

3.7. Mechanical

3.7.1. Approval Sheet

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3.7.3. Overview

3.7.3.1. Scope

This document sets out the Authority's requirements for the organisation of CADD data and the presentation of Mechanical and Structural Design Drawings for the manufacture and installation of Mechanical equipment and Support Structures required by our clients for the management of the roads.

3.7.3.2. Objective

The objective of this guideline is to provide Mechanical and Structural Design drawings in a format that can be readily read and stored by the Authority on its equipment. The presentation of designs shall conform to the Australian Drawing Standards so that these can be clearly understood by Manufacturers and Installers of the designed Mechanical Equipment and Support Structures.

It defines the way in which data is to be organised and how it is to be presented to the authority.

3.7.3.3. Audience

This Guide has been prepared to assist persons and/or organisations that use CADD for the preparation of drawings associated with Mechanical and Structural Engineering, with the RTA as the intended final client.

3.7.3.4. Usage

The use of this Guide is limited to the production of the various drawings required to convey information for the manufacture of Mechanical and Structural components, for Machinery and for Support Structures. This document is complemented by the design brief for the works.

3.7.3.5. CADD Packages

The MEDU utilises the CADD package MicroStation Version 8 (2004). A three dimensional computer aided design package to produce drawings.

FORMAT

DATA FORMAT	DESCRIPTION
MicroStation document file	MicroStation's binary drawing file format (.dgn).

3.7.3.6. Document Status

This is a controlled document, which is the responsibility of the RTA CADD Advisory Group. Submissions to amend this are to be forwarded to the Secretary, RTA CADD Advisory Group.

Interpretation and clarification of issues contained within this document can be obtained by contacting the Secretary, RTA CADD Advisory Group.

3.7.4. Reference Documents

The following documents are to be read in conjunction with this Guideline.

DESIGN BRIEF

CADD DATA EXCHANGE STANDARDS

AUSTRALIAN STEEL DETAILERS' HANDBOOK
- Australian Steel Institute

DESIGN CAPACITY TABLES FOR STRUCTURAL STEEL
Volume 1 – Open sections third edition - Australian Steel Institute

DESIGN CAPACITY TABLES FOR STRUCTURAL STEEL
volume 2 - Hollow sections second edition- Australian Steel Institute

INTERIM GUIDE TO SIGNS AND MARKINGS MANUAL

MATERIAL SUPPLIERS SPECIFICATIONS

3.7.4.1. Current Australian Standards Publications

AS1100.101	TECHNICAL DRAWING GENERAL PRINCIPLES
AS1100.201	TECHNICAL DRAWING MECHANICAL ENGINEERING
AS1100.501	TECHNICAL DRAWING STRUCTURAL ENGINEERING DRAWING
AS1101.1	GRAPHIC SYMBOLS FOR GENERAL ENGINEERING HYDRAULIC AND PNEUMATIC SYSTEMS
AS1101.3	GRAPHICAL SYMBOLS FOR GENERAL ENGINEERING - WELDING AND NON-DESTRUCTIVE EXAMINATION
AS/NZS 1170.0	STRUCTURAL DESIGN ACTIONS - GENERAL PRINCIPLES
AS/NZS 1170.1	STRUCTURAL DESIGN ACTIONS - PERMANENT, IMPOSED AND OTHER ACTIONS
AS/NZS 1170.2	STRUCTURAL DESIGN ACTIONS - WIND ACTIONS
AS1554.1	STRUCTURAL STEEL WELDING -WELDING OF STEEL STRUCTURES
AS3600	CONCRETE STRUCTURES
AS4100	STEEL STRUCTURES
AS4600	COLD-FORMED STEEL STRUCTURES

3.7.5. Drawings

3.7.5.1. Guide to Generating Drawings

Two methods are used to generate drawings for the Mechanical Engineering Design Unit:

- a) *2D format directly from a Design Model inside a drawing border without attaching reference files from a design model.*

The preferred method Mechanical Engineering Design Unit generates drawings for simple Mechanical and Structural Designs is in a 2D format directly from a Design Model without attaching reference files from a design model. A number of sheets may be required to generate a design.

All sheets for a design are located under one file/drawing number unless noted otherwise. If a part or item is common to several Designs then a separated drawing shall be created and referred to under Item number in the Material List.

