.1 Preliminary

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

11.2 Compliance

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

Comply with all relevant provisions and recommendations of:

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
4246:2006(NZS)	Energy efficiency - Installing insulation in residential buildings
4859.1:2002(AS/NZS)	Materials for the thermal insulation of buildings - General criteria and technical provisions

11.3 Thermal Insulation

11.3.1 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.

11.3.2 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.

11.3.3 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.

11.3.4 Product

Glass Fibre Pads

Glass fibre thermal insulating pads.

Manufacturer, brand name & type:

R-Value:

Location:

11.3.5 Installation

Wall Insulation - Glass Fibre Pads

Install glass fibre insulation pads, complete with accessories, friction fitted between wall studs and dwangs etc. and held in place in accordance with the manufacturer's installation recommendations. Completely fill the framing voids, leave no gaps at the edges or at penetrations etc, and maintain full insulation pad thickness. Support external wall insulation with vertical strapping tape at 400mm centres to the outside face, stainless steel stapled to the framing.

Ceiling Insulation, Truss/Framed Roof - Glass Fibre Pad

Install glass fibre insulation pads, complete with accessories, friction fitted between the ceiling joists, over the ceiling lining in accordance with the manufacturer's installation recommendations. Leave no gaps along the insulation pad edges and joints, and at the ceiling perimeter/wall junction. Separate ceiling insulation 200mm from recessed light fittings and other recessed electrical fittings; refer to the drawings for containment requirements around recessed electrical fittings.

11.3.6 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.

12 METALWORK

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:

1387:1985(NZS/BS)	Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads
3678:2011(AS/NZS)	Structural steel - Hot-rolled plates, floorplates and slabs
3679.1:2010(AS/NZS)	Structural steel - Hot-rolled bars and sections
4680:2006(AS/NZS)	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 1231	Aluminium, anodic coatings
AS/NZS 14341:2012	Welding consumables – Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels – Classifications
AS/NZS 1554.1	Metal-arc welding of steel structures
AS/NZS 1554.6:2012	Structural steel welding - Part 6: Welding stainless steels for structural purposes
AS/NZS 1554.7:2006	Structural steel welding - Welding of sheet steel structures
BS 4848	Hot rolled structural steel sections
BS 6497	Powder organic coatings for steel
NZS/BS 4848.2:1991	Specification for hot-rolled structural steel sections - Hollow sections
NZS/BS 4848.4:1972	Specification for hot-rolled structural steel sections - Equal and unequal angles

12.3 Metalwork

12.3.1 Scope

Manufacture and install the Metalwork elements, as specified and identified on the drawings and schedules, to the locations, layout and details shown on the drawings, complete with all components and accessories. All aspects of this work shall be carried out to comply with the requirements of the New Zealand Building Code, relevant Standards, and in accordance with any specific manufacturer's requirements, other relevant product manufacturers' recommendations, and as noted and detailed on the drawings and schedules.

12.3.2 Requirements

Shop Drawings

Prepare and submit to the Architect/Designer for verification and approval Shop Drawings, issued For Fabrication & Installation, covering the following aspects:

- Fully dimensioned plans, elevations and sections of all elements; to the appropriate scale.
- Assembly jointing and fixing methods and details; to the appropriate scale.
- Jointing details and method of fixing between individual elements/components.
- Methods of installation construction, site assembly connections and all support systems for fixed elements.
- Where required - provision for thermal movement, wind load movement, and seismic movement.
- Installation sequence for large elements.
- Co-ordination requirements with other work and trades.
- A schedule of materials, finishes, fittings, fixings and fastenings, sealants and other accessories.

Shop Drawings are required for the following Metalwork items: See Engineer's Drawings in the Supporting documents

12.3.3 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 other trades as required to manufacture and install Metalwork elements and components to the required locations and tolerances.

12.3.4 Workmanship

All fabrication, assembly and installation work shall be carried out by qualified welders and trade related tradesmen, familiar with the specified products and fabrication and assembly techniques, to the best standard of workmanship under experienced factory supervision and control. All work shall be such as to leave a neat, efficient and robust assembly. Do not use damaged or defective products to fabricate steel metalwork elements and components.

12.3.5 Delivery & Handling

Store Metalwork elements, components and accessories undercover, off the floor and on a flat, level surface. Keep dry and protect from damage, moisture and contamination at all times.

Handle elements without scratching or damaging and in a manner that prevents distortion or deformation and pre-finished and vulnerable surfaces from rubbing together. Do not install damaged or defective metalwork elements or accessories.

12.3.6 Fabricated Elements

Support Frames

Support Frames. Materials, finish, dimensions, assembly details and installation methods as specified, scheduled and shown on the drawings.

