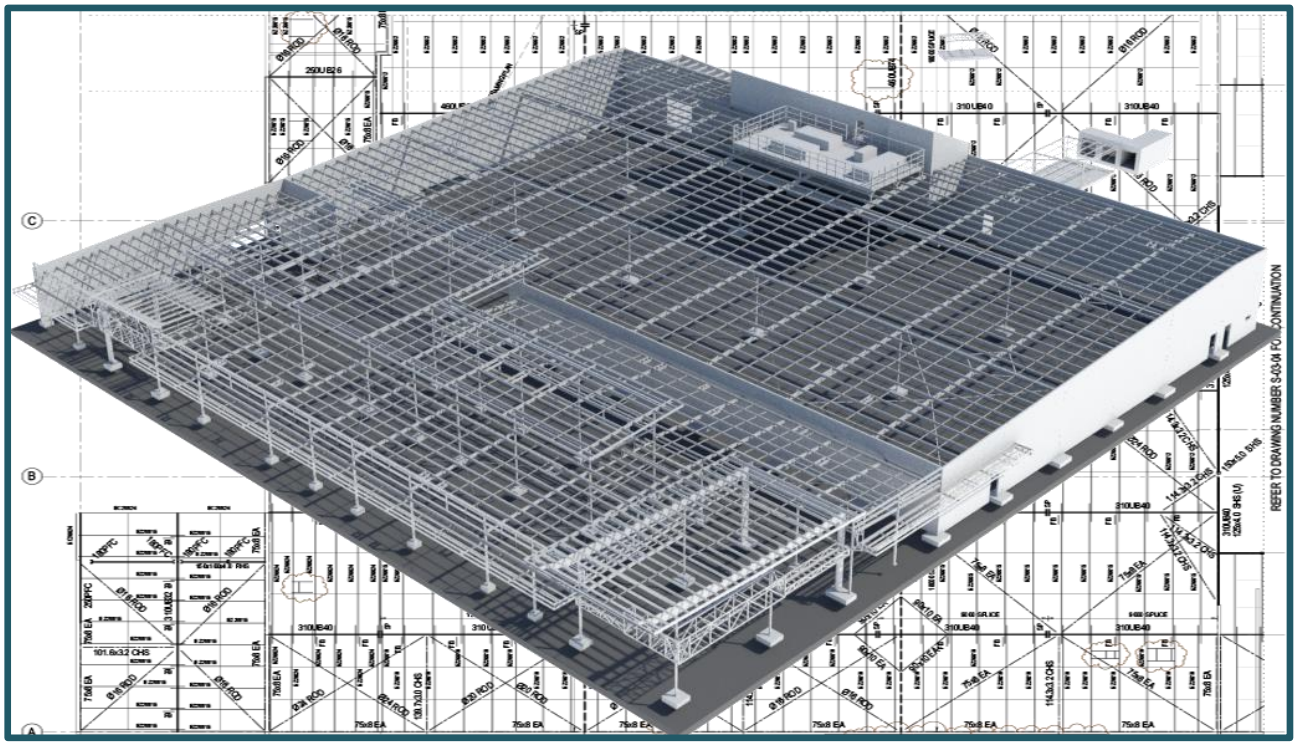
AUSTRALIAN STEEL INSTITUTE

ASI

Structural Steelwork Standard Drawing Notes



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FOREWORD

The ASI structural steelwork 'Standard drawing notes' (SDN) have been developed and configured to align with the new ASI 'National Structural Steelwork Specification' (NSSS). The drawing notes and the NSSS have been configured to be applicable to general structural steel framing for buildings and structures. In combination, the SDN and NSSS are intended to be the implementation tools used to embed the requirements defined in the recently published new Australian Standard AS/NZS 5131 'Structural steelwork – Fabrication and erection' into engineering and steelwork procurement practice in Australia.

The intent of the SDN and NSSS is to standardise the development of structural steelwork related project requirements across Australia, which will significantly improve efficiencies in project delivery, cost, quality, compliance and long term value. In combination with the ASI 'National Structural Steelwork Compliance Scheme' (NSSCS) and contingent certification of fabricators, our community can expect risk minimised, fit-for-purpose, value engineered outcomes for structural steelwork projects in Australia.