Creation of hard-copy prints of MEDU designs, in the form of drawings, requires initial setting up of Sheet models.

With this method 'a', the drawing border is scaled up (or down) to cover the required area in the design, all text and dimensioning must be scaled the same amount, also, this is to ensure that when the scaled print is created, text and dimensioning elements are at the correct physical size.

To simplify this process within RTA, scaled selected boarders from k:\mechanical\template directory\ boarder library have attached associated standard named levels, named filter for each sheet, line attributes, text attributes and dimensions. For all new drawings, borders shall be selected from the border library then saved with the new allocated drawing number so that all standard attributes are imported into the sheet model file. For existing drawings standard text and dimension attributes from the template directory can be imported into a file.

- b) *A Sheet model typically consisting of a collection of design model references that are scaled and positioned as necessary to create a drawing, inside a drawing border, which can be printed. The referenced views can be in a 2D and 3D format.*

This method is used for complex designs that are created from a 3D Design Model references.

The advantage of this method is it allows the designer to create sheet models of complex general arrangement, assembly and detail part drawings of a product in both 3D and 2D format this is done by referencing in saved views from a design model. A view in 3D and 2D format allows a client, manufacturer, erector and maintenance personnel to easily interpret a design. It has also the advantage of views being automatically updated in the sheet model if any modifications are required to the design model.

When creating Maintenance manuals to clarify Assembly or Maintenance procedures of a complex product, exploded Assembly views of that product's parts, in 3D format shall be created. To indicate correct Assembly procedure lines showing points of assembly to fitting parts shall be drawn.

Note: Refer to CADD software manual for methods to create a drawing.

By creating a Design Model, animation of a design concept can be created by using visualization techniques.

Animation can be used for marketing of a conceptual design, training of Maintenance personnel and for seeking feed back from the general public.

3.7.6. General Drawing Standards

3.7.6.1. Line Attributes

The MEDU has adopted six line thicknesses to be used in the presentation of drawings. All drawing details are to be represented by using these line thicknesses. On electronic plans, single vector lines of specified colour are used to represent these line thicknesses. The correlation between line colour, weight and thickness is as shown in Table 1.

0.15 mm	0 #	blue
0.25 mm	1 #	white/black
0.35 mm	2 #	red
0.5 mm	3 #	green
0.7 mm	4 #	cyan
1.0 mm	5 #	yellow

Table 1: Line colour, weight and thickness

3.7.6.2. Text Attributes

The general requirements for the text font that is to be used in drawings are laid down in AS 1100.101. The Authority requires the following criteria be met:

- The font is vector based.
- General form of characters to be as per ISO 3098/1 type B upright.
- Cell size / aspect ratio to be 0.9.
- Characters to be monospaced.

To comply with these requirements it is suggested to use the ISO 3098. The MEDU has adopted four text heights in presentation of the drawings. These text heights enable a half size drawing to be clearly interpreted. All text on the drawings is to be represented by using these text heights. The correlation between text use and sheet size is as shown in Table 2. The correlation between text height, weight and colour is as shown in Table 3.

Notes: Text Heights for Sign Messages are as indicated on Sign Face drawing. For other requirements, refer to AS 1100.101 Section 4

CHARACTER USE	Text Height (h), mm	
	Sheet size	
	A1	A3
Drawing numbers	7.0	5.0
Titles	5.0	3.5
Subtitles, headings, view and section designation	5.0	3.5
General notes, material lists, dimensions	3.5	2.5

Table 2: Text use, and sheet size

Text Height	Weight	Colour
1.5 mm	0 #	blue
2.5 mm	1 #	white/black
3.5 mm	2 #	red
5.0 mm	3 #	green
7.0 mm	5 #	cyan

Table 3: Text height, weight and colour

3.7.6.2.1. *Sheet Composition*

Sheet composition considers the overall presentation of detail and associated support documentation in accordance with the design brief. Drawings shall not appear to be cluttered, but shall clearly present the information required in an orderly format. The final product must be fully prepared using electronic means without manual enhancement.

3.7.6.3. Presentation

3.7.6.3.1. *Plan Size*

Generally, the RTA prefers its standard presentation sheet to be A3 format. A1 format is accepted, however should only be used if drawing is required to be clearer by using a larger scale and will only fit on an A1 sheet or is requested by client.