See Engineer's specifications and drawings in the supporting documents

Balustrades

Balustrades. Materials, finish, dimensions, assembly details and installation methods as specified, scheduled and shown on the drawings.

See specifications and drawings in the supporting documents

Handrails

Handrails. Materials, finish, dimensions, assembly details and installation methods as specified, scheduled and shown on the drawings.

See specifications and drawings in the supporting documents

12.3.7 Steel Materials

Steel Bar

Mild Steel Bar. Including mild steel flat, square, angle and engineering round sections, to AS 3679-300. To the locations and details identified on the drawings and schedules.

Structural Sections

Mild Steel Structural Sections. Including mild steel channel, universal beam, universal column and rolled steel joist sections, to AS 3679-300. To the locations and details identified on the drawings and schedules.

Hollow Sections

Hollow Sections. Including rectangular and square sections, to NZS 4848.2. To the locations and details identified on the drawings and schedules.

12.3.8 Aluminium Materials

Proprietary Handrail System

Aluminium Proprietary handrail System. Pre-engineered handrail system, complete with system stanchions, base plates, mounting brackets, rails, bends, end caps, and fixing accessories. Finish as specified. Installed in accordance with the manufacturer's requirements to the locations layout and details identified on the drawings.

See Provista specifications and drawings in the supporting documents

Proprietary Balustrade System

Aluminium Proprietary Balustrade System. Pre-engineered balustrade system, complete with system stanchions, base plates, mounting brackets, rails, bends, end caps, and fixing accessories. Finish as specified. Installed in accordance with the manufacturer's requirements to the locations layout and details identified on the drawings.

See Provista specifications and drawings in the supporting documents

12.3.9 Fastenings & Accessories

Bolts, Nuts & Washers. Selected to suit the mechanical properties and composition of the parent metal. Bolt type, size and finish shall be selected to suit the assembly and construction and the installed location and environment of the fabricated element.

Screws. Including self-tapping screws, self-tapping and machine screws. Selected to suit the mechanical properties and composition of the parent metal. Screw type, head, gauge and length and finish shall be selected to suit the assembly and construction and the installed location and environment of the fabricated element.

Socket Screws. Including cap screws, button head and countersunk socket screws, and grub screws. Selected to suit the mechanical properties and composition of the parent metal. Screw type, head, gauge and length and finish shall be selected to suit the assembly and construction and the installed location and environment of the fabricated element.

Rivets. Including standard blind rivets, multi-grip rivets, bulb-tite rivets, structural rivets and sealed rivets. Selected to suit the mechanical properties and composition of the parent metal. Rivet type, head style, gauge, length and finish shall be selected to suit the assembly and construction and the installed location and environment of the fabricated element.

Masonry Fasteners. Including split drive pins, nail-in anchors, through-bolts, sleeve anchors, masonry screw-bolts, chemical anchors and drop-in anchors. Selected to suit the mechanical properties and composition of the parent metal. Fastener type, diameter, length and finish shall be selected to suit the installation requirements and environment of the fabricated element.

12.3.10 Fabrication & Assembly

General

Ensure that appropriate quality assurance measures are followed during fabrication and assembly of elements.

Check that all materials are free of defects and damage including warping, buckling and fractures prior to manufacture.

All cutting, folding, bending, drilling, welding, grinding and finishing of materials shall be carried out using suitable machinery, tools and equipment and fabrication and finishing techniques in a factory workshop to ensure the accurate fabrication and assembly of elements, without distortion, warp, buckling or fracture, to the dimensions and details shown on the approved contract drawings (shop or otherwise).

Take all measures to protect surfaces of the work that will be visible when complete from marking, scratching and other damage likely to affect the quality, finish and appearance of the element. Remove all burrs and sharp edges and form arrised edges.

Corner joints of identical sections shall be mitred unless shown or specified otherwise.

Mechanical joints shall be tight with no visible gaps. Unless shown or noted otherwise, use countersunk screws to mechanically connect cleats to frames. Mastic seal mechanical joints of externally installed metalwork elements, including all mating surfaces, cleats and other fixtures.

All moving parts shall move freely, without binding, to the required operation, functionality and tolerances when the element is fully assembled and installed.

Carrying out any necessary finishing and cleaning requirements and leave surfaces, edges and joints smooth and free of defects and contaminants to the required completion level and in preparation for any specified coating, treatment or finish.

Prior to dispatch and delivery and where necessary; trail assemble multiple components of a single element to the completed/installed arrangement to ensure proper site assembly, fitting and installation.

Welding - General

All welds shall be shop welds, unless specified as a field weld, and in accordance with the approved For Fabrication and Installation Shop Drawings.

All weld runs shall be as specified and without a concave surface. Welds shall have proper penetration, with all slag deposits removed as work proceeds and when runs are completed. Welds shall be continuous around joints to prevent the ingress of moisture.

