

STRUCTURAL SPECIFICATION
SEISMIC STRENGTHENING
11 JOHNSONVILLE ROAD
FOR
JUDE BEST



12/12/19

Silvester Clark Ltd
Consulting Engineers
153 Thorndon Quay
Wellington

CONTENTS

CONCRETE WORK.....	2
REINFORCING STEEL.....	10
STRUCTURAL STEELWORK	12

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CONCRETE WORK

A GENERAL & CODES

CO 1. GENERAL

Refer to the Conditions of Contract and to the Preliminaries Section which are binding on all sections. Protect from damage the work of the other trades; make good at own expense any such damage to work or material.

CO 2. SCOPE

This section includes supplying, positioning and placing all concrete, formwork, reinforcing and other materials and work necessary for the completion of the concrete work as shown on the drawings or specified herein.

CO 3. STANDARD SPECIFICATIONS

Where any standard specifications are quoted they shall mean the current issue at the time of tendering, and shall include any amendments thereto and any standards in substitution therefore. All materials and workmanship shall comply with the requirements of the following standards as appropriate and shall include other standards also referenced therein:

- NZS 3104: *"Concrete Production – High and Special Grade"*
- NZS 3106: *"Code of Practice for Concrete Structures for the Storage of Liquids"*
- NZS 3109: *"Concrete Construction"*
- NZS 3112: *"Methods of Test for Concrete"*
- NZS 3113: *"Chemical Admixtures for Concrete"*
- NZS 3114: *"Concrete Surface Finishes"*
- NZS 3121: *"Specification for Water and Aggregate for Concrete"*
- NZS 3122: *"Specification for Portland and Blended Cements"*
- AS/NZS 4671: *"Steel Reinforcing Materials"*
- AS/NZS 4672: *"Steel Prestressing Materials"*
- AS/NZS 3679: *"Hot Rolled Bars & Sections"*
- AS/NZS 1554: *"Part 3, Welding of Reinforcing Steel"*
- AS/NZS 4680: *"Hot Dipped Galvanized (zinc) Coatings on Fabricated Ferrous Articles"*
- AS/NZS 2699: *"Part 3, Lintels and Shelf Angles (Durability Requirements)"*

CO 4. SAFETY

The Contractor shall comply fully both on and off site with the provisions of the New Zealand Building Code in all matters relating to construction safety, in particular with approved documents F1 (Hazardous Agents on Site), F2 (Hazardous Building Materials), F4 (Safety from Falling) and F5 (Construction and Demolition Hazards). The Contractor shall at all times comply with the Health and Safety at Work Act 2015 and the Health and Safety in Employment Regulations 2016 and all subsequent amendments.

CO 5. QUALITY ASSURANCE

It is the Contractor's responsibility to ensure that the construction of all concrete complies in all respects with the drawings and specifications. The Contractor's quality assurance procedure should encompass all aspects of the concrete construction, but not necessarily limited to:

- Formwork quality;
- Reinforcing steel placement;
- Cast in items;
- Concrete qualities;
- Concrete finishes; and
- Concrete tolerances.

The Contractor shall advise the Engineer in writing the name of a suitably experienced and qualified person to be responsible for the quality control of the concrete work. The nominated person will be required to complete and sign a written quality control checklist for each on site concrete pour. A copy of each completed checklist is to be provided to the Engineer before pouring and in sufficient time for the Engineer to carry out an inspection. The format and detail of the checklist shall be agreed by the Engineer and Contractor prior to the commencement of work.

Quality standards shall be submitted to the Engineer prior to the commencement of work.

CO 6. INSPECTION

The Engineer shall be given at least 48 hours notice prior to any concrete pour. Should the Engineer be required to make additional visits to the site due to some elements not being ready for inspection, then the Engineer will, at their discretion, charge the Contractor for such additional inspections at standard hourly rates that will include travel, inspection and reporting time.

CO 7. TESTS

Control tests shall be made by the concrete supplier in accordance with NZS 3104; the cost for such tests will be by the concrete supplier. Tests at the site will be at the discretion of the Engineer and will be undertaken by the concrete supplier and made available to the Engineer.

Allowance will be provided for the making of four (4) test cylinders at random for each pour of concrete on site. These tests are in addition to those required by NZS 3104; one cylinder is to be broken at seven (7) days and the remaining cylinders at 28 days. The results of these tests shall be made available to the Engineer.