3.7.6.3.2. *Plan Borders*

Plan borders are to be in accordance with the RTA standard. Refer to Appendix A – Standard RTA Border Sheets, which gives examples of standard A3 borders, which are supplied by the RTA. A1 standard borders are available on request.

3.7.6.3.3. *Scales*

Scales used on drawings may vary in accordance with the size and character of the feature being detailed or the degree of detailing required.

All drawings shall be to a defined natural scale with the scale being selected so that the drawing may be easily read when reduced to half of its original size.

The following scales are recommended for use:

3.7.6.3.4. *General Arrangement Drawings*

1:10, 1:20, 1:25, 1:50 and 1:100

3.7.6.3.5. *Detail Drawings*

1:1, 1:2, 1:2.5, 1:5, 1:10 and 1:20

Drawings shall not contain two similar scales, eg a scale of 1:2 shall not be used on the same drawing together with a scale of 1:2.5

3.7.6.3.6. *Use of Filters*

Filters are a use by MEDU to group associated levels for the purposes of viewing or not viewing as a group. Each Filter would contain levels that control the Name of level, attribute style, weight and colour.

3.7.7. Drawing Registration

3.7.7.1. Drawings

The Drawing Number for official drawings shall have the prefix **ME** with five digits added to a Drawing number.

3.7.7.2. Sketches

The Drawing Number for official sketches shall be similar to drawings except that the prefix **SK** shall be added to a Drawing Number.

3.7.7.3. Abbreviations

Refer to ASI 100.101, ASI 100.201 and ASI 100.501 for a list of acceptable Standard Abbreviations for Mechanical and Structural drawings.

3.7.8. Information to be Shown on Drawings

The arrangement of upper case letters for each of the abbreviations as shown in each table shall be followed, abbreviations shall not contain a full stop.

3.7.8.1. General

Information to be shown on the drawings shall include any required design information and such items as are specified in the respective design codes, or as instructed by the design engineer.

Each drawing shall provide all the information necessary for the construction of the work shown and shall omit irrelevant details. References shall be given to associate drawings for particular details or for showing the relationship with other components, and to schedules.

Information shall include datum's, such as survey marks, referenced to permanent structures or the Australian Height Datum (AHD).

Written descriptions on drawings shall be clear and concise. Instructions shall be positive and written in the imperative mood. Special requirements relating to construction details shall be noted or referenced on the drawing.

Clarity of detailing and dimensioning is essential.

3.7.8.2. General Notes

General notes, where provided, shall be presented with Clause or reference numbers and upper case lettering, either on a separate drawing or on the drawings to which they refer. For the information required on drawings or general notes, reference shall be made to the relevant Standards.

3.7.8.3. Detail Drawings

Detail drawings shall show Parts and/or Structural details according to the proposed Manufacturing and erection disciplines required to complete a product.

3.7.8.4. Amendments

An amendment to an issued drawing shall be numbered or otherwise designated and the amendment described in the amendment box. The altered text and pictorial aspects for that drawing issue only shall be highlighted by drawing a cloud, made up of a series of arcs, around the amendment and the cloud designated with the number or other designation, preferably in a triangle.

3.7.8.5. Lines

3.7.8.5.1. *Types of lines*

Lines on drawings shall be selected according to their application. Preferred types are shown in Table 3.1, ASI 100.101 and shall be selected from one of the line groups given in Figure 3.1, ASI 100.101.

3.7.8.5.2. *Dimensioning*

In all cases, dimensions shown on drawings shall be in millimetres and they shall be shown in accordance with AS 1100.101. The use of a space between the third and fourth digit in a four-digit number is optional but is mandatory in a five-digit number.

Dimensions shall be placed on drawings using the 'aligned' method with each dimension being placed parallel to its dimension line in order that it may be read from either the bottom or the right hand side of the drawing.

An overall dimension except where dimensional tolerances are of critical importance shall cover a chain of dimensions.

Where several dimensions are to be given to a common datum surface, either the line method or the point method may be used.

Dimensions and notes shown with leaders shall be inscribed using the unidirectional method.