All butt welds are to be full penetration unless specified otherwise on the shop drawings. Butt welds shall be ground flush.

Welding of hollow sections shall incorporate internal sections or backing plates as necessary to complete the specified weld.

Open ended hollow sections shall be capped using 3mm material and seal welded, unless shown otherwise on the approved shop drawings.

Properly prepare materials for welding; ensure that all edges to be welded are dry, clean and free of grease, dirt, rust and other contaminants. Grind off any residue or scale from cutting processes prior to welding.

Tack welds shall only be used for temporary attachment where jigging is impractical and only for permanent attachment where specified on the approved shop drawings as an integral component of the fabrication.

Protect surfaces of the work that will be visible when complete from weld splatter and other damage likely to affect the quality, finish and appearance of the element.

Steel Welding Requirements

Welding methods employed for the manufacture of steel metalwork shall be:

- metal-arc welding for mild steel to AS/NZS 1554.1
- projection welding to BS EN 28167:1992
- seam welding to BS EN ISO 16433:2007
- gas welding
- other methods subject to approval by the Architect/Designer.

12.3.11 Finish

Mill Finish Metalwork. Metalwork elements, components, and accessories specified on the drawings and schedules as being Mill Finish shall be untreated and without any applied coating or finish.

Galvanised Metalwork. Metalwork elements, components, and accessories specified on the drawings and schedules as being Galvanised shall be hot-dip galvanised in accordance with AS/NZS 4680.

Galvanising vent holes shall only be as shown on the approved For Fabrication & Installation Shop Drawings and identified as 'Vent Hole'.

Painted Metalwork. Refer to Painting for specification requirements, materials, products, surface preparation and coatings for metalwork elements, components, and accessories specified on the drawings and schedules as being Paint finished. All factory priming and paint coating undertaken by the metalwork manufacturer shall be carried out in strict accordance with the requirements of the Painting specification.

See specifications and drawings in the supporting documents

12.3.12 Installation

Check that all necessary building and finishing works have been carried out and completed and that the metalwork elements can be installed.

Install fixed metalwork elements plumb, level and true to line, and to the required tolerances to the locations, layout and details shown on the drawings. Provide all necessary temporary supports, all fixings and fastenings as specified and as required, and apply any required bedding compounds and sealants in accordance with the drawings. Ensure that fixed elements are secure and properly supported. Do not mark or scratch pre-finished metalwork surfaces.

12.3.13 Completion

Check that the metalwork elements have been fabricated and assembled and finished and installed to the required layout and tolerances as specified and shown on the drawings. Check that fixed elements are secure and correctly fastened. Check that all moving parts move freely and without binding to the required operation, functionality. Check for damage and defects and replace/repair as necessary.

Leave the completed works clean and tidy, and remove all rubbish and excess material from site.

Issue to the Owner a copy of any specific maintenance requirements and any manufacturer specific Product Warranty and Installer Warranty for the installed metalwork elements.

Where necessary, provide all Producer Statements.

13 TILING

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:

3103:1991(NZS)	Specification for sands for mortars and plasters
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
4858:2004(AS/NZS)	Wet area membranes

13.3 Workmanship

13.3.1 Co-operation

Co-operate with the Contractor and other Subcontractors to ensure that substrates are completely appropriate for the tiling required, particularly with regard to concrete surface finish, the use of retarders, release agents or curing compounds, and with regard fixing and finishing of sheet substrates and their support.

13.3.2 Workmanship

Delay tiling to allow maximum curing and settling and initial creep of the substrates, particularly to load bearing structural elements.

All work by competent and experienced tilers. Co-ordinate with other trades and instruct them as necessary to ensure appropriate substrate conditions to assure first class tiling results.

Protect all adjacent surfaces from damage or staining during tiling: arrange any making good or cleaning required as instructed by the Architect/Designer. Wash down and remove form work release agents, slab curing compounds, and surface retarders. Clean down with mould killer, etching agents, or wire brush as required. Grind off high spots if required. Ensure that the moisture content of substrates is appropriate.

Set out tiles as detailed or for even margins with patterns to register in all directions. The finished surfaces shall be true and even and with lines accurate, level and plumb, or to even falls as noted, and finished flush with adjoining work as appropriate. Cut edges to the manufacturers instructions, and stone arris where the cut edges are not concealed under adjoining work.

No retempering of partially set or dried mortar, adhesive or grout. Prior to grouting rake out any excess bedding material. Grout shall be coloured as directed, placed full depth, and finish tooled to a dense, uniform surface. Clean excess grout off tiles and adjacent surfaces.

Form control joints at tiling edges abutting concrete or masonry, within the tiled surface to give a maximum panel dimension of 2m, and over any control joints in the substrate. Rake control joints full depth to the substrate as work proceeds, mask edges and clean out just prior to placing filler, and fill full depth and flush. Clean excess filler off the tiles or other surfaces.