Delivery dockets and other certified records of concrete quality and quantity shall be kept on site and made available on request for the Engineer.

CO 8. RECORD OF CONCRETE POURS

The Contractor shall keep a daily record of the concrete poured, recording the location and extent of each pour. The position of the concrete placed shall also be defined on the working drawings, together with the positions from which concrete

samples are taken so that, in the event of a test indicating unsatisfactory results, the position of the concrete in question will be known.

CO 9. CONCRETE

All concrete, apart from “no fines”, shall be Special Grade as defined in NZS 3109 from an approved Ready Mix Plant. The maximum aggregate size shall be 20mm unless specified otherwise. Calcium chloride hardener shall not be used. Concrete shall have the following strengths at 28 days. Note strengths noted here supersede those noted on the first page of this section in the specification.

Blinding Concrete	10MPa
Foundation pads and strip footings	30MPa

CO 10. WORK FOR OTHER TRADES

Build in fillets, cast in fastenings, bolts, sleeves and form all holes, recesses and chases as required by other trades and as shown on the drawings or as described in this specification.

CO 11. REJECTION OF CONCRETE

Concrete may be rejected by the Engineer for any failure to comply with this specification, including where the appearance of the concrete in place shows, in the opinion of the Engineer, that it does not comply with this specification.

CO 12. NOTICE

Provide a minimum of 48 hours notice prior to pouring to allow inspection of the work.

B MATERIALS

CO 13. COMPLIANCE

All materials shall comply with the requirements of the relevant standard specifications.

CO 14. CONCRETE WORK

Concrete work shall comply with the requirements of NZS 3109:1997 including all standards referred to therein. A copy of NZS 3109:1997 shall be available on site at all times. No additives shall be used without prior approval of the Engineer except as stated herein.

CO 15. CONCRETE SUPPLY

All concrete shall be ready mixed Special grade concrete produced by a graded concrete plant. Concrete production shall comply with the requirements of NZS 3104. If requested copies of the concrete mix design and evidence of the production plant's current grading shall be provided.

Mix design for the concrete slabs on grade shall incorporate measures to reduce the shrinkage of the finished slabs in place. The mix design shall consider:

- water/cement ratio
- slump and water content
- cement content
- sand grading and percentage of sand
- special aggregate grading to achieve a high stone content
- the use of superplasticisers or other admixtures to reduce the water/cement ratio.

CO 16. REINFORCEMENT

Reinforcement generally to be as required by NZS 3109:1997.

Grade 300 shall comply with AS/NZS 4671 Grade 300E. Plain round bars are shown by the symbol “R” and deformed bars are shown by the symbol “D”, both followed by the diameter in millimetres.

Grade 500 steel bars shall comply with AS/NZS 4671 Grade 500E. Plain round bars are shown by the symbol “YR” and deformed bars are shown by the symbol “Y”, both followed by the diameter in millimetres.

Steel mesh shall comply with AS/4671.

All reinforcing, unless specifically shown otherwise on the drawings, is to be free of scale, loose rust, oil and grease at the time concrete is placed.

If so requested by the Engineer, test certificates for the reinforcing shall be supplied showing the origin, manufacture and compliance with the standards referred to herein.

Reinforcing shall be cold bent to radii as set out in the relevant New Zealand standards and shall **not be re-bent** except as instructed by the Engineer. Hot bending shall not be permitted except under the direct supervision of the Engineer.

CO 17. FORMWORK

Formwork shall conform to NZS 3109. The Contractor shall be responsible for the sufficiency of the formwork and its supports.

Fairfaced formwork shall be so constructed as to provide straight and true angles and to produce cast surfaces within a tolerance of 5mm on the given dimensions and without visible offsets, bulges or misalignment of the concrete.

Steel formwork shall be used where specified or appropriate with all joints welded and ground smooth and flush. All internal corners shall be formed by folding the steel not butting.

Where formwork is used below ground level, the Contractor shall allow for its removal and the backfilling of the ground between the ground and the concrete. Where portions of a concrete element adjoin sashes, etc, they shall be boxed to form a rebate. Any rebate shall not decrease specified cover to reinforcing or the dimensions given on the Engineer’s drawing for the relevant concrete element.