Scope

This SDN and NSSS cover, and are strongly aligned to, the scope in AS/NZS 5131. They therefore address areas including materials used for fabrication, cutting, holing, shaping, welding, bolting, surface preparation, corrosion protection, shop assembly, handling, transport and erection. They also include recognition of the particular requirements in AS/NZS 5131 for architecturally exposed structural steel (AESS) and cold formed purlins and girts used in conjunction with structural steelwork.

Structure of this document

This document is structured largely in a similar fashion to the NSSS, which should be referenced for background understanding. However, in comparison to the NSSS, these drawing notes do not explicitly document all of the 'particular requirements' noted in the NSSS and covered in AS/NZS 5131. Items covered in the SDN are restricted to what are considered the default or most common fabrication and erection aspects, including those project-specific selections that are mandatory in AS/NZS 5131.

Accordingly, it is very important that users inform themselves fully on what has not been included in the SDN, and understand where it may be necessary to add additional requirements for the project-specific drawing notes. Comparison with the NSSS provides a convenient approach to do this.

Using this document

It is expected the Standard Drawing Notes will be used essentially 'as is' in the following way:

1. The user should delete the informative commentary and user instructions and input any mandatory or optional 'particular requirements' needed for the specific project (from Sections 6 to 14 of the NSSS) into Section 5 of this document.
2. Section 1 of this document should be incorporated into the relevant area of the user's existing drawing notes.
3. Sections 2, 3 and 4 of this document are designed to replace the user's existing drawing notes for structural steelwork fabrication, erection and testing/inspection respectively.
4. Appendix A provides guidance on the basis for the default paint system selection. Users should inform themselves fully before selecting an appropriate paint system.
5. Appendix B provides a selection of potential additional clauses that might be appropriate for specific projects. Users may select these and incorporate into Sections 2, 3 and 4 as needed.

Informative material is included in a green text box thus:

This is informative material and should be deleted in the final project specification

Instructions to the user to add relevant material are shown thus: *[Add itemized list defining scope]* and should be deleted from the final project drawing notes.

The term ‘specifier’ is used within the context of the informative notes. Depending on the structure of the contract, this entity may be the engineer, the architect, a specifier, the client or other appropriate responsible party.

Additional items not covered

There are a number of additional related items not covered in these drawing notes that should be covered elsewhere in the project drawing notes, including:

- Details of any environmental rating tool applicable
- Site safety
- Safety in design
- Environmental sustainability in design
- Corrosion environment and atmospheric corrosivity category.

ASI STRUCTURAL STEELWORK STANDARD DRAWING NOTES

1.0 GENERAL

1.1 Construction Category

In accordance with the requirements of AS/NZS 5131 the Construction Categories for this project are defined in the table below:

	Element	Importance Level	Service Category	Fabrication Category	Construction Category
1	All structural steelwork UNO.	IL2	SC1	FC1	**CC2**
2	*[Provide a list of drawings, components or assemblies where a different CC to above is required]*	*[IL2]*	*[SC2]*	*[FC1]*	***[CC3]***

In accordance with the requirements of AS/NZS 5131, a Construction Category or Categories shall be assigned to the structure described by the scope of work. Construction Categories (CC1 to CC4) may apply to the whole of the structure, to a part of the structure or to specific details. A structure can include several Construction Categories.

Guidance on the calculation of the Construction Category can be found in Appendix C of AS/NZS 5131 and is based on the 'Importance Level' (IL), the 'Service Category' (SC) and the 'Fabrication Category' (FC).

See also ASI TN011 'AS/NZS 5131 Structural steelwork – Fabrication and erection: Implementation guide for engineers, specifiers and procurers' for further details.

1.2 Treatment grades

Unless noted otherwise in the Project Drawings, for the elements on this project, the treatment grades according to AS/NZS 5131 shall be:

	Element	Treatment grade
1	All painted structural steelwork UNO.	P2
2	*[Provide a list of drawings, components or assemblies which are intended to be painted where a different treatment grade to above applies]*	*[P3]*

Treatment grades (P1 to P3 in AS/NZS 2312 and AS/NZS 5131) are related to the expected life of the corrosion protection and may be related to the type of corrosion protection system used in a particular area of the structure. Refer to Clause 9.8.4 of AS/NZS 5131 for a definition of the treatment grades.

