

SCC Drafting and Design Presentation Standards

Introduction

This manual provides the drafting and design presentation standards for the production of all drawings and project electronic models delivered as outputs of the planning and/or design activity of infrastructure projects performed for the Sunshine Coast Council. The primary purpose of these instructions is to specify “the design” of the proposed project and to convey the engineering “requirements for tendering and construction” of infrastructure.

The primary purpose of project drawings is to clearly represent the design that is required to be constructed. It is important that the shapes and location of the different materials together with their interfaces are clearly articulated. The information shown must be adequate for the tendering and construction contractor to be able to calculate any construction information from the drawings.

Functional drafting refers to a technique that eliminates all unnecessary detail while maintaining the full clarity, completeness and accuracy of the finished drawing without being subject to variable interpretation. The use of rectified aerial photography as the backdrop for engineering survey used in the planning and/or design process is one method of achieving this approach. This is because the impacts of the design process (either immediate or surrounding) are immediately recognisable without the need for further detailing.

Signing Drawings

The first initial and surname of the relevant surveyor / designers, are printed in the title block. These people do not need to sign the drawings.

The relevant Discipline Reviewer signs and dates the relevant drawings on the final drawing set when they are satisfied that the design is fit-for-purpose.

The Design Checker, Reviewer and Coordinator sign and date in the relevant area on the final drawing set when they are satisfied that the design is fit-for-purpose.

The attributed project electronic model is becoming a standard method to check the design together with its interfaces with the site and various design interfaces, and between design disciplines. Once the design has been checked via the project electronic model, the projects engineering drawings can then be produced directly from this model. This process is designed to achieve a good engineering output avoiding errors in the project electronic model and engineering drawings.

Visualisations can also be produced to assist tendering and constructors to identify what they have to build.

Construction drawing development process

'Issued for Construction' is the term given to the first project drawing/s produced and released for inclusion in the project. These drawings are the 'A' drawings initially issued that have all the appropriate signatures for approvals prior to the drawings being placed in the documentation for project construction.

'Design Revision' is the term used when a project drawing has design content amended after it has been released for construction. Areas in the drawing where the content design has been amended must show clouds around amendments. The checker of the amendments must hand sign and date in the signature box on the final print media with the original reviewer and coordinator names printed. Revision identifiers matching the new revision is then recommended and approved with initials in the relevant area in the bottom left hand side of the title block. Clouds from the previous revision are to be removed.

'As Constructed' drawings are those drawings that represent the design as it has been constructed, including any design modifications made since the Issued for Construction issue of the drawings.

Standard drawings have been developed to reduce the number of details that have to be shown in the project drawings. These standard drawings are provided in the Councils' Standard Drawings Index and are updated on a regular basis, and can be referenced in the design documentation.

Linework

All linework on drawings shall be in accordance with the layer names and colours are provided in the “SCC Civil Title Block” template. The thicknesses of lines are to be used on the drawings without change. All Subsurface Utility Information (SUI) is to be shown in accordance with the Australian Standard 5488. The linetype is to indicate the Quality Level of the SUI.