Where it is necessary to indicate that a particular dimension on a drawing is not shown to the same scale as the view or detail in which it appears, the dimension shall be underlined with a full thick line. This method of representing details drawn out of scale shall not be applied to entire details that are shown 'NOT TO SCALE'.

All dimension attributes shall be saved under a named dimension style. This is particularly important if it is necessary to cross-reference to a detail of a scale which is different to the main scale on the drawing sheet e.g. Slot detail of an item.

Radii shall be dimensioned by the use of a dimension line, which passes (or is in line with) the centre of the arc and terminates at the lead end with a single arrowhead. However, radii of arcs that need not have their centres located shall be dimensioned using one of the methods shown in AS 1100.101.

Dimensions for radii shall be preceded by the conventional abbreviation 'R'.

Geometric tolerance shall be used when geometry characteristics are critical for the assembly of components into a finished product.

3.7.8.5.3. *Symbols*

Symbols shall conform to an Australian or a joint Australian/New Zealand Standard appropriate to the type and class of the work.

3.7.8.5.4. *Hatching and Shading Standards*

See Appendix B of this guide for acceptable hatching and shading standards for items commonly represented on Mechanical and Structural drawings prepared for the RTA.

3.7.9. Conventions for Cross Referencing

3.7.9.1. General

The convention for elevation, section and detail cross-references is complementary, i.e. the cross-reference given on the sheet from which an elevation, section or detail is taken is complemented by the cross-reference on the associated sheet where the elevation, section or detail is shown.

3.7.9.2. Elevations

Elevations shall be drawn as a view seen from a vertical plane immediately in front of the element under consideration and shall be projected from that elements 'PLAN' view.

3.7.9.3. Sections

Sections shall be drawn as a view from a cutting plane located through an element previously drawn as an Elevation or Plan.

Generally, only the details at the cutting plane of the section should be shown, however, details beyond the cutting plane may be included provided that the included details are not confusing to the main details being shown.

Sections, where possible, shall be drawn adjacent to the plan or elevation to which they relate. Where section details cannot be shown on the sheet of origin, they shall be cross referenced in accordance with AS 1100.501.

3.7.10. Steel Structural Detailing

3.7.10.1. General

In all cases where Structural Steel Elements are specified, the material used shall be in accordance with the relevant Australian Standards, Material Specification and Weld Details. This shall be stated on the drawings.

Structural steelwork drawings shall show sufficient detail for the complete fabrication of a particular item or sufficient detail to enable the fabricator to prepare detailed shop drawings for the particular item.

Each item of fabricated steelwork shall be detailed in the form that when the item is released from the fabrication shop, each part that is attached in the fabrication shop be shown as part of the total assembly. Fabricated items that form part of the total assembly need not be detailed as separate items nor shall the quantity of those items shown separately unless unduly complicated and in such a case, the quantity of those items be shown separately with the detail of the item.

In the majority of cases, it is sufficient to detail a fabricated item in one or two views, with enlarged details of the more complex portions as necessary viz:

A normal plate with holes in it would require a plan view only.

A tapered plate would require a plan and a section.

A universal beam type girder would require an elevation and cross section.

A fabricated item with a longitudinal axis of symmetry, such as a built-up plate girder, steel trough girder or steel box girder, would require an elevation and sections to depict different plate sizes and part plans to show all relevant details.

3.7.10.2. Welding

The necessary information concerning the location, type, size, category and length of welds in welded joints and whether the welds are to be made in the shop or at the site shall be given on the drawings with the use of standard symbols.

All symbols shall be in accordance with AS 1101.3.

3.7.10.3. Closing Dimensions

In accordance with industry practice, overall dimensions of steel items shall be provided to enable the correct manufacture of the items.

Dimensions required for the correct positioning of holes etc in items shall be provided from one end only and as such no closing dimensions shall be given on the drawings.

3.7.10.4. Use of Asterisks and Similar Symbols

Asterisks, filled in dots and triangles, or other like symbols used as a reference to a note, dimension, reduced level, etc, and on a drawing should be used as sparingly as possible. They can be used to avoid repetition of a note or where space precludes the use of a direct note. However, where it is necessary to have references to different items on the same drawing separate symbols shall be used.