Treatment grades may apply to the whole structure or to a part of the structure or to specific details. A structure can include several treatment grades. A detail or group of details will normally be ascribed one treatment grade.

Refer ASI 'Australian steelwork corrosion and coatings guide' or ISO 8501-3 for more information.

Notes:

1. Unless AESS is required, surface preparation to treatment grades is not necessary for galvanized products.
2. The galvanized surface will require surface preparation if it is to be painted after galvanizing. Surface preparation options after galvanizing are provided in AS/NZS 2312.2.
3. Intumescent coatings may require specific surface preparation and assessment for compatibility with corrosion protection systems. The specifier should review manufacturer data in this regard.

1.3 Coating Quality Level

The Coating Quality Level assessed according to AS/NZS 5131 shall be as given in the table below.

Item	Coating Quality Level (PC1, PC2)

The Coating Quality Level (PC1 or PC2) is a function of the corrosion category and type of preparation. Clause 9.2.1 of AS/NZS 5131 provides guidance on assessment of the Coating Quality Level.

2.0 STRUCTURAL STEELWORK FABRICATION

2.1 Workmanship and quality

All structural steelwork shall be fabricated in accordance with AS/NZS 5131.

All work on this project shall be undertaken by competent personnel. Requirements and examples of qualifications for competent personnel are contained in AS/NZS 5131.

Steelwork shall be fabricated by fabricators certified under the ASI 'National Structural Steelwork Compliance Scheme' (NSSCS) (see http://www.scacompliance.com.au/).

Third-party certification of steel and steelwork is not mandated in AS/NZS 5131, as this is against Standards drafting rules. However, ASI strongly recommends that in the present procurement environment, third-party construction product certification provides necessary surety on compliance.

Refer http://steel.org.au/key-issues/compliance for further details.

2.2 Tolerances

Fabrication tolerances shall conform to the requirements of AS/NZS 5131.

The tolerance class for functional tolerances shall be Class 1 UNO.

Class 1 tolerances are the default requirement in AS/NZS 5131 and should be acceptable for most steelwork construction. They are generally equivalent to what has been specified in AS 4100.

Class 2 tolerances are tighter and might be considered for higher specification work such as major bridges and the like. AS/NZS 5131 suggests Class 2 should be considered for CC3 and CC4 structures or components.

Class 1 and Class 2 tolerances are tabulated in Appendix F of AS/NZS 5131.

2.3 Steel materials

2.3.1 Grades

All structural steel material shall conform to the following table UNO:

Component	To conform with Australian Standard	Minimum Grade
Hot rolled steel sections	AS/NZS 3679.1; TS 102	300
Plate	AS/NZS 3678; TS 102	250
Flats	AS/NZS 1594; TS 102	300
Hollow sections: Circular (CHS) Square (SHS) Rectangular (RHS)	AS/NZS 1163; TS 102	 C350L0[A] C350L0[B] C350L0[B]
Welded beams and columns	AS/NZS 3679.2; TS 102	300
Shear studs (composite slab to steel)	AS/NZS 1554.2	380
Quench & tempered plate	AS 3597	690
Purlins and girts	AS 1397	450

The specifier should review these steel grades and modify, delete or add as required. The minimum grade noted is not necessarily the minimum grade available, but rather what is considered to be the most common grade utilised.

[A] CHS property grades may vary between C350L0 and C250L0 as they may be based on both diameter and thickness between different manufacturers. This mostly occurs for CHS dia ≤ 165.1 mm (150 NB) which are compliant with both AS/NZS 1163 and AS 1074. Note also that very larger diameter and/or thicker CHS may be fabricated items with differing grades and other parameters not described in AS/NZS 1163. The specifier should check availability of the appropriate grades.

[B] SHS & RHS also available in Grade C450L0.