Where upper floors, etc are propped/supported off lower levels, the design and removal of this formwork shall be submitted to the Engineer for review. The design of supporting formwork should be by a Chartered Engineer.

Formwork to be reused shall have its surface thoroughly cleaned and any damage made good before being used again.

All ties and spreaders shall be of an approved type and placed so as to leave a regular and neat pattern. There should be a minimum between ties and the surface of the concrete.

Stripping times shall be as specified in NZS 3109.

CO 18. POLYTHENE DAMP PROOF COURSE

Allow to supply and lay Moistop or Dampguard DPC (unless other material is shown on the drawings) over sand blinding under all concrete slabs on grade. Joint DPC as necessary in accordance with the manufacturer's recommendations. Turn DPC up or down against foundations, walls and columns as appropriate and adequately seal around protrusions and service pipes to ensure the waterproofness of the complete membrane.

C WORKMANSHIP

CO 19. COMPLIANCE

All workmanship shall comply with the requirements of the relevant standard specifications.

CO 20. SURFACE FINISH – FORMED SURFACES

All surface finishes shall comply with the requirements of NZS 3114:1987 as specified hereunder.

F1 Surfaces not exposed to view

F5 Surfaces exposed to view

No repair work shall be carried out without prior acceptance of proposed methods by the Engineer.

CO 21. FORMWORK RELEASE AGENTS

Use the same type and brand throughout the entire area of any one finish. Apply evenly and using the minimum amount to ensure a clean release. The Contractor is responsible for ensuring the compatibility of the form release agent used with any subsequent finishes to be applied to the surface.

On no account may any release agent come into contact with any reinforcing; should this occur the Engineer is to be immediately advised and the forms removed and the reinforcing cleaned of all release agent before the forms are replaced.

Notwithstanding the requirements of this clause, the responsibility for the removal of formwork without damage to the required finishes remains with the Contractor.

CO 22. HOLES, REBATES AND CHASES

Construct all holes, rebates or chases shown on the structural drawings. Check all trades for any holes, rebates or chases required by those trades and advise the Engineer if such holes, rebates or chases are not shown on the drawings. Holes may be drilled into cover concrete for fixing of finishings provided that the depth of the holes is no greater than the cover concrete of the member.

Any holes for fixings shown on the drawings are to be noted by the Contractor and the reinforcing checked for clashes prior to concrete being poured. In the event of any drilled fixing clashing with reinforcing, then the Engineer shall be advised and any cost of meeting the Engineer's requirements shall be borne by the Contractor.

In the event of holes being required in poured concrete which are not shown on the drawings, the Contractor shall drill a pilot holes to determine if there is a reinforcing clash, and, if such a clash is detected, shall follow the Engineer's instructions. On no account, drill or cast any holes, rebates or chases not shown on the drawings without prior instruction from the Engineer.

CO 23. SURFACE FINISH – UNFORMED FINISHED SURFACE

All concrete finishes shall be in accordance with NZS 3114 unless specified herein. The concrete shall be compacted thoroughly by vibrators and by working with approved tools and a slight excess shall be struck off with a screed. While the concrete is still plastic, the Contractor shall take steps to correct any irregularities so that the finished surface meets the requirements. No "driers" may be used in finishing the slabs.

Where falls are shown or specified, the surface shall be puddle free. A level shall be used while concrete is being poured to ensure that slabs are finished to correct levels. Final screeding shall be carried out in two directions at right angles.

Concrete surfaces which do not meet with the requirements shall be ground mechanically to the Engineer's approval. Great care shall be taken to obtain a proper surface finish; the slab being finished by skilled and experienced finishers to comply, unless otherwise directed, with the following requirements of NZS 3114:

- U1 Surface not exposed to view, tops of foundations, etc
- U3 Floor surfaces and other surfaces exposed to view

CO 24. PLACING OF CONCRETE

Concrete is to be placed while still plastic enough to achieve full compaction. Place concrete in one continuous operation up to formwork and construction joints. Place directly into corners and crevices. The depth of each layer of pour is not to exceed 500mm and the concrete should be placed so as to avoid lateral flows of greater than 750mm.

Concrete shall not be dropped in free fall through more than two (2) metres. Compact by mechanical vibration with vibrators penetrating any previous layer of unhardened concrete and then being slowly withdrawn.