On completion thoroughly clean the full tiled surfaces, and lightly buff where appropriate. Protect finished work from subsequent damage.

No exterior tiling during inclement weather.

13.4 Materials

13.4.1 Materials

All adhesives/beddings/grouts shall be selected for each specific tile/substrate situation, selected as the best readily available, and each is subject to approval by the Architect/Designer (who may require appropriate manufacturers information for consideration prior to approval).

Water, cement, sand and sand particle size grading, all exactly to the relevant NZS requirements.

Crack control joint filler as recommended by the tiles supplier, with the colours selected from the standard range.

Materials shall be from the same batch for even type and colour, and shall be delivered with their packaging and labeling intact.

Store in dry areas, machine mix all materials to the manufacturers requirements, and do not mix proprietary materials.

13.4.2 Tiles/Scope

All tiles true to shape, free of warp, and accurate in dimensions to facilitate laying with minimum joint width. All tiles true to samples and free of imperfections. Tiles from the same batch where possible, and delivered with the original packaging and labeling intact. Tiles handled and stored carefully to preserve edges.

The exact setout will be notified with the tile(s) selection.

14 JOINERY

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:

1491:1996(AS/NZS)	Finger jointed structural timber
1859.1:2004(AS/NZS)	Reconstituted wood-based panels - Specifications - Particleboard
2208:1996(AS/NZS)	Safety glazing materials in buildings
2924.1:1998(AS/NZS)	High pressure decorative laminates - Sheets made from thermosetting resins - Classification and specifications
3601:1987(NZS/BS)	Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes
3602:2003(NZS)	Timber and wood-based products for use in building
3610:1979(NZS)	Specification for profiles of mouldings and joinery
3619:1979(NZS)	Specification for timber windows
3631:1988(NZS)	New Zealand timber grading rules

14.3 Workmanship

14.3.1 Workmanship

All work shall be carried out by or under the direct supervision of competent and experienced joiners in accordance with recognised good trade practice, and shall be carried out in a properly established workshop complete with all mechanical equipment appropriate for the work. All work shall be in strict accordance with the drawings.

Confer with the Main Contractor to check openings sizes, fittings limiting dimensions and available access dimensions (and make provision for site assembly if appropriate). Additional dimensions will be supplied by the Architect/Designer if required.

All items assembled by appropriate joints customarily employed in good quality work. Joints shall be accurately cut, fitted and full surface glued and shall be tongued, mortice and tenon, doweled or housed in preference to scarfed or mitred. Use screws in preference to nails or brads. Install glue blocks in appropriate locations. Unavoidable screw pockets matching buttoned in clear finished work.

The following are unacceptable defects and will most likely result in rejection of cabinets specified for clear finishing:

- a) Scratches, bruises, machine or hammer marks on exposed surfaces;
- b) Glue stains on clear finish specified work;
- c) Iron-on veneers;
- d) Corrugated fasteners and machine staples;
- e) Baseboard showing through veneers through excessive sanding (to remove marks presumably).

14.3.2 Delivery

Brace and / or crate all items as required to prevent distortion or disfigurement during transit.

Arrange for delivery to site, not during inclement weather. Attend upon the carpenter to identify items and instruct in assembly procedures.

15 PAINTING & DECORATING

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:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2009(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards
AS 1580	Methods of test for paints
BRANZ IB 257	Wood primers
NZS 7702	Colours for specific purposes

15.3 General

15.3.1 Alternatives

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

15.3.2 Co-operation

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

15.3.3 Preparation

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

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

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

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

15.3.4 Protection

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

15.3.5 Qualifications

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

15.3.6 Workmanship

Strictly adhere to all Manufacturers' instructions.

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

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

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

15.3.7 General

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

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

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

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

15.3.8 Materials

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

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

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

15.3.9 Completion

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

16 FLOOR COVERINGS

16.1 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.

16.2 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:

1884:1985(NZS/AS)	Floor coverings - Resilient sheet and tiles - Laying and maintenance 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

16.3 Carpet & Resilient Floor Coverings

16.3.1 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.

16.3.2 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.

Manufacturer, brand name & range: See the '4 page' specification

Vinyl Tile

Flexible vinyl tile or plank flooring; polyurethane (PUR) reinforced, to the specified product, size and 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.

Manufacturer, brand name & range: See the '4 page' specification

16.3.3 Trim & Accessories

Naplock Carpet Bar

Naplock carpet bar; to the specified product, material, colour and finish, and size. Installed as an edge finish to stretch-in carpet floor coverings in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

Carpet Transition Strip

Carpet to vinyl/thin resilient flooring transition strip; to the specified product, material, finish and colour, and size. Installed as a transition strip between carpet and thin resilient floor coverings in accordance with the manufacturer's requirements to the locations and details shown on the drawings.

