



Assets Planning and Delivery Group
Engineering

DESIGN STANDARD DS 80

WCX CAD Standard Water Corporation eXternal (WCX) Manual

VERSION 8
REVISION 0

JUNE 2023

FOREWORD

The intent of Design Standards is to specify requirements that assure effective design and delivery of fit for purpose Water Corporation infrastructure assets for best whole-of-life value with least risk to Corporation service standards and safety. Design standards are also intended to promote uniformity of approach by asset designers, drafters and constructors to the design, construction, commissioning and delivery of water infrastructure and to the compatibility of new infrastructure with existing like infrastructure.

Design Standards draw on the asset design, management and field operational experience gained and documented by the Corporation and by the water industry generally over time. They are intended for application by Corporation staff, designers, constructors and land developers to the planning, design, construction and commissioning of Corporation infrastructure including water services provided by land developers for takeover by the Corporation.

Nothing in this Design Standard diminishes the responsibility of designers and constructors for applying the requirements of the Western Australia's Work Health and Safety (General) Regulations 2022 to the delivery of Corporation assets. Information on these statutory requirements may be viewed at the following web site location:

[Overview of Western Australia's Work Health and Safety \(General\) Regulations 2022 \(dmirs.wa.gov.au\)](https://dmirs.wa.gov.au)

Enquiries relating to the technical content of a Design Standard should be directed to the Senior Principal Engineer, Advisory Section, Engineering. Future Design Standard changes, if any, will be issued to registered Design Standard users as and when published.

Head of Engineering

This document is prepared without the assumption of a duty of care by the Water Corporation. The document is not intended to be nor should it be relied on as a substitute for professional engineering design expertise or any other professional advice.

Users should use and reference the current version of this document.

© Copyright – Water Corporation: This standard and software is copyright. With the exception of use permitted by the Copyright Act 1968, no part may be reproduced without the written permission of the Water Corporation.

DISCLAIMER

Water Corporation accepts no liability for any loss or damage that arises from anything in the Standards/Specifications including any loss or damage that may arise due to the errors and omissions of any person. Any person or entity which relies upon the Standards/Specifications from the Water Corporation website does so that their own risk and without any right of recourse to the Water Corporation, including, but not limited to, using the Standards/Specification for works other than for or on behalf of the Water Corporation.

The Water Corporation shall not be responsible, nor liable, to any person or entity for any loss or damage suffered as a consequence of the unlawful use of, or reference to, the Standards/Specifications, including but not limited to the use of any part of the Standards/Specification without first obtaining prior express written permission from the CEO of the Water Corporation.

Any interpretation of anything in the Standards/Specifications that deviates from specific Water Corporation Project requirements must be referred to, and resolved by, reference to and for determination by the Water Corporation's project manager and/or designer for that particular Project.

REVISION STATUS

The revision status of this standard is shown section by section below.

REVISION STATUS						
SECT.	VER./ REV.	DATE	PAGES REVISED	REVISION DESCRIPTION (Section, Clause, Sub-Clause)	RVWD.	APRV.
ALL	8/0	06.23	All	All sections renumbered and updated. Sections 6,7,8,13,15,&16 removed.	KM	DM
1	8/0	06.23	All	Section 1 rewritten	KM	DM
5	8/0	06.23	All	Section 5 rewritten	KM	DM

DESIGN STANDARD DS 80

WCX CAD Standard

CONTENTS

<i>Section</i>	<i>Page</i>
1 INTRODUCTION.....	9
1.1 Purpose.....	9
1.2 Scope.....	9
1.3 Mandatory Requirements	9
1.3.1 Titleblock	9
1.3.2 Units and Coordinate system	9
1.3.3 CAD software and Interdependencies.....	9
1.4 Drawing Submission Requirements:	10
1.5 General Requirements:.....	10
1.5.1 Planset Number and title, and Drawing number placeholder.....	10
1.5.2 Titleblock Attributes	10
1.5.3 Preliminary Drawings	11
1.5.4 Concept Design and Engineering Design Report Drawings	11
1.5.5 Revisions.....	11
1.5.6 Revision Clouds	11
1.5.7 Use of Standard Drawings for projects.	11
1.5.8 ‘Hold’ Points	12
1.5.9 Point Cloud or Photogrammetry Surveys	12
1.5.10 Aerial Images	12
1.6 Definitions.....	12
2 PLANSET CREATION - TYPE EXAMPLE PLANSET TITLES	13
2.1 Water Resource Recovery Facility or Wastewater Treatment Plant	13
2.1.1 Metropolitan.....	13
2.1.2 Country.....	13
2.2 Wastewater Conveyance.....	13
2.2.1 Metropolitan - Reticulation Area, Pumping Station, Pressure Main & Main/Branch Sewer.....	13
2.2.1.1 For Reticulation Area With Gravity System Only	13
2.2.1.2 For Reticulation Area With Pressure Sewer System Only	13
2.2.1.3 For Reticulation Area With Both Gravity And Pressure Sewer Systems	13
2.2.1.4 For Pumping Station And Pressure Main.....	14
2.2.1.5 For Main/Branch Sewer	14
2.2.2 Country - Reticulation Area, Pumping Station, Pressure Main & Main/Branch Sewer	14
2.2.2.1 For Reticulation Area.....	14
2.2.2.2 For Pumping Station And Pressure Main Within Single Sewer District Town	14
2.2.2.3 For Pumping Station And Pressure Main Within Multiple Sewer District Town.....	14
2.2.2.4 For Main/Branch Sewer	14
2.3 Water Supply.....	14
2.3.1 Metropolitan - Distribution or Trunk Main, Water Treatment Plant, Reservoir, Pumping Station & Groundwater Scheme	14
2.3.1.1 For Distribution or Trunk Main	14
2.3.1.2 For Water Treatment Plant.....	14
2.3.1.3 For Reservoir.....	15
2.3.1.4 For Pumping Station	15