CO 25. TOLERANCES – IN SITU CONCRETE

All concrete members shall be of the sizes shown or specified and comply with the tolerances specified in Table 5.2 NZS 3109. No variations will be considered for alterations to cast-in plates, inserts and the like outside the tolerances specified.

Concrete surface variations and irregularities shall comply with the requirements for the applicable finish as specified in NZS 3114.

CO 26. PLACING AND FASTENING OF REINFORCEMENT

Reinforcement to be as required by NZS 3109 unless otherwise shown on the drawings. Whether shown on the drawings or not, the Contractor shall allow for and provide sufficient supporting rods or other aids to hold the steel in its correct position until the concrete is able to do so. In any case, no extras will be recognised for placing and holding the steel accurately and firmly with covers as shown or specified. No boxing which would interfere with accurate fastening of the reinforcement shall be fixed in position until the steel is firmly fixed.

No reinforcing shall be placed so as to come into contact with non-ferrous metals.

Any free ends of partially embedded reinforcing shall be well braced to prevent movement at the embedded end.

No welding of any reinforcing shall take place except as shown on the drawings or otherwise permitted by express instruction of the Engineer.

The placing of any concrete shall not commence until the fixing of the reinforcement has been approved by the Engineer. Concrete placed in violation of this shall be liable to rejection and removal.

During concreting, at least one competent employee shall be in attendance to re-support or fix any rods displaced from correct cover due to concreting operations. The Contractor shall also make provision for workmen to reach any position of the work without damaging or displacing the reinforcing.

CO 27. TOLERANCES

Supply bars to comply with the following tolerances:

Cut length: Not less than the dimension shown on the drawings.

Splice length: Not less than the dimension shown on the drawings.

Splice position: Within 100 mm of the location shown on the drawing.

CO 28. COVER

All rods shall have the cover shown on the drawings but where the cover is not specifically mentioned, it shall be in accordance with the values given in NZS 3109. Concrete cover shall not be reduced where the concrete is to be plastered. Tolerances in covers shall be: -0mm +10mm, except for slabs which shall be -0mm +3mm.

CO 29. CURING

Ensure that slabs are covered and cured as soon as possible after concreting. On no account shall the surface be allowed to dry out. Curing shall continue for at least seven (7) days.

If a curing compound is used then the Contractor shall ensure that it is compatible with any subsequent floor finishes, coverings or adhesives. Curing by water shall not be used in freezing conditions.

REINFORCING STEEL

A GENERAL & CODES

RE 1. GENERAL

Refer to the Conditions of Contract and Preliminary and General Clauses which shall apply to this section of the Contract.

RE 2. SCOPE

This section deals with the supply and fixing in place of the reinforcement for all cast in-situ work and reinforced masonry.

RE 3. SAFETY.

The Contractor shall comply fully both on and off site with the provisions of the New Zealand Building Code in all matters relating to construction safety, in particular with approved documents F1 (Hazardous Agents on Site), F2 (Hazardous Building Materials), F4 (Safety from Falling) and F5 (Construction and Demolition Hazards). The Contractor shall at all times comply with the Health and Safety at Work Act 2015 and the Health and Safety in Employment Regulations 2016 and all subsequent amendments.

B MATERIALS

RE 4. MATERIALS

Reinforcement generally to be as required by NZS 3109.

Grade 300 Steel Bars shall comply with AS/NZS 3679.1: Grade 300 or AS /NZS 4671 grade 300E. Plain round bars are shown by the symbol "R" and deformed bars are shown by the symbol "D", both followed by the diameter in millimetres.

Grade 500 Steel Bars shall comply with AS/NZS 4671 Grade 500E. Plain round bars are shown by the symbol "YR" and deformed bars are shown by the symbol "Y", both followed by the diameter in millimetres.

Steel mesh shall comply with AS/NZS 4671.

All reinforcing, unless specifically shown otherwise on the drawings, is to be free of scale, loose rust, oil and grease at the time concrete is placed.

If so requested by the Engineer, test certificates for reinforcing shall be supplied showing origin, manufacturer and compliance with standards referred to herein.

Test certificates for all reinforcing mesh and loose bars variations applicable to the project shall be provided to the engineer for review prior to the first concrete pour.

Reinforcing shall be cold bent to radii as set out in the relevant NZ standards, and shall not be rebent except as instructed by the Engineer. Hot bending shall not be permitted except under the direct supervision of the Engineer.