Standards Australia TS 102:2016 'Structural steel – Limits on elements added' provides important requirements in part to address the recent issue of imported steel containing elevated levels of boron, which can affect the weldability of the steel.

Member sizes shall be as shown on the structural drawings. No substitution is permitted without approval in writing from the engineer.

Documentation supplied with materials and components shall conform to the requirements of AS/NZS 5131.

2.3.2 Lamellar tearing

Joint details which are susceptible to lamellar tearing (LT) are indicated on the project drawings as 'LT susceptible', with the specific plate with high through-thickness stress noted. The specific plate in joints that are indicated as 'LT susceptible' shall be supplied ultrasonically tested to AS 1710 Class 1.

2.3.3 Z-plate requirement

Joints that are designated 'LT susceptible' (see Clause 2.3.2) and further require plate to a nominated Z-value are indicated on the project drawings with a designated Z-value. The plate used for these joints shall be ordered to the designated Z-value.

Guidance is provided in Appendix H of AS/NZS 1554.1:2014 for the choice of Z-qualities to avoid lamellar tearing in welded connections subject to tension stresses in the through-thickness direction.

'LT susceptible' joints include cruciform joints and T-butt joints at or near plate cut edges.

2.3.4 Supplementary ultrasonic testing

Supplementary ultrasonic testing to AS 2207 and AS/NZS 1554.1 is required for all plates 40mm thickness and over.

Thicker plate may contain inclusions and laminations that affect the through-thickness ductility. For critical projects or components it is highly recommended that the plate is ordered requesting UT to AS 1710 Class 1.

The suggested thickness limit of 40mm is based on supply of steel plate from known quality manufacturers. Where the quality of the supply is not known or questionable, it is suggested that this figure should be reduced. Based on industry feedback, a value of 25mm may be appropriate.

2.3.5 Steel quality

All structural steel shall be sourced from mills with a relevant JAS ANZ accredited third-party certification scheme such as the ACRS Scheme (see http://steelcertification.com/). Alternative sourcing of third-party certified structural steel shall be submitted for review and must be approved prior to the commencement of procurement.

Third-party certification of steel and steelwork is not mandated in AS/NZS 5131, as this is against Standards drafting rules. However, ASI strongly recommends that in the present procurement environment, third-party construction product certification provides necessary surety on compliance.

Refer http://steel.org.au/key-issues/compliance for further details.

2.3.6 Splicing of structural members

All structural steelwork members shall be supplied in a single length, except where otherwise indicated with splice locations shown on the structural drawings. Splices at other locations shall be approved by the engineer prior to fabrication commencing.

2.4 Cutting, holing and shaping

All cutting, holing and shaping of structural steel shall conform to the requirements of AS/NZS 5131.

Penetrations or cut-outs other than those shown on the drawings shall not be made without prior approval.

2.5 Bolting

2.5.1 Bolt designation

4.6/S	Commercial Grade 4.6 bolts to AS 1111, tightened to a snug tight condition to AS/NZS 5131
8.8/S	High strength structural bolts of Grade 8.8 to AS/NZS 1252.1, tightened to a snug tight condition to AS/NZS 5131
8.8/TB	High strength structural bolts of Grade 8.8 to AS/NZS 1252.1, fully tensioned to AS/NZS 5131 as a bearing joint
8.8/TF	High strength structural bolts of Grade 8.8 to AS/NZS 1252.1, fully tensioned to AS/NZS 5131 as a friction joint

2.5.2 Bolt quality

High strength structural bolts shall be verified to AS/NZS 1252.2. The documentation required by the Standard, including the 'Supplier Declaration of Conformity' (SDoC) shall be provided.

ASI strongly recommends that high strength bolt assembly verification to AS/NZS 1252.2 is specified, given the demonstrable issues with ensuring bolt compliance in today's procurement environment.

2.5.3 Method of tensioning

/TB and /TF bolt categories shall be installed using either the part turn method or the direct tension indicator method to AS/NZS 5131.