2.3.1.5	For Groundwater Scheme	15
2.3.2	Country - Specific Project within Water Supply Scheme, Specific Project on Main Conduit & Aboriginal Community	15
2.3.2.1	For Specific Project within Water Supply Scheme	15
2.3.2.2	For Specific Project on Main Conduit	15
2.3.2.3	For Aboriginal Community	15
2.4	Metropolitan Drainage	15
2.4.1	Main Drain, Branch Drain, Pumping Station & Pressure Main, Declared Drainage Area Alteration & Declared Drainage Area Alteration (Ministerial).....	15
2.4.1.1	For Main Drain.....	15
2.4.1.2	For Branch Drain	15
2.4.1.3	For Branch Drain Pumping Station & Pressure Main.....	16
2.4.1.4	For Declared Drainage Area Alteration	16
2.4.1.5	For Declared Drainage Area Alteration (Ministerial)	16
2.5	SCADA Drawings	16
2.5.1	The set of SCADA drawings created shall consist of a SCADA Block Diagram, Communications Details and Communication Location Plan drawings.	16
2.5.1.1	For Metropolitan UWSS - Planset HZ23	16
2.5.1.2	For G&AWS MicroSCADA & UWSS - Planset CB81.....	16
2.5.1.3	For North West Region - Planset FW54	16
2.5.1.4	For Mid West Region - Planset EQ42.....	16
2.5.1.5	For South West Region - Planset HY74	17
2.5.1.6	For Great Southern Region - Planset IB24	17
2.6	Dams & Dam Safety	17
2.6.1.1	For Metropolitan	17
2.6.1.2	For Regional.....	17
2.7	Development Services	17
2.7.1	Wastewater Reticulation Area & Extension, Pumping Station, Pressure Main & Main/Branch Sewer	17
2.7.1.1	For Wastewater Reticulation Area - Subdivision Including Vacant Strata of Small Landholdings Involving a Single Stage	17
2.7.1.2	For Wastewater Reticulation Area - Staged Subdivisions	17
2.7.1.3	For Wastewater Reticulation Area – Subdivision with Advanced Works Agreement (AWA) – Concept Plans.....	18
2.7.1.4	For Wastewater Reticulation Area – Subdivision with Advanced Works Agreement (AWA) – Stages	18
2.7.1.5	For Wastewater Reticulation Area – Subdivision with Multi Staged Works Agreement (MSWA) – Concept Plans.....	18
2.7.1.6	For Wastewater Reticulation Area – Subdivision with Multi Staged Works Agreement (MSWA) – Stages	18
2.7.1.7	For Wastewater Reticulation Extension - Subdivision of Existing Serviced Lots.....	18
2.7.2	Water Supply Reticulation, Pumping Station & Distribution or Trunk Main.....	18
2.7.2.1	For Water Reticulation - Subdivision Including Vacant Strata of Small Landholdings Involving a Single Stage.....	18
2.7.2.2	For Water Supply Reticulation.....	19
2.7.2.3	For Water Supply Reticulation – Subdivision with Advanced Works Agreement (AWA) – Concept Plans	19
2.7.2.4	For Water Supply Reticulation – Subdivision with Advanced Works Agreement (AWA) – Stages	19
2.7.2.5	For Water Supply Reticulation – Subdivision with Multi Staged Works Agreement (MSWA) – Concept Plans.....	19
2.7.2.6	For Water Supply Reticulation – Subdivision with Multi Staged Works Agreement (MSWA) – Stages	19
2.7.3	Network Expansion - Wastewater & Water Extension, Private Wastewater Pumping Station & Drainage.....	19
2.7.3.1	For Wastewater Extension	19