RE 5. ACCESSORIES

The Contractor shall allow for and provide sufficient supporting rods or other aids to hold the steel in its correct position until the concrete is able to do so. In any case, no extras will be recognised for placing and holding the steel accurately and firmly with covers as shown or specified.

C WORKMANSHIP

RE 6. FIXING

Fix bars with approved spacers to ensure that bars remain securely fixed in place until after concrete is placed. Do not weld any bars without approval in writing from the Engineer. All bars are to be fixed in place to give covers shown on the drawings or, where not specifically shown, to comply with the requirements of NZS 3109.

RE 7. TOLERANCES

1. Supply bars to comply with the following tolerances:
2. Cut length: Not less than the dimension shown on the drawings.
3. Splice length: Not less than the dimension shown on the drawings.
4. Splice position: Within 100 mm of the location shown on the drawing.

STRUCTURAL STEELWORK

A GENERAL & CODES

ST 1. GENERAL

Refer to the Conditions of Contract and to the Preliminaries Section which are binding on all sections. Protect from damage the work of the other trades; make good at own expense any such damage to work or material.

ST 2. STANDARD SPECIFICATIONS

Where any standard specifications are quoted they shall mean the current issue at time of tendering, and shall include any amendments thereto and any standards in substitution therefore.

All materials and workmanship shall comply with the following standards as appropriate contained in New Zealand or Australian Steels:

- AS/NZS 1163: *"Structural Steel Hollow Sections"*
- AS/NZS 1594: *"Hot-rolled Steel Flat Products"*
- AS/NZS 3678: *"Structural Steel – Hot-rolled Plates, Floorplates and Slabs"*
- AS/NZS 3679: *"Part 1: Hot-rolled Bars and Sections"*
"Part 2: Welded I-sections"
- NZS 3404: *"Steel Structures Standard"*
- AS/NZS 1252: *"High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering"*
- AS/NZS 1553: *"Covered Electrodes for Welding"*
- AS/NZS 1554: *"Part 1: Welding of Steel Structures"*
"Part 4: Welding of High Strength Quenched and Tempered Steels"
- AS/NZS 1559: *"Hot Dipped Galvanised Steel Bolts with Associated Nuts and Washers"*
- AS/NZS 2312: *"Guide to the Protection of Structural Steel Against Atmospheric Corrosion By the Use of Protective Coatings"*
- AS/NZS 3750: *"Paints for Steel Structures"*
- AS/NZS 4680: *"Hot-dipped Galvanised (zinc) Coatings on Fabricated Ferrous Articles"*
- AS 1418: *"Cranes, Hoists and Winches. Part 1, General Requirements"*
- NZS 4711: *"Qualification Tests for Metal-arc Welders"*

ST 3. SAFETY

The Contractor shall comply fully both on and off site with the provisions of the New Zealand Building Code in all matters relating to construction safety, in particular with approved documents F1 (Hazardous Agents on Site), F2 (Hazardous Building Materials), F4 (Safety from Falling) and F5 (Construction and Demolition Hazards). The Contractor shall at all times comply with the Health and Safety at Work Act 2015 and the Health and Safety in Employment Regulations 2016 and all subsequent amendments.

ST 4. TESTS

Tests of welds may be required by the Engineer to be carried out on any welds. In the event of such tests being ordered, and all welds being found to be satisfactory, then the costs of such tests shall be paid for as an extra to the contract. In the event of any welds not being approved as satisfactory, then the costs of the initial tests and of any subsequent testing whatsoever shall be borne by the structural steel subcontractor.

As a minimum, all welds shall be subject to 100% visual inspection in accordance with AS/NZS 1554.1.

ST 5. INSPECTION

The Engineer, or his representative, shall have access to the work at all reasonable times, and facilities shall be provided to enable him to inspect any part or stage of the work.

ST 6. WELDING SYMBOLS

Welding symbols used on the drawings are generally in accordance with NZS 5902 Part 2, Amendment No. 2.

B MATERIALS

ST 7. COMPLIANCE

All materials shall comply with the requirements of the relevant standard specifications.

Steel from other than New Zealand, Australian or British sources is unacceptable without prior approval. If requested, copies of the steel manufacturer's mill test certificates shall be provided.