2.5.4 Contact surfaces in tensioned connections

For connections where 8.8/TF bolts are specified, a friction coefficient of 0.35 has been assumed for the design. The contact surfaces shall be prepared according to AS/NZS 5131 and be free from paint, lacquer or other applied finishes unless the applied finish has been tested in accordance with AS/NZS 5131 Appendix G and a friction coefficient of 0.35 or higher is determined.

2.5.5 Bolt finish

All bolts shall be hot-dip galvanized to AS/NZS 1214.

2.6 Welding

2.6.1 Welding consumables

Welding consumables shall conform to the requirements of AS/NZS 1554, based on the yield strength of the steel to be welded, as defined in the table below:

Nominal yield strength of steel to be welded	To conform with Australian Standard
≤ 500 MPa	AS/NZS 1554.1
>500MPa; ≤ 690 MPa	AS/NZS 1554.4

2.6.2 Weld consumable strength

Nominal yield strength of steel to be welded	Nominal tensile strength of weld metal, f_{uw} (MPa)
All steel with Grade ≤ 300 MPa	430
All steel with 300 < Grade ≤ 450 MPa	490
Quench & tempered steel to Grade 690 MPa	760

The designation of welding consumables has recently been harmonised internationally. Refer to ASI Tech Note TN008 for further details.

The specifier should adjust the stated weld metal tensile strength in the above table to suit the design basis.

2.6.3 Weld quality

Element	Weld category
Shop welds	G.P. UNO
Site welds	G.P. UNO

The specifier should ensure that, where appropriate, weld categories for particular connections are designated on the Project Drawings.

ASI is encouraging industry to consider GP welds as the default nomination unless the additional performance of SP welds is specifically required. In this case, those welds should be noted on the Project Drawings. Certainly, SP welds should be specified where the decreased capacity of GP welds would result in increase in connection size.

There is not a significant cost difference between GP and SP welds in respect of the actual welding process. However, GP welds have an increased level of defects allowable. The cost of NDE and any necessary rectification may therefore be reduced.

2.6.4 Non-destructive examination

The extent of non-destructive examination (NDE) shall be as defined in Table 13.6.2.2(A) of AS/NZS 5131.

The extent and type of NDE is 'recommended' in AS/NZS 5131, as it is a function of the confidence in the fabrication process. It is acceptable to vary these recommendations based on knowledge of specific fabricator competency or confidence gained during the fabrication process for the project. WTIA Tech Note TN11 provides guidance on the basis for selection of the extent and type of NDE.

For structures designed to AS 4100 earthquake design categories D and E, the type and extent of NDE shall be the greater of that defined in Table 13.6.2.2(A) and Table 13.6.2.2(B).

2.7 Minimum connection detailing guidelines

Unless specifically noted otherwise on the drawings, connection details shall be in accordance with the following minimum requirements:

(a) All welds shall be 6mm continuous fillet weld (CFW) all round.

(b) All steel to steel bolted connections shall be minimum two M20 Grade 8.8/S.
(c) A minimum of two threads shall extend past the nut.
(d) All plates shall be 10mm minimum thick.
(e) All purlin cleats shall be 8mm minimum thick.

All detailing where not specifically shown shall be in accordance with the Australian Steel Institute (ASI) current editions of the 'Design capacity tables for structural steel' and the ASI standardised structural connection details contained therein.

The ends of hollow section members shall be sealed with nominal thickness plates and continuous seal welded unless noted otherwise. If hollow sections are to be hot-dip galvanized, vent and drainage holes shall be provided conforming to the requirements of AS/NZS 5131 in non-viewable locations.

2.8 Surface treatment and corrosion protection

Unless noted otherwise in the contractual documentation, the minimum surface treatment of both internal and external steelwork shall conform to the requirements of AS/NZS 5131.

Structural steelwork to be galvanized shall conform to the requirements of AS/NZS 5131.

It is not normally necessary to specify the coating thickness for steelwork galvanized to AS/NZS 4680 or fasteners to AS/NZS 1214 as this is mandated in the Standards.