<u>SUBSURFACE UTILITY INFORMATION (SUI) LEGEND</u>	
<u>A S 5488-2013</u>	
— COFU(QL - A) — — — — —	Optic Fibre - Quality Level A
— COFU(QL - B) — — — — —	Optic Fibre - Quality Level B
— COFU(QL - C) — — — — —	Optic Fibre - Quality Level C
— COFU(QL - D) — — — — —	Optic Fibre - Quality Level D
— C(QL - A) — — — — —	Communications - Quality Level A
— C(QL - B) — — — — —	Communications - Quality Level B
— C(QL - C) — — — — —	Communications - Quality Level C
— C(QL - D) — — — — —	Communications - Quality Level D
— E(QL - A) — — — — —	Electricity - Quality Level A
— E(QL - B) — — — — —	Electricity - Quality Level B
— E(QL - C) — — — — —	Electricity - Quality Level C
— E(QL - D) — — — — —	Electricity - Quality Level D
— S(QL - A) — — — — —	Sewer - Quality Level A
— S(QL - B) — — — — —	Sewer - Quality Level B
— S(QL - C) — — — — —	Sewer - Quality Level C
— S(QL - D) — — — — —	Sewer - Quality Level D
— SRM(QL - A) — — — — —	Sewer Rising Main - Quality Level A
— SRM(QL - B) — — — — —	Sewer Rising Main - Quality Level B
— SRM(QL - C) — — — — —	Sewer Rising Main - Quality Level C
— SRM(QL - D) — — — — —	Sewer Rising Main - Quality Level D
— SH(QL - A) — — — — —	Sewer House Connection - Quality Level A
— SH(QL - B) — — — — —	Sewer House Connection - Quality Level B
— SH(QL - C) — — — — —	Sewer House Connection - Quality Level C
— SH(QL - D) — — — — —	Sewer House Connection - Quality Level D
— W(QL - A) — — — — —	Water - Quality Level A
— W(QL - B) — — — — —	Water - Quality Level B
— W(QL - C) — — — — —	Water - Quality Level C
— W(QL - D) — — — — —	Water - Quality Level D
— WH(QL - A) — — — — —	Water House Connection - Quality Level A
— WH(QL - B) — — — — —	Water House Connection - Quality Level B
— WH(QL - C) — — — — —	Water House Connection - Quality Level C
— W(QL - D) — — — — —	Water House Connection - Quality Level D

Lettering

The lettering on all drawings shall be in accordance with the font style details as outlined below.

Text styles, heights and layer names shall be as outlined in the Table below - Text Styles

Table 1 Text Styles

APPLICATION	STYLE	LAYER	TEXT HEIGHT (Final height on A1 size drawing)	LINWEIGHT
Drawing text / Notes / Dimensions	Upper & Lower Case	D_TXT_035	3.5 mm	0.3 mm
Heights	Upper & Lower Case	D_TXT_050	4.0 mm	0.3 mm
Sub-Titles	UPPER CASE	D_TXT_050	5.0 mm	0.5 mm
Titles	UPPER CASE	D_TXT_070	7.0 mm	0.7 mm

Sections, Views and Details

General

Views and sections, where possible, shall be drawn adjacent to the plan or elevation to which they relate. Where details cannot be shown on the sheet of origin, they shall be cross referenced in accordance with *AS 1100 - Technical Drawing, Part 501: Structural Engineering Drawing* and Section 2.8 Orientation.

If a series of cutting planes are used to define sections or views, any change in direction of the cutting plane shall be shown by 0.7mm thick lines.

Use letters to nominate Sections and Views, and numbers to nominate Details. Do not reference views or sections with the same letter, or details with the same number, on the same drawing set for that element, for example Section A and View A on the abutment drawings.

Each element shall start labelling at the letter A and the number 1.

If the entire range of the alphabet is used, lettering shall continue with AA, BB etc. The letters I and O shall not be used to avoid confusion.

If the Section, View or Detail is shown on the same drawing it is taken from then '-' shall be shown in the title. If it is shown on another drawing, then the series number shall be shown, for example, 2, if referring to the second Abutment drawing.

Section arrows and titles shall be drawn in accordance with Figure below of Sections and Details.

Sections

Sections are a view taken from a defined cutting plane. Other linework such as hidden detail lines or detail beyond the cutting plane may be included provided that it does not confuse the intent of the section. For example, a section taken through a headstock showing the wing wall that is beyond the cutting plane.

Dimensions

Each dimension necessary for the complete definition of a particular element shall be clearly shown on the drawing and shall be shown once only. Dimension and leader line arrows are to be 3.5mm (A1 drawing) filled in type.