16.3.4 Floor Levelling Compound

Floor levelling compound, as specified. Applied as a surface preparation to uneven floor substrates for subsequent floor covering laying in accordance with the manufacturer's requirements.

16.3.5 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.

16.3.6 Co-operation

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

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

16.3.7 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.

16.3.8 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°C room temperature.

16.3.9 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:

New Particle Board Floors

Check that the particle board sheets have been laid with staggered joints, with joints gapped 1mm - 2mm and supported on all edges on framing members or unsupported T&G jointed long-edges, and is fixed exactly to the particle board manufacturer's recommendations.

Using the specified proprietary levelling compound, repair flush with feathered edges any damaged areas of the particle board floor. Mechanically sand to remove all surface irregularities and contaminants likely to effect the floor covering adhesion. Vacuum clean leaving the surface clean and free of dust and contaminants etc.

Check that all particle board sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.

Check to ensure the particle board moisture content is below 12% for air-conditioned spaces, 14% for

intermittently heated spaces, and 16% for unheated spaces - do not commence laying floor coverings until the particle board is surface-dry and the moisture readings are less than the required moisture level over the entire area.

Location:

Structural Fibre Cement Sheet Floors

Ensure the structural fibre cement flooring sheets have been laid with staggered joints supported on all edges on framing members or unsupported T&G jointed long-edges, and is fixed exactly to the fibre cement sheet manufacturer's recommendations.

Using the specified proprietary levelling compound, repair flush with feathered edges any damaged areas of the structural fibre cement sheet floor. Mechanically sand to remove all surface irregularities and contaminants likely to effect the floor covering adhesion. Vacuum clean leaving the surface clean and free of dust and contaminants etc.

Check that all fibre cement sheet joints are flush and even, and that all fixings are countersunk and filled with a compatible filler.

Check to ensure the fibre cement sheet moisture content is below 12% for air-conditioned spaces, 14% for intermittently heated spaces, and 16% for unheated spaces - do not commence laying floor coverings until the structural fibre cement sheet floor is surface-dry and the moisture readings are less than the required moisture level over the entire area.

Location:

16.3.10 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.

Vinyl Floor Coverings

Install vinyl floor coverings and accessories, including all jointing, in accordance with the manufacturers' recommendations, procedures and techniques (includes heating and temperature settings), and as shown on the drawings.

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

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

Vinyl sheet flooring accurately laid and fitted, and fully bonded to the substrate, and neatly coved, or as noted, at wall and upstand edges, and butterfly mitred where required. All vinyl sheet seams, coving and corner fill-sections thermo-welded with colour-matching rods in continuous seams unless noted otherwise on the drawings. Neatly trim welds and finish smooth and flush with the vinyl sheet. Roll vinyl sheets with a suitably weighted roller as recommended by the manufacturer to ensure maximum adhesion.

Accurately install stair tread nosings and lay pre-cut vinyl sections to each stair tread and riser; pencil coved along the back of the tread and finished neatly into or under the nosing edge as appropriate. Install vinyl skirting, capping and edge trim, transition strips, etc., as noted and detailed on the drawings; all finished straight and level and true to line.

Install vinyl tiles or planks to the required layout pattern from the centre of the space so that the perimeter edges are closed with at least half a tile or plank. Tiles and planks accurately laid true to line and with joints flush and even. Roll tiles with a suitably weighted roller as recommended by the manufacturer to ensure maximum adhesion.

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.

16.3.11 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.

17 PLUMBING

17.1 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.

17.2 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
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3500.1:2003(AS/NZS)	Plumbing and drainage - Water services
3500.2:2003(AS/NZS)	Plumbing and drainage - Sanitary plumbing and drainage
3500.3:2003(AS/NZS)	Plumbing and drainage - Stormwater drainage
3500.4:2003(AS/NZS)	Plumbing and drainage - Part 4: Heated water services
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
4541:2007(NZS)	Automatic fire sprinkler systems
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

4611:1982(NZS)	Non-thermostatic shower mixing valves
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
5103:1973(NZS)	Code of practice for the design, installation and operation of sprinkler irrigation systems
5261:2003(NZS)	Gas installation
5262:2003(NZS)	Gas appliance safety
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 1596	LP gas handling and storage
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC G12	Water Supplies
NZBC G13	Foul Water

17.3 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.

17.4 Workmanship

17.4.1 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.

17.4.2 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.

17.4.3 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.

17.4.4 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.

17.4.5 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.

17.4.6 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.

17.4.7 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.

17.4.8 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.

17.5 Systems

17.5.1 Wastes & Vents

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

Fit bird proof domes to all vents.