ST 8. BORON CONTENT

The contractor is to submit for approval, by the structural engineer, documentation from the steel mill that indicates the boron content that will be in the steel provided. This documentation is to be included with the tender documents or prior to ordering steel work.

The contractor may not use steel obtained from another mill without approval from the structural engineer.

ST 9. BOLTS

All bolts shall be Grade 8.8. The tightening of the Grade 8.8 bolts shall be in accordance with Hera Connections document R100 Part 2.

ST 10. PAINTING SYSTEMS

Surface preparation and pretreatment of steel surfaces to be painted shall comply with the requirements of *** “Metal Finishing – Preparation and Pretreatment of Surfaces”. All painting systems are to be by one manufacturer. The following system is approved for general use:

Primer - interior (dry) steelwork Carboguard 504

C WORKMANSHIP

ST 11. COMPLIANCE

All workmanship shall comply with the requirements of the relevant standard specifications.

ST 12. FABRICATION

Check all dimensions on site before fabricating any part. Read the entire drawings to ensure all fixings have been provided for.

The steelwork shall be accurately fabricated so that all parts fit truly on assembly.

All similar parts shall be interchangeable. Fabrication shall be carried out in accordance with NZS 3404. All bolts shall be of such length that the threaded portion does not extend within the parts bolted, and washers shall be used to prevent the nuts from binding at the bottom of the threads.

If the structural steel subcontractor wishes to provide any additional splices other than those shown on the drawings to suit stock lengths or to suit preferred erection methods, such splices shall be full strength double vee butt welded and in any event the locations of any such proposed splices shall be submitted to the Engineer for approval prior to commencing work.

Radius sharp edges to a minimum 2mm radius.

ST 13. TOLERANCES

Unless otherwise stated on the drawings, all steel members shall be straight and free from twist. No surface shall deviate from a straight plane by more than 1mm over any 100mm and by more than 6mm overall. Any work required to straighten steel to comply with this requirement shall be carried out only after the approval of the Engineer and at the steelwork contractor's cost.

ST 14. WELDING

All welding shall be in accordance with sound modern practices and shall be in accordance with AS/NZS 1554 and shall be carried out by competent welders holding a certificate in accordance with the requirements of NZS 4711.

All burrs and sharp arises shall be removed by grinding prior to welding commencing.

All hollow sections are to be sealed by a continuous seal weld all around.

The surfaces to be welded, and the surrounding material for a distance of at least 12mm from the prospective weld, shall be free from scale, dirt, grease, heavy rust, paint, or other surface deposit. Shearing, chipping, machining or machine gas cutting may cut fusion faces. Hand gas cutting may be substituted for machine gas cutting if the latter is impracticable and in such cases the cutter must be adequately guided so that the cut specified is clean and uniform. If the fusion face is rough, it shall be dressed by chipping, grinding and filling to the satisfaction of the Engineer. The gap between steel parts to be welded, and the form of fusion, shall be as shown on the drawings. The steel parts to be welded shall be held securely in their relative position during welding.

Welding, other than track welding, may not be performed before the Engineer has been advised that the welds are ready for inspection and has, if he so chooses, inspected and improved the members prepared and tacked ready for welding. The Contractor shall prepare welds in groups as large as reasonably possible, and not less than 12 welds, for the Engineer's inspection at any one visit. The Engineer may require welds done in contravention of this clause, to be cut open for inspection, X-rayed or otherwise tested. Such work, and the making good therefore, shall be done at the Contractor's expense.

All slag shall be removed after making each welding run by light hammering and wire brushing, or by other approved methods.

The sequence of welding shall be such that distortion is minimised and any unavoidable distortion shall be corrected. The plant and operation thereof shall be such so as to ensure that:

- (a) welds will be of good, clean metal, uniformly and continuously deposited; and
- (b) the surface of the weld will have an even contour and the regular finish indicating adequate fusion with the parent metal. All joints are to be sealed by welding.

Welds showing more than minor undercutting will not be accepted, but must be made good to the satisfaction of the Engineer. Welds which show cavities, or incomplete fusion, shall be cut out and shall be re-welded to the satisfaction of the Engineer.

Where the thickness of steel differs at butted joints by more than 1.5mm, the thicker side is to be ground to a one in 12 taper to match the thinner side.