Unless noted otherwise in the contractual documentation, the corrosion protection when selecting a paint system shall be as specified in the table below:

Designation	Location	Protective coating system	AS/NZS 2312.1 reference
INT1	Internal steelwork - hidden	Alkyd primer system	ALK1
INT2	Internal steelwork – requiring colour finish	Alkyd primer with acrylic latex top coat system	ACL1
EXT1	Internal/External steelwork – colour not required	Single coat solvent borne inorganic zinc silicate system	IZS1
EXT2	External steelwork in industrial environment – MIO finish acceptable	Micaceous iron oxide (MIO) system	EHB6
EXT3	External steelwork – colour and gloss finish required	High build polyurethane system	PUR4

The specifier should adjust this table to suit project specific requirements. The examples shown in the table are default only and will not necessarily meet project-specific performance requirements.

Refer Appendix A for a general description of each paint system indicated and the surface preparation requirements.

2.9 Architecturally exposed structural steelwork

Architecturally exposed structural steel (AESS) shall conform to the requirements of AS/NZS 5131.

Areas to be treated as AESS and the AESS category (1,2,3,4 or C) are designated on the project drawings.

Architecturally sensitive connection details are indicated on the project drawings.

AESS components shall be AESS 2 UNO.

The specifier should carefully assess the appropriate AESS categories for the components of the project, based on the requirements in AS/NZS 5131. In general, it is expected that AESS 2 (for elements viewed at a distance) and AESS 3 (for elements viewed at close range) will be the categories most commonly specified.

The ASI publication 'Guide for specifying architecturally exposed structural steel' provides further information.

2.10 Light gauge steel members

Light gauge steel members, comprising purlins, girts and structural decking, shall conform to the requirements of AS/NZS 5131.

2.11 Mechanical and chemical anchors

Mechanical and chemical anchors shall conform to the requirements of AS/NZS 5131.

3.0 STRUCTURAL STEELWORK ERECTION

3.1 General

Structural steelwork erection shall conform to the requirements of AS/NZS 5131.

The recent ASI guide: 'Practical guide to planning the safe erection of steel structures' provides guidance on the erection planning process, assignment of responsibilities and risk management.

3.2 Camber

All members having a natural camber within the straightness tolerance shall be erected with the natural camber up.

3.3 Tolerances

Erection tolerances shall conform to the requirements of AS/NZS 5131.

The tolerance class for functional tolerances shall be Class 1 UNO.

Class 1 tolerances are the default requirement in AS/NZS 5131 and should be acceptable for most steelwork construction. They are generally equivalent to what has been specified in AS 4100.

Class 2 tolerances are tighter and might be considered for higher specification work such as major bridges and the like. AS/NZS 5131 suggests Class 2 should be considered for CC3 and CC4 structures or components.

Class 1 and Class 2 tolerances are tabulated in Appendix F of AS/NZS 5131.

3.4 Post-installed anchors

The installation of mechanical and chemical anchors shall conform to the requirements of AS/NZS 5131.

Site testing shall be performed on mechanical and chemical anchors to validate correct installation (proof testing). A minimum test sample population shall be three specimens or 2.5% of the total relevant

anchor population, whichever is greater. If a single failure is recorded, the minimum test sample population shall be increased to six test specimens or 5% of the total relevant anchor population, whichever is greater. If two or more test samples fail, all anchors in the relevant anchor population shall be tested.

The 'test sample population' is defined as a group of anchors representative of the relevant anchor population, having the same type of anchor, the same base material (that has not experienced different environmental exposure), same installation method and same installation personnel. Where any of these variables change, this group of anchors shall be considered a separate anchor population.

All site testing of post-installed anchors shall be undertaken according to the requirements of AEFAC Technical Note – Site testing guidelines Volumes 1 to 4 (available at www.aefac.org.au/resources).

3.5 Connection to footings

Footing bolts shall meet the requirements of AS/NZS 5131.

Materials used for grouting under steel base plates and bearing plates shall meet the requirements defined in AS/NZS 5131.

3.6 Cast-in components

All bolts, nuts and washers, including hold down bolts, cast-in ferrules and masonry anchors are to be hot-dip galvanized unless noted otherwise. All galvanized components to be cast into concrete must be passivated.

3.6 Erection Sequence Methodology

Where assessed as required from the risk planning workshops, submit the Erection Sequence Methodology' (ESM) for approval.