17.5.2 Cold Water System

Supply From New Connection to Reticulated Supply

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.

Make complete arrangements for the installation of a new connection to the reticulated supply in the street and the main feed and toby in the position shown. Lay on a 20mm main from the toby along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, protection, backfilling, signal strip etc. to comply with all Supply Authority requirements). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessibly

positioned cleanable in-line sediment and dirt filter.

Primary distribution from the water filter shall be in 20mm piping, reducing to 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).

17.5.3 Hot Water System

Electric Storage High Pressure Hot Water Cylinder

Supply the electric storage high pressure hot water cylinder noted on the drawings and install it where shown. Where appropriate install the cylinder on a safetray, with its drain discharging in a visible location.

Install temperature and pressure relief valves, cold water expansion valves, flow control valves, line strainers, pressure limit valves, and non-return/isolating valves as required to leave the hot water system in full design operational order. Install a tempering valve for each cylinder to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 55°C.

Check that the water pressure is suitable for the cylinders operation, and install PRV's if excessive.

Pressure relief discharges shall be copper and to the exterior in approved positions.

Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.

Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the showers temperature and pressure remain as even as possible.

17.6 Elements

17.6.1 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.

17.6.2 Plumbing Hardware

Allow the below net sum for the supply only of selected plumbing finishing tapware. Take delivery, check for 'perfect' condition, and install exactly in accordance with the manufacturer's recommendations. Check all items for correct operation. The plumber is responsible for the hardware from delivery until Practical completion of the contract.

17.6.3 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 1mm powder coated aluminium unless otherwise noted. Supply the flashings to appropriate trades for building in as work proceeds, with all flashings neatly dressed to substrates.

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.

17.6.4 Appliances

All appliances are exactly identified in the '4 page specification' or 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.

18 DRAINLAYING

18.1 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.

18.2 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
3500.2:2003(AS/NZS)	Plumbing and drainage - Sanitary plumbing and drainage
3500.3:2003(AS/NZS)	Plumbing and drainage - 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

18.3 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.

18.4 Workmanship

18.4.1 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.

18.4.2 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.

18.4.3 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.

18.4.4 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.

18.4.5 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.

18.5 Elements

18.5.1 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.

18.5.2 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.

18.5.3 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).

19 ELECTRICAL

19.1 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.

19.2 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)
3350.2.35:1999(AS/NZS)	Safety of household and similar electrical appliances - Particular requirements - Instantaneous water heaters
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
6104:1981(NZS)	Specification for emergency electricity supply in buildings
AS/NZS 1125	Conductors in insulated electric cables and flexible cords
AS/NZS 2053	Specification for unplasticized PVC conduit and fittings for electrical wiring
AS/NZS 3012	Electrical installations - Construction and demolition sites
AS/NZS 3018	Domestic electrical installations
AS/NZS 3085	Telecommunications installations
AS/NZS 3100	Requirements for electrical apparatus
AS/NZS 3191	PVC insulated flexible cords
AS/NZS 3439	Electrical switchgear and controlgear
AS/NZS 3947	Low-voltage switchgear
AS/NZS 60227	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Flexible cables (cords)
AS/NZS 60598	Luminaires - Particular requirements - Recessed luminaires
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)
NZCEP 54	Recessed luminaires

NZS 1989	Plugs and socket outlets
NZS 6206	Electric meter boxes

19.3 Workmanship

19.3.1 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.

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.

19.3.2 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.

19.3.3 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.

19.3.4 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.

19.4 Systems

19.4.1 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.

19.4.2 Mains

Install a neutral screened 16mm main cable underground (depth, cover/protection, backfilling, signal strip etc. to comply with all relevant regulations) from the grid connection position noted on the Site Plan along the route indicated to the meterboard, positioned where shown on the Floor Plan, and make appropriate arrangements for the grid connection. Install pilot as required. The meterboard shall be metalclad with a meter reading window, recessed maximum depth into the wall and at 2m to the top of the board, with the meters and water heater controllers by the supply company nominated by the Principal. Install all switches and fuses that are necessary. From the meterboard run (route to approval) a neutral screened 16mm main plus controllers etc. to the switchboard.

19.4.3 Control Conductor

50mm² bare copper gradient control Conductor buried 0.5m deep and 1.0m Away from outer edge of foundation Electrically bonded to each units reinforcing in at least 2 locations with Wicon c/70 connectors see supporting Documents and the electrical plans

19.5 Materials & Control

19.5.1 Materials

All materials delivered with packaging and labeling intact. All required incidentals (insulating tape, seals, fixings, etc.) shall be completely appropriate for the application involved. The use of items damaged in any way is subject to approval in each instance.

19.5.2 Switchboard

The switchboard shall be an appropriate size standard PDL DBF series board installed fully recessed where shown and at 2m to the top of the board. Install appropriate sized MCB's for all circuits, including a minimum of two power and one lighting RCDs as required to cover all outlets.