3.7.11. Concrete Structural Detailing

3.7.11.1. General

Reinforcement shall be specified by the classification and designation of bar and reference number of mesh (see AS/NZS 4671). Where a schedule is prepared in conjunction with the drawings, a reference number for that schedule shall be given on both schedule and drawing.

Reinforcement shall be specified on the view of the structural element in which the reinforcement will be first placed, e.g. where a bar is placed in a slab and extends into a wall it shall be specified on the plan of the slab.

3.7.11.2. Concrete drawings

Concrete drawings shall clearly show the dimensions and shape of the structural element or elements depicted. The classification and designation, size, shape, extent and location of all reinforcement shall also be clearly shown. Depending on the complexity of the element, the detail drawing may show both the concrete outlines and reinforcement on the same view or provide separate views, or drawings for each.

NOTE: For concrete beams, depth is specified first, for strip footings, width is specified first.

3.7.11.3. Reinforcing Bar and Fabric Mesh Detailing

This shall be in accordance with ASI 100.501.

The numbering of reinforcement, whether bars or fabric, shall be in sequential order and shall proceed from the bottom to the top of the element under consideration wherever possible and/or practical.

Bar reinforcement shall be specified by the number or spacing of bars, type, size, spacing and location. If required, by a shape code and bar mark. Spacing is normally specified at right angles to the bar direction and any variation shall be fully detailed, e.g. for skewed bars. One of the following notations shall be used:

NOTE: The use of bar marks, shape codes and bundle marks on engineering drawings is optional. Each set of 'identical' bars in a structure shall be given the same bar mark. A group of bars in the same placing zone may be regarded as being 'identical' if they have the same type, size and bent shape. If supplied in a set for a tapered section, these can have a varying length.

3.7.11.4. General Arrangement

The General Arrangement shall give an overall picture of the assembly of a Mechanical and Structure Design as it will appear once constructed. The General Arrangement shall include a plan, elevation, typical cross section as required with a list of "General Notes" as required which apply to the entire set of drawings.

3.7.11.5. Front Elevation

Elevations shall be drawn as a view seen from a vertical plane immediately in front of the element under consideration and shall be projected from that element's 'PLAN' view.

Hidden details shall be shown as broken lines in accordance with the line types shown in ASI 100.501

3.7.11.6. Plan View

Plan views shall be drawn as a horizontal view taken immediately above the element under consideration.

Hidden details shall be shown as broken lines where appropriate in accordance with the line types shown in ASI 100.501.

This shall contain the following information:

- An outline of the structure;
- The location of any public utilities;
- The Control Line and Carriageway centreline (as appropriate);
- Outlines of the structural elements;
- Relevant horizontal clearances;
- Shapes and slopes of any embankments or cuttings;
- Extent of any protection required; e.g. Safety barriers

3.7.12. Major Sign Structure General Arrangement Drawings

Major Sign Structure General Arrangement Drawings shall be create using method a) and shall include the following:

- Font Elevation of Sign Structure viewed from in front of the Sign Face.
- Overall Dimensions a Phantom outline of sign face.
- Dimension from bottom of sign face to ground level.
- Dimension from bottom of sign face to arm or lower arm when two or more arms are required.
- Dimension between arms.
- Dimension from horizontal edge of sign and vertical centre line of sign face mounting holes.
- Dimension between vertical centre lines of sign face mounting holes.

For a double sided sign structure, additional end elevation and rear view is required.

- Dimension from post to Kerb, Guide rail or/and edge marking.
- Dimension from sign Kerb, Guide rail or/and edge marking.
- Over all Dimension showing the depth of a concrete Pile Footing, Pile Cap or slab footing
- Material List
- Sign Face Message
- Mass of steel structure, Anchor bolts and Reinforcement
- Volume of Concrete
- Plan view of footing showing anchor bolt centres, overall diameter of pile footing or overall plan dimensions of the slab footing showing the location of the anchor bolts
- Utility service both above and below ground level.

3.7.12.1. Major Sign Structure Detail drawings

Sheet 2 shall show the following structural details of the following:

- Post Details
- Baseplate
- Flange plate detail
- End Plate

Sheet 3 shall show the following structural details of the following:

- Arm details
- Arm plate detail
- Endplate detail (required if minimum Arm section is greater or equal to 150 mm)
- Vertical member detail
- Vertical member slot detail for the connection of vertical member to arm member.