The 'Erection Sequence Methodology' (ESM) is recommended for projects where a risk assessment has been undertaken and indicates the need. The scope and extent of the ESM is an outcome of the risk planning workshops.

Refer ASI 'Practical guide to planning the safe erection of steel structures' for further guidance.

3.7 Proprietary items

Proprietary items (e.g. purlins, roof/wall sheeting, ferrules) shall be installed in accordance with the manufacturer's specifications.

4.0 STRUCTURAL STEELWORK INSPECTION, TESTING AND CORRECTION

Inspection, testing and correction shall conform to the requirements of AS/NZS 5131.

Inspection and Test Plans (ITP) shall be prepared, as listed in the table overleaf.

Item	ITP
Materials and components	Required
Preparation and assembly	Required
Welding	Required
Mechanical fastening	Required
Surface treatment	Required
Paint coatings	Required
Galvanized coatings	Required
Erection	Required

5.0 PARTICULAR REQUIREMENTS

There are no additional or particular requirements.

This section is reserved to note any 'particular requirements' (as defined in the National Structural Steelwork Specification) that might be relevant to the current project. In most cases, for the usual small to medium projects, there will be no or limited particular requirements.

APPENDIX A – DESCRIPTION OF PAINT SYSTEMS

The following tabulations provide description of and specification clauses applicable to a range of standard paint system types.

Commentary is indicated in green. Clauses intended to be representative of those used in a specification are shown in black text. Items where the specifier needs to provide details and/or typical clauses are indicated, are shown [in square brackets].

System INT1: Internal hidden steelwork
System type: Alkyd primer system (AS/NZS 2312.1 ALK1)
System description: This system will provide only short-term service life in low corrosivity exterior conditions, but is an economical and easily applied coating for internal hidden steelwork. Blast cleaning to at least Sa2 will be required for AESS and require specification.
Specification clauses:
[Describe the element/location or note drawing reference] **Surface preparation:** [All interior steelwork shall have surface preparation by mechanical cleaning to St3 or by abrasive blast cleaning to Sa1 as specified in ISO 8501-1] or [All interior steelwork shall have surface preparation by abrasive blast cleaning to Sa2 as specified in ISO 8501-1] **First coat:** [40 microns Red oxide alkyd primer] **Colour/ Finish:** Not applicable

System INT2: Internal steelwork requiring colour finish
System type: Alkyd primer with acrylic latex topcoat system (AS/NZS 2312.1 ACL1).
System description: This system will provide only short-term service life in low corrosivity exterior conditions, but is an economical and easily applied system for internal steelwork requiring a colour finish. Blast cleaning to at least Sa2 will be required for AESS and require specification.
Specification clauses:
[Describe the element/location or note drawing reference] **Surface preparation:** [All interior steelwork shall have surface preparation by mechanical cleaning to St3 or by abrasive blast cleaning to Sa1 as specified in ISO 8501-1] or [All interior steelwork shall have surface preparation by abrasive blast cleaning to Sa2 as specified in ISO 8501-1] **First coat:** [40 microns Red oxide alkyd primer] **Second coat:** [40 microns acrylic latex] **Third coat:** [40 microns acrylic latex] **Colour/ Finish:** [Describe the topcoat colour and finish required. An appropriate gloss level will require specification.]

System EXT1: Internal/external where colour not required
System type: Single coat solvent borne inorganic zinc silicate (AS/NZS 2312.1 IZS1).
System description: This system will provide economic long term service life in corrosive exterior environments, but can also be economical internally. Alternative to hot-dip galvanizing where item too large for galvanizing bath. Can withstand transport and handling damage and unaffected by UV. Only available in matt grey. Requires a minimum relative humidity during application and curing.
Specification clauses:
[Describe the element/location or note drawing reference] **First coat:** [75 microns Inorganic zinc silicate]

Surface preparation: Abrasive blast to AS 1627.4 Class 2½ **Application**: [Minimum humidity of 50% is required during coating application. Test for cure (9.9.17) shall be carried out.] **Colour/ Finish:** Not applicable