The Contractor shall employ a competent welding supervisor or charge hand to ensure that the standard of workmanship and the quality of materials comply with this specification. The Engineer may, at his discretion, require test specimens to be made by each or any welder employed on the work. Such specimens are to be tested by an independent authority. All costs of such tests are to be borne by the Contractor.

Nelson studs shall be welded using purpose-made plant. Studs shall be welded to beams through the metal decking unless detailed otherwise.

ST 15. HOLES

Make all bolted connections in accordance with NZS 3404.

All holes in material greater in thickness than 16mm are to be drilled. Flame cutting of holes is forbidden. Holes shall be of diameter no greater than 2mm larger than the bolt diameter unless otherwise shown.

No holes shall be distorted or enlarged on site without prior notification and inspection by the Engineer.

ST 16. BOLTING

All snug tight bolts shall be installed with tapered washers when bearing on bevelled surfaces. The threaded portion of a bolt shall project through both ends of the nut by at least one thread after being tightened. The joined parts shall be firmly drawn together.

ST 17. STAGING, ETC

The Contractor shall provide staging and protection, as may be necessary, to enable the welders to perform properly and safely the welding operation.

ST 18. ERECTION

Care shall be taken to ensure that the fabricated sections are not overstrained in handling and that they are adequately braced and supported during site welding. The Engineer may require a sequence of erection to be submitted for approval. Such approval shall not relieve the Contractor of the responsibility for the true and accurate erection of the works.

The whole of the steelwork shall be finished true to line and level in a workmanlike manner. Any erection cleats are to be removed and holes filled with weld, then ground to a smooth, even surface.

ST 19. DRY PACKING

All spaces between base plates or wall plates and concrete work shall be filled with approved dry packing or non-shrink grout, unless shown otherwise on the drawings. This dry pack mortar shall be hammered in tight to completely fill the space.

ST 20. COOPERATION WITH CONCRETER

Steelworker shall check all concrete and fixing dimensions on the site before fabricating any steelwork affected by these dimensions.

ST 21. CLEANING

Before painting, all surfaces shall be free of oil and grease and then abrasive blast cleaned to AS 1627 Part 4 Class 2½. All surfaces must be clean and dry immediately before the application of the paint. Surfaces to be surrounded by concrete shall remain unpainted.

ST 22. PRIMING

Surfaces to be covered with concrete are to be primed only to a depth of 25mm below concrete surface.

Ensuring that the surface is properly cleaned, apply by airless spray, conventional spray, brush or roller, one coat of primer to a dry film thickness as recommended by the manufacturer. Leave unpainted 75mm either side of all areas where on-site welding is required, and leave for 48 hours to harden before transporting to site. All site contamination must be removed by suitable means after erection.

Damaged and on-site welded areas (including transport and erection damage) must be power tool disc prepared and patch primed with one coat of the same primer. This is to be applied at a sufficient rate to bring this coating to its original thickness. Black bolts, nuts and washers must be degreased before coating. See under the Painting specification for any finishing coats.

ST 23. SHOP DRAWINGS

Shop drawings will be required and, before fabrication is commenced, two copies of these drawings shall be submitted to the Engineer for review.

These drawings shall provide complete details of each assembly in the steelwork, together with all information relative to their fabrication, surface treatment and erection. Each component and connection shall show the relevant work points. The review of shop drawings by the Engineer and permission to fabricate shall not relieve the Contractor of his responsibility for the accuracy of these drawings and for the correctness of the fabrication, setting out and erection of the steelwork. The cost of rectifying any errors shall be at the Contractor's sole expense. Two sets of the as-built drawings shall be provided to the Engineer.

ST 24. PRODUCER STATEMENTS

When the work is complete, the Contractor shall furnish a fully completed Producer Statement covering the work completed under this section of the specification. This Producer Statement does not relieve the Contractor of any responsibility in respect of the full completion and maintenance of the works.



DISCLOSURE STATEMENT

1. The following information has been supplied to Capital Commercial (2013) Limited ("Bayleys") to be made available for distribution on the vendor's behalf to potential purchasers to assist purchasers with their due diligence and to use at the purchaser's discretion.
2. Bayleys and the Vendor do not warrant the accuracy or completeness of the information and recommends that all recipients undertake their own due diligence, obtain their own reports to their satisfaction and seek independent advice prior to committing to purchaser.