The dimensioning of any element shall be such that:-

- No dimension relating to that element need be deduced from other dimensions
- All dimensions necessary to construct the element shall be shown so that there is no need to scale off a drawing to determine a dimension
- Dimensions shown on drawings shall be in metres and shall be placed parallel and above its dimension line and be able to be read either from the bottom or the right hand side of the drawing.
- A chain of dimensions shall be covered by an overall dimension except where dimensional tolerances are of critical importance.
- Where practical, dimensions shall be placed centrally between the arrows denoting the limit for the dimension.
- Dimensions for all components shall be calculated to an accuracy of 0.001m. Dimensions to be shown on the drawings may then be rounded off as shown.
- Concrete – 0.005 metres
- Roadworks – 0.01 metres
- Heights shall be calculated to an accuracy of 0.001m. This is done to avoid any cumulative error that may occur. Heights shown on the final drawings may then be rounded off where necessary.
- Heights and Chainages shall be shown in metres to three decimal places as shown below.
- Designed surface heights - 0.001 metres
- Chainages - 0.001 metres
- Contours - 0.250 metres generally, - 0.100 metres acceptable where ground is extremely flat
- Existing surface, flood and existing water heights - as reported
- Dimension lines shall not be shown as centrelines or as part of an elements outline.
- Projection lines for dimensions shall extend from a point not less than 2mm (A1 drawing) from the surface of the object to a point not less than 2mm (A1 drawing) beyond the dimension line.
- Leader lines, projection lines, centre lines and the like are to be kept clear of dimension text, if possible, otherwise the clashing line is to be broken to provide an uninterrupted view of the dimension text.
- Leader lines shall commence from either the beginning or end of a note with a short horizontal line (length 4mm - A1 drawing) before being angled to the point of reference.
- The termination of the leader line shall be with an arrow to the outline of the element, or with a fully shaded dot (1.5mm diameter - A1 drawing) within the area being noted.
- Dimension text height shall be 3.5mm and offset 1.5mm (A1 drawing) from the dimension line.

Grades

Grades of roads and bridges shall be represented as a percentage. A slope of 5% indicates a displacement of 5 units vertically to 100 units horizontally. Grades rising in the direction of increasing chainage are shown as positive figures and grades falling in the direction of increasing chainage are shown as negative figures.

Crossfalls and Superelevations

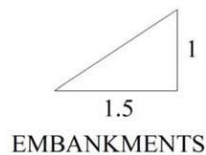
Crossfall is the resultant slope of the road surface in cross section, designed primarily to drain water from the road surface. Superelevation is the resultant slope of the road surface in cross section, designed primarily to counter the effects of a horizontal curve.

Crossfalls and superelevations of roads and bridges shall be represented as a percentage. A slope of 3% indicates a displacement of 3 units vertically to 100 units horizontally. Where a surface slope is shown an arrow shall indicate the downhill direction.

Slopes and Batters

These shall be expressed as the vertical distance, given as unity, relative to the horizontal distance, for example the slope of an embankment should be expressed as 1 on 1.5 (1 unit vertical to 1.5 units horizontal). A small right angled triangle showing the horizontal and vertical relationship may be drawn adjacent to the slope to indicate the angle of the feature being shown as follows:-

Figure 2 Slopes (1 on x)



Walls

When a wall is not set vertically, but at a slight angle to the vertical, it is said to be raked. The rake of a wall is expressed as the horizontal distance (given as unity) relative to the vertical height, for example the slope of a wall is expressed as 1 in 8 (1 unit horizontal to 8 units vertical).

Figure 3 Rake Slope (1 in x)



Contours

Contours are lines on a drawing joining points on the ground which are all at the same height above a known datum.

Contour lines are generally shown in intervals of 0.25 metres. Major contours at even metres, 123, 124 and so on, are labelled and shown as a full line. 0.25m interval minor contours are not labelled and are shown as short dashed lines

The height of a contour is to be shown at a convenient point on an even metre contour line such that each contour can be easily and clearly defined.

The frequency of numbering should be such that the height of any contour line can be determined readily.


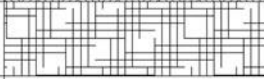







Reference Symbols

The following points are to be considered when using reference symbols:-

- Notes referenced by a symbol are to be used only when necessary, for example to reduce the number of similar notes of reference on the same drawing or to add extra notation for an item in a confined space on the drawing

- The reference note should be placed as close as possible to the point of interest on the drawing
- Use different symbols for each subsequent reference on any drawing.
- The size of the symbol is to be such that it is easily identified in all instances on an A3 size print of the drawing

Table 2 Material Symbols

MATERIAL	EXAMPLE
Earth	
Rock	
Filling	
Concrete blinding	
Mortar	
Concrete	
Compressible filler	
Joint materials	
Deck wearing surface	

Titles

Each drawing can comprises several Sections, Views and Details and each view shall be given the appropriate title using 5mm (A1 drawing) text for the title (0.7mm thick) and 3.5mm (A1 drawing) text for the scale (0.35mm thick).