System EXT2: External coating in industrial environment where MIO finish acceptable
System type: Multi-coat micaceous iron oxide (AS/NZS 2312.1 EHB6)
System description: This system will provide long-term service life in corrosive exterior environments. Micaceous Iron Oxide (MIO) is a lamellar pigment which provides excellent barrier protection in a corrosion resistant coating system. It will provide a low gloss metallic spangle finish. It is available in a very limited range of colours, generally greys. Because of the metallic look it can be difficult to apply on site except in small areas.
Specification clauses:
[Describe the element/location or note drawing reference] **Surface preparation**: Abrasive blast to AS 1627.4 Class 2½ **First coat:** [75 microns epoxy zinc] **Second coat:** [125 microns epoxy MIO] **Third coat:** [125 microns epoxy MIO] **Colour/ Finish:** [Describe topcoat colour required from manufacturer's colour chart]

System EXT3: External coating where colour and gloss finish are required
System type: Multi-coat epoxy (AS/NZS 2312.1 PUR4)
System description: This system will provide long-term service life in corrosive exterior environments. Polyurethane is by far the most common of the decorative finishes for steel. It is tough, graffiti resistant and provides excellent colour and gloss retention. If required, it is easily applied at site by brush and roller application. It also has excellent touch-up characteristics. Polyurethane is available in a wide range of colours such as those set out in AS 2700 and in manufacturer's colour charts.
Specification clauses:
[Describe the element/location or note drawing reference] **Surface preparation**: Abrasive blast to AS 1627.4 Class 2½ **First coat:** [75 microns epoxy zinc] **Second coat:** [125 microns high build epoxy] **Third coat:** [50 microns polyurethane gloss] **Colour/ Finish:** [Describe topcoat colour required from AS 2700 or manufacturer's colour chart. The selection of colours for service pipes and identification of hazards may require reference to AS 1345 and AS 1318.]

APPENDIX B – ADDITIONAL CLAUSES

Steelwork erection

The structural steelwork erector shall be responsible for temporary stability during erection.

The structural steelwork erector shall provide and leave in place until permanent bracing elements are constructed, such temporary bracing as is necessary to securely stabilise the structure during erection.

Bolted connections

Threaded sleeves shall be welded to both walls of the member where used for RHS and SHS connections.

Shop drawings

Shop drawings shall be submitted for approval. No steelwork shall be fabricated until final approval of the shop detail drawings has been received and all review comments on the workshop drawings have been resolved.

Site weld approval

Other than site welds (if any) shown on the shop drawings, do not weld on site without prior approval. Where possible, locate site welds in positions for down hand welding.

Architectural features

Where steel elements shown on the structural or architectural drawings are required to be curved, bent or rolled, the fabrication contractor shall be responsible for the methods to achieve the required shapes without localised distortion or compromising the strength of the members.

Camber guidelines

Steel beams, trusses and portals shall be cambered 2.0mm upwards for every 1000mm span unless noted otherwise on the drawings.

All rafters and beams over 6000mm in length shall be cambered 5mm upwards for every 2000mm of length unless noted otherwise on the drawings.

Positive pre-set to cantilever beams shall be 5.0mm for every 1000mm of length unless noted otherwise on the drawings.

Galvanizing bath restrictions

Where intended to be galvanized, ensure structural steelwork is detailed in accordance with available galvanizing bath dimensions.

Construction with precast panels

The structure has been designed with the precast panels providing lateral stability. The steelwork will not be stable until the precast panels are in their final position with the fixings in place. The contractor shall ensure that the steel structure is in a stable and safe condition until the precast erection is completed.

Concrete encased steel

Concrete encased steelwork shall be unpainted and free of scale. All steelwork above ground shall be placed centrally with 50mm minimum cover concrete encasement. All steelwork below ground shall be

placed centrally with 75mm minimum cover concrete encasement. Refer to drawings for any reinforcement requirements.

Fire protection to steel

Refer to architect's specifications for fire protection requirements. Members to be fire sprayed must not be painted and must be free of scale. For members to be protected with fire rated plasterboards, installation and jointing of the plasterboards are to architect's details and manufacturer's specifications.