19.6 Elements

19.6.1 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.

19.6.2 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.

19.6.3 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.

19.6.4 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.

- Garage door operating mechanisms.
- wet areas air exhaust fans and ducting as noted - supply and install.
- Hot water cylinders installed complete by the Plumber. Supply and connect.
- Heat pump

Lots 16 - 23 Menin Gate Crescent

ENTERPRISE HOMES LTD - SPECIFICATION SUMMARY

LOCATION: Lots 16 - 23 Menin Gate Crescent
Lounge, Living, Dining, Study Nook, 3 Bedrooms,
WIR, Kitchen, Bathroom, WC, Laundry Area
Single Garage

Lot 16

Living Up 52.5m²
Living Down 54.1m²
Garage – 19.8m²
Total – 126.4m²

Lots 17 - 21

Living Up 52.9m²
Living Down 54.8m²
Garage – 19.8m²
Total – 127.5m²

Lot 22

Living Up 47.8 m²
Living Down 49.7m²
Garage – 19.8m²
Total – 117.3m²

Lot 23

Living Up 32.6m²
Living Down 43.8m²
Garage – 20.5m²
Total – 96.9m²

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Lots 16 - 23 Menin Gate Crescent

FOUNDATIONS & FLOOR

100mm 20MPA concrete slab with Grade 500 SE62 Class 'E' reinforcing mesh and DPC on perimeter and internal foundation beams as per engineers design requirements

FRAMES, TRUSSES and SUBFLOOR

Frames: H1.2 - 90 x 45mm Graded Timber

Trusses: H1.2 - Pinus Radiata Graded Timber

Purlins: H1.2 - 75 x 50mm Graded Timber

Window Reveals: H3.1 – Timber

Subfloor: H1.2 240mm Floor Joists, H1.2 and H3 20mm Laminex Strandfloor

INSULATION

Walls: R 2.6 Fibreglass Insulation (includes garage)

First Floor Ceilings: R 4.0 Fibreglass Insulation

Other: R 4.0 Noise Control Fibreglass Insulation as per plan

INTERIOR LININGS AND FINISH

Walls 10mm Gibraltar Board - 2 coats, paint finish all rooms

Ceilings 13mm Gibraltar Board - 2 coats, paint finish all rooms

Garage Ceiling – 16mm Gib Fyreline - 2 coats, paint finish

Garage Walls – 10mm, 13mm Gib and 16mm Gib Fyreline - 2 coats, paint finish

Fire Wall in garage ceiling space - 16mm Gib Fyreline - plaster only.

Interior doors, window jambs, skirting's painted

INTERIOR DOORS, JAMBS AND SKIRTINGS

Internal Doors – Flush Panel

Gib Grooved Door Jambs

Windsor, Futura Corbel Lever Door Handles

In Wall Slider – WIR Units 16 - 21

MDF Skirting throughout, except treated Pinus Radiata in wet areas

WARDROBES

Bed 3 - 1 x 2 Panel Slider - 2 Gib- board panels

Bed 1 & 3, Unit 22. 1Gib/1 Mirror

Bed 1 Unit 23, 1 Gib/1 Mirror

Shelves - MDF painted

Track Colour: Pearl White

Lots 16 - 23 Menin Gate Crescent

FLOOR COVERINGS

Vinyl Planking – Kitchen, WC, Laundry Areas.

Brand & Colour:

Ceramic Floor Tiles – Bathroom, Entrance Way

Brand & Colour:

Carpet – Lounge, Living, Dining, Bedrooms, Stairway, Nook & Hallway

Brands & Colour

Garage Carpet to all Garages

WINDOW DRESSINGS

Sunscreen blinds in living areas & Blockout blinds in Bedrooms

Colour: TBA

EXTERIOR CLADDING

ACC Panel – plaster finish

Colour: Colour Wattle White

150mm James Hardie Linea Weatherboard

Colour: Men in Black

Soffits: 4.5mm Fibre Cement

ROOFING

Coloursteel – Longrun Corrugate

Colour: Ebony

FASCIA/GUTTER

Coloursteel - Box Type Fascia & Gutter

Colour: Ebony

SPOUTING

Coloursteel - Rectangle Down-Pipes

Colour: Ebony

Lots 16 - 23 Menin Gate Crescent

ALUMINIUM WINDOWS & DOORS

Powder Coated Aluminum Window Suite with Condensation Channels
and 25mm Pinus Radiata Reveals
Double Glazed (including Garage windows)
Colour: Silver Pearl

FRONT DOOR

810mm FLWG Door in Aluminum Frame & Toplight Window Units 16 - 22
Toplight Window – Clear
910mm FLWG Door in Aluminium Frame, Top Glazing Panel Unit 23 Only
Windsor Front Door Hardware – Option 1 – Lever handle