Abbreviations

Abbreviations fall into three categories:-

- Metric units
- Accepted abbreviations
- When space is limited
- There is no need for a full stop in any abbreviation.

Table 3 Abbreviations - Metric Units

UNIT	SYMBOL
Degree (Celsius)	°C
Kilogram	kg
Kilometre	km
Kilopascal	kPa
Kilonewton	kN

Megapascal	MPa
Metre	m
Millimetre	mm
Tonne	t

Table 4 Accepted Abbreviations

DESCRIPTION	ABBREVIATION
Approximate	approx
Australian Height Datum	AHD
Average Recurrence Interval	ARI
Bore Hole	BH
Bench Mark	BM
Bridge Inventory System	BIS
Centreline	CL
Centres	crs
Circular Hollow Section	CHS
Construction Joint	CJ
Control Line	CTRL
Curve-Curve	CC
Curve-Tangent	CT
Deck Wearing Surface	DWS
Diameter	dia
Downstream	D/S
Environmental Design Report	EDR
Environmental Management	EMP
Plan	
Geocentric Datum of Australia	GDA
Horizontal Curve	HC
Height	Ht
Hot-dip Galvanised	galv
Inside Diameter	ID
International System of Units	SI
Intersection Point	IP
Maximum	max
Mean High Water	MHW
Mean High Water Springs	MHWS
Mean Low Water	MLW
Mean Low Water Springs	MLWS
Minimum	min
Nominal	nom

Number	No
Outside Diameter	OD
Percentage	%
Polytetrafluoroethylene	PTFE
Polyvinylchloride	PVC
Prestressed Concrete	PSC
Radius	R
Rectangular Hollow Section	RHS
Reinforced Concrete	RC
Required	reqd
Revision	rev
Reference Point	RP
Second	s
Tangent-Curve	TC
Transport and Main Roads	TMR
Unplasticised Polyvinylchloride	uPVC
Upstream	U/S
Vertical Curve	VC

When Space is Limited other than in the previous examples, using abbreviations is generally discouraged in normal drafting practice. There are however some abbreviations that may be used, if necessary, when space is limited.

DESCRIPTION	ABBREVIATION
Average	avg
Drawing Number	Drg No
Holding Down	HD
Road	Rd
Spaces	sps
Supplementary Specifications	Supp Specs
Typical	typ
Ultimate	Ult

Scales

Scales shall be shown below the title of each view of a drawing, quoting the scale used as a ratio, 1:200 at A1. All views are to be drawn to a recognised scale, for example 1:7 or 1:9.9 are not recognised scales, except where views are distorted for a specific purpose.

The scale is to be such that the drawing may be easily read when reduced to A3 size. Similar scales should not be used on the one drawing, for example 1:20 and 1:25.

Drawing views larger or smaller than needed and/or positioned sparsely on sheets necessitating extra drawings is to be avoided. Sectional and detail views are to be shown at approximately twice the size

of the view it is taken from where practical. When room on the drawing permits, the smaller of the preferred scales shall be used to fill the sheet.

Table 5 Preferred Scales

APPLICATION	SCALE
GENERAL ARRANGEMENTS	
Locality Plan	1:1000 or 1:2000
Plan	1:500 or 1:1000
Typical Sections	1:50 or 1:100
Section	1:50 or 1:100
Details	1:20 or 1:10
LONGITUDINAL SECTIONS	
Rural Road	1:500h / 1:50v
Urban Street	1:250h / 1:25v
Drainage	1:200h / 1:20v
CROSS SECTIONS	
	1:50 or 1:100
Distorted	1:100h / 1:50v
EROSION & SEDIMENT CONTROL	
Plan / Elevation	1:200 or 1:500
Sections and Details	1:50 or 1:100
LINEMARKING	
Plan / Elevation	1:500 or 1:200
Sections	1:20

Standards for engineering design drawings

Standardisation of the presentation of engineering design plans is necessary for consistency in Council's and other service provider's records and desirable for facilitating Council's use. Refer to Council's [Planning scheme policy for development works](#) Appendix SC6.14A presentation requirements.