3.7.12.2. Order of Drawings

The order of the sheets in a set of drawings shall follow the logical order of the construction procedure of the structure itself. The numbering sequence shall be as follows:

- Construction Notes
- General Arrangement
- Steel fabrication shop drawings
- Foundations i.e. Piles, Pile /Pile-cap combinations or slab footing

3.7.12.3. Construction Notes

Sheet 1 with Standard construction notes and weld details shall be attached to the final design set.

3.7.13. Appendix A Standard RTA Border Sheets

GENERAL

- G1. GENERAL STRUCTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH AUSTRALIAN BRIDGE DESIGN CODE AS5100-2004, RTA SPECIFICATIONS AND ALL OTHER CONSULTANT'S DRAWINGS.
- G2. DO NOT SCALE DIMENSIONS SHOWN ON THE DRAWINGS.
- G3. VERIFY SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS.
- G4. MAINTAIN THE STRUCTURE IN A STABLE CONDITION DURING CONSTRUCTION AND ENSURE THAT NO PART IS OVER STRESSED.
- G5. DESIGN WIND LOADS IN ACCORDANCE WITH AS1170.2:2002, TERRAIN CATAGORY 2 AND THE FOLLOWING:

REGION	V ₁₀₀₀ (m/s)
A	46
B	60

FOUNDATION AND FOOTINGS

- F1. FOOTING DESIGN FOR ULTIMATE SOIL BEARING CAPACITY Q_u = 150 kPa
- F2. A QUALIFIED GEOTECHNICAL ENGINEER SHALL VERIFY THE ASSUMED ALLOWABLE SOIL BEARING CAPACITY ON SITE PRIOR TO ANY PLACEMENT OF CONCRETE FOR THE PILE FOOTING.
- F3. IF DIFFERENT SOIL CONDITIONS ARE ENCOUNTERED ON SITE, THE FOOTING SHALL BE REDESIGNED.
- F4. ANY ALTERATION FROM THE ABOVE CRITERIA IS SUBJECT TO DESIGNER APPROVAL.
- F5. DO NOT EXCAVATE BELOW THE LEVEL OF ANY EXISTING ADJOINING FOOTINGS WITHOUT THE PERMISSION OF THE ENGINEER.

REINFORCEMENT

- R1. REINFORCEMENT SYMBOLS
 N HOT-ROLLED DEFORMED BAR, GRADE 500 TO AS/NZS4671
 R PLAIN ROUND, GRADE 250 TO AS/NZS4671
 F HARD DRAWN REINFORCING FABRIC TO AS/NZS4671
- R2. CONCRETE CURING AND STRIPPING TO SHALL BE IN ACCORDANCE WITH RELEVANT SAA CODES.
- R3. ALL CONCRETE SHALL BE COMPACTED BY IMMERSION TYPE VIBRATORS.
- R4. ALL REINFORCEMENT SHALL BE SUPPORTED ON APPROVED CHAIRS AT MAXIMUM 800mm CENTRES.
- R5. ALL UNSUPPORTED BARS SHALL BE TIED IN THE TRANSVERSE DIRECTION TO N12 AT 400 CENTRES.
- R6. HOT BENDING OF REINFORCEMENT IS NOT PERMITTED.

CONCRETE

- C1. CONCRETE PROPERTIES:

ELEMENT	AS3600 GRADE	SLUMP (mm)	MAX AGG SIZE (mm)	CEMENT TYPE
FOOTING	N25	80	20	A

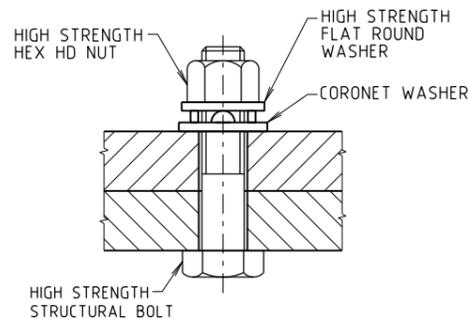
- C2. MINIMUM CLEAR COVER TO ANY REINFORCEMENT COMPLYING WITH AS3400 SHALL BE 75mm FOR FOOTINGS.
- C3. NO HOLES OR CHASES OR EMBED PIPES IN CONCRETE MEMBERS UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
- C4. REINFORCEMENT IS SHOWN DIAGRAMATICAL, IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- C5. SPLICES OF REINFORCEMENT SHALL ONLY BE MADE IN POSITIONS SHOWN.
- C6. WRITTEN APPROVAL OF THE ENGINEER SHALL BE OBTAINED FOR ANY OTHER SPLICES.
- C7. WHERE LAP LENGTHS ARE NOT SHOWN THEY SHALL SATISFY THE REQUIREMENTS OF AS3600.
- C8. DO NOT WELD REINFORCEMENT UNLESS SHOWN ON THE DRAWINGS.
- C9. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600.
- C10. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF ANY APPLIED FINISHES.

STEEL

- S1. ALL STEELWORK SHALL CONFIRM WITH THE FOLLOWING AUSTRALIAN STANDARDS: AS1163, AS4671, AS1450, AS1594, AS3678, AS3679 AND AS4100, AND OTHER AUSTRALIAN STANDARDS AS APPROPRIATE.
- S2. ALL WELDING OF STEEL SHALL BE IN ACCORDANCE WITH AS1554.1. PREHEATING REQUIREMENTS AND INTER-RUN CONTROL SHALL CONFORM WITH AS1554.1-CLASS 5.3.
- S3. WELD QUALITY SHALL BE OF "SP" CATEGORY USING PRE QUALIFIED WELDING CONSUMABLES AS INDICATED IN TABLE SHOWN. EXCEPT FOR ANCHOR BOLTS AND RHS CAPPING PLATES AND ANY SOCKETS THAT MAY BE "GP" CATEGORY WELDS.
- S4. NOTICE SHOULD BE GIVEN BY THE FABRICATOR TO THE PRINCIPLE AFTER WELD PREPARATION AND SET UP, BUT PRIOR TO WELDING, FOR INSPECTION OF SETUP AND WELD PROCEDURE.
- S5. ALL STEEL COMPONENTS SHALL CONFORM TO THE FOLLOWING TABLE UNO.

SECTIONS/ COMPONENTS	AUSTRALIAN STANDARD	GRADE
PLATES	AS3678	350 (UNO)
HOTROLLED SECTIONS	AS3679	300
CHS < DIA 457	AS1163	350 MIN
CHS > DIA 457	AS1163	250 MIN UNO
RHS	AS1163	350
SHS	AS1163	350
FLAT BARS, RODS	AS3679	250

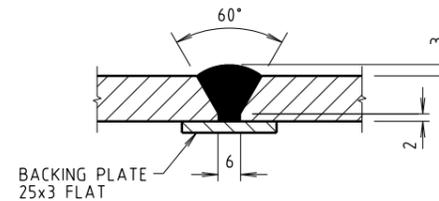
- S6. REMOVE ALL BURRS AND SHARP EDGES AFTER FABRICATION.
- S7. ALL STEELWORK TO BE FREE FROM PITTING AND CLEANED OF LOOSE MILL SCALE, LOOSE RUST AND FOREIGN PARTICLES EITHER BY BLAST CLEANING OF OTHER EFFECTIVE METHOD THEN HOT DIPPED GALVANISED TO AS4680 WITH MINIMUM FILM THICKNESS OF 100 MICRONS.
- S8. FASTENERS TO CONFIRM WITH RELEVANT AUSTRALIAN STANDARDS AS1111, AS1112, AS1237 AND HOT DIPPED GALVANISED TO AS1214.
- S9. WRITE IN WELD DRAWING NUMBER ON POST 1000mm ABOVE BASE PLATE OR AS DIRECTED.
- S10. WHEN USING SHORT LENGTHS THE FIRST BUTT WELD CONNECTION MUST NOT OCCUR WITHIN 1500mm FROM BASE PLATE UNLESS STATED OTHERWISE.
- S11. ALL TAPPED HOLES IN END PLATE OF POST AND ARMS TO RECEIVE A COATING OF "KOPR-KOTE" OR EQUIVALENT ON APPLICATION OF BOLT AFTER GALVANISING.
- S12. BOLT DESIGNATION
- 4.6S COMMERCIAL BOLTS OF GRADE 4.6 TO AS1111 SNUG TIGHTENED.
- 8.8S HIGH STRENGTH STRUCTURAL BOLTS, NUTS & WASHERS OF GRADE 8.8 TO AS1252 SNUG TIGHTENED.
- 8.8TB HIGH STRENGTH STRUCTURAL BOLTS, NUTS & WASHERS OF GRADE 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A BEARING JOINT.
- 8.8TF HIGH STRENGTH STRUCTURAL BOLTS, NUTS & WASHERS OF GRADE 8.8 TO AS1252 FULLY TENSIONED TO AS4100 AS A FRICTION JOINT.