GARAGE DOOR

Painted Steel Sectional Type Door - Dominator
Door Size: 2.4m x 2.1m
Type: Futura – Color: Ebony

KITCHEN JOINERY

Cupboard Joinery and Pantry shelves – White Melamine
Pantry & Cupboard Fronts - Melamine / Melteca 2mm PVC Edge
Bi Fold Pantry Doors
Hardware: TBA
Colour: TBA
Tiled Splashback – Above Hob in Kitchen

KITCHEN SINK & BENCH TOP SURFACE

Bench top - 30mm Granite
Bench top Colour: Absolute Black
Bench Top Edging 30mm square
Sink – Under Mounted Mercer DC202 1 ½ bowls
Sink Mixer – Paffoni Red Stick Mixer

KITCHEN APPLIANCES

Wall Oven: OB60SC5CEX1
Electric Hob Unit: CE604CBX1
Dishwasher: DW60FC2X1
Rangehood: HC90PLX4

Lots 16 - 23 Menin Gate Crescent

MAIN BATHROOM

Englefield Acrylic 1000mm x 1000mm Round Corner Shower with Safety Glass
Door and Easy Clean waste, To All Units
Alpha Slide Chrome Shower Rose
Echo Chrome or Paffoni Red Shower mixer
Bath – Sorrento, Units 16 – 21 Only
900mm Vanity – FR90D2WH
Echo Chrome or Paffoni Red - Vanity and Basin Mixer
900mm x 900mm Mirror
Mirror/Vanity Striplight
1 Row of Tiling above Vanity
5 bar ladder Heated Towel Rail
Heat-lamp/ 2 x Light and Ceiling Extractor Fans
Toilet Pan, Seat and Cistern - Colour White
Toilet Roll Holder

WC, Units 16 – 21 Only

Toilet Pan, Seat and Cistern - Colour White
Toilet Roll Holder
Soho Wall Hung Vanity
500x 900mm Mirror
Manrose CDF225T 125mm vented in line fan (Lots 17 - 21) auto timer

Lots 16 - 23 Menin Gate Crescent

ELECTRICAL

External Power Entry - 1
Mains single phase / Circuit breaker switchboard
Ceiling Downlights LED: 23 internal, 2 external Units 16 – 21
Ceiling Downlights LED: 19 Internal, 2 External Unit 22 Only
Ceiling Downlights LED: 17 Internal, 3 External Unit 23 Only
2x LED Pendant Lights over breakfast bar Units 16 – 21 Only
1x LED Pendant Light over breakfast bar Unit 22 Only
Strip lights over vanity in Bathroom
Heat-lamp/ 2 x Light and Ceiling Extractor Fan (Bathroom)
Two Way Switching: Stairway
Single Heat points – N/A
Double heat points - Total: 19 Units 16 – 22 Only
Double Heat Points- Total: 18 Unit 23 Only
Double Heat Point With USB Port : 6, Units 16 – 21 Only
Double Heat Point With USB Port : 5, Unit 22 Only
Double Heat Point With USB Port : 4, Unit 23 Only
Up/Down Wall Lights: 2 (Use Bulkheads) Units 16 – 22 Only
Up/Down Wall Lights: 1 (Use Bulkheads) Unit 23 Only
Double Light Security Sensor – 1 (right of entrance door)
Night Rate Water Heating
Wiring for Dishwasher
Wiring and Installation of Wall Oven
Wiring for Range Hood
Wiring for Heat Pump
Smoke Alarms: 2

HEATING

Heat Pump in Living Room

SYSTEM & FIBRE OPTIC

1 x Sky TV/Data Outlet – Lounge Room
Wiring for 1 x Satellite dish circuit only
2 x TV/Data Outlets – Living and Bedroom 1
3 x Data/Telephone/Internet Outlets – Bdrm 1, Kitchen, Nook Units 16 – 21 Only
2 x Data/Telephone/Internet Outlets – Bdrm 1 & Kitchen Units 22 & 23 Only
1 x Communications Hub and Fibre Optic Hub - Garage

Lots 16 - 23 Menin Gate Crescent

PLUMBING

Metered Town Supply Water
Tempering valve on hot water supply
Pipes: Cold water & Hot water Polybutylene
Mains Pressure cylinder: 250 Litre
Piping for Dishwasher Install
Plumbing for fridge/ice maker
Chrome Wastes in all sinks
Two Outside Hose Taps

LAUNDRY

1 x Laundry Tub
1 Row Tiling

LANDSCAPING

Driveway & Paths: Exposed Aggregate Concrete (as per plan)
Fencing – Timber on side boundary Fences
Letterbox - with street number
Clothesline