CORONET LOAD INDICATOR WASHER ASSEMBLY DETAIL

PREQUALIFIED WELDING CONSUMABLES

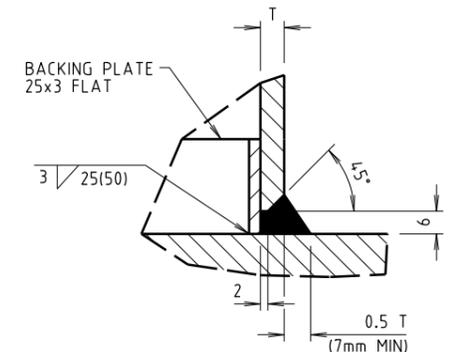
STEEL GRADE IN	WELD METAL CLASSIFICATION		
	MANUAL METAL-ARC AS1553.1	GRADE	SUBMERGED ARC - AS1858.1 FLUX CORED - AS2203 GAS METAL ARC - AS2717
AS1163			
AS3678			
AS3679			
250, C250, 300	E41XX, E48XX	0 AND 1	W40X, W50X
250LO, C250LO, 300LO	E41XX, E48XX	2	W402, W502
250L15, 300L15	E41XX, E48XX	3	W403, W503
350, C350, WR350	E48XX, E41XX	0 AND 1	W50X, W40X
400, C400			
350LO, C350LO, WR350LO	E48XX, E41XX	2	W502, W402
400LO, C450LO			
350L15, 400L15,	E48XX, E41XX	3	W503, W403
WR350L15	E48XX, E41XX	3	W503, W403



BUTT WELD CONNECTION

SEE NOTE No. S12

SUBMERGED ARC WELDING IS ACCEPTABLE PROVIDED FULL PENETRATION TESTS HAVE BEEN APPROVED BY THE RTA



RHS-FLANGE PLATE CONNECTION

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CONSTRUCTION NOTES

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 PHONE (02) 8837-0884
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Quality Standard
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 Lic. 082 7443
 Standards Australia

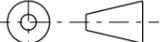
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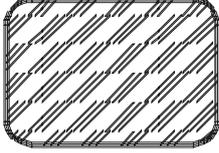
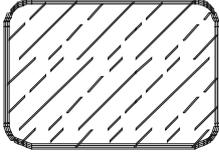
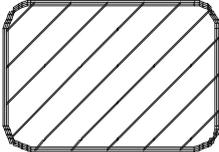
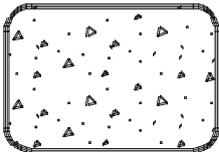
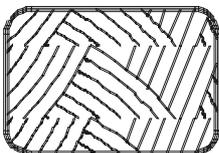
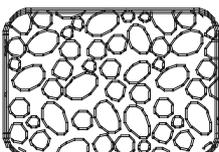
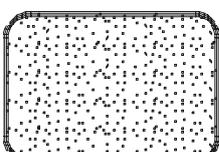
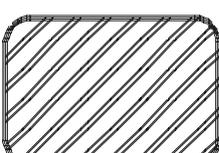
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3.7.14. Appendix B Standard Hatching and Shading Symbols

NAME	DESCRIPTION	
ALUM	ALUMINIUM PATTERN	
BRASS	BRASS OR BRONZE PATTERN	
STEEL	STEEL PATTERN	
CONCRT	CONCRETE PATTERN	
EARTH	EARTH OR NATURAL GROUND PATTERN	
GRAVEL	GRAVEL POROUS FILL PATTERN	
SAND	SAND OR GROUT PATTERN	
BRICK	BRICK PATTERN	
STONE	STONE PATTERN	