2.7.3.2	For Water Supply Extension	19
2.7.3.3	For Private Wastewater Pumping Station	19
2.8	Country Region	20
2.8.1	Subdivision, Wastewater Extension, Water Supply Extension, Wastewater Private Pumping Station & Drainage	20
2.8.1.1	For Subdivision	20
2.8.1.2	For Staged Subdivision	20
2.8.1.3	For Wastewater Extension	20
2.8.1.4	For Water Supply Extension	20
2.8.1.5	For Wastewater & Water Supply Extension	20
2.8.1.6	For Wastewater Private Pumping Station	20
2.8.1.7	For Drainage	20
2.9	Facilities Management	20
2.9.1	For Water Corporation Depots and Offices	20
3	BUNDLE NUMBERING CONVENTION	21
3.1	Major Water Resource Recovery Facility or Wastewater Treatment Plant	22
3.2	Minor Water Resource Recovery Facility or Wastewater Treatment Plant	23
3.3	Wastewater Conveyance - Reticulation Area (Gravity &/or Pressure Sewer System).....	24
3.4	Wastewater Conveyance - Pumping Station & Pressure Main	24
3.5	Wastewater Conveyance - Main & Branch Sewer	25
3.6	Water Treatment Plants & Membrane Treatment Plants	26
3.7	Water Supply - Reticulation.....	27
3.8	Water Supply - Tank & Reservoir	27
3.9	Water Supply - Pumping Station.....	28
3.10	Water Supply - Distribution, Bore or Trunk Main.....	29
3.11	Drainage & Irrigation - Urban & Country Main Drain.....	30
3.12	Supervisory Control & Data Acquisition (SCADA)	31
3.12.1	Metropolitan – Specific Site & Country (Town & Regional) – Specific Site Drawings	31
3.12.2	SCADA Block Diagrams	31
3.12.2.1	For Metropolitan UWSS - Planset HZ23	31
3.12.2.2	For Goldfields and Agricultural Region - Planset CB81	31
3.12.2.3	For North West Region - Planset FW54	32
3.12.2.4	For Mid West Region - Planset EQ42.....	32
3.12.2.5	For South West Region - Planset HY74	32
3.12.2.6	For Great Southern Region - Planset IB24	32
3.12.2.7	Drawing Titles - SCADA.....	32
3.13	Dams & Dam Safety.....	32
3.14	Development Services Branch & Regions - Design Submissions - Water - Reticulation (for subdivisional, MSWA and AWA projects only).....	34
3.15	Development Services Branch & Regions - Design Submissions - Wastewater - Reticulation (for subdivisional, MSWA & AWA projects only).....	34
3.16	Development Services Branch & Regions – MSWA & AWA Design Submissions – Concept Plans	34
3.17	Development Services Branch & Regions - Design Submissions - Wastewater - Private Pumping Station, Pressure Main & Associated Reticulation	34

3.18	Development Services Branch & Network Expansion - Design Submissions – Drainage & Irrigation.....	35
3.19	Water Reclamation Plant	35
3.20	Procurement and Property Branch - Water Corporation Non Operation Facilities -Design Submissions.....	36
4	DRAWING DEFAULT LAYERING SYSTEMS	37
5	WATER CORPORATION – DRAWING CHECKING, APPROVAL AND CANCELLING REQUIREMENTS.....	41
5.1.1	Drawing Checking and Approval.....	41
5.1.1.1	Draftsperson and Drafting Check.....	41
5.1.1.2	Design Calculations and Check (If Design Input Within Drawing)	41
5.1.1.3	Review and Recommendation.....	41
5.1.1.4	Review and Approval.....	41
5.1.1.5	Revision Responsibilities	41
5.1.1.6	Design Survey and ‘As Constructed’ Survey Recording	42
5.1.2	Drawing Revision to Cancelled Status.....	42
5.1.2.1	Case 1	42
5.1.2.2	Case 2	42
6	WATER CORPORATION - DRAWING MANAGEMENT SYSTEM PROCEDURAL FLOW CHARTS.....	44
7	STANDARD WATER, WASTEWATER & TREATMENT PROCESS PIPEWORK DESIGNATIONS.....	49
7.1	Pipe Type Designations.....	50
7.2	Joint, Coating and Lining Designations	53
8	VERTICAL DATUM & COORDINATE SYSTEM DESIGNATIONS.....	54
8.1.1	Vertical Datum	54
8.1.2	Coordinate System for NEW Drawings	54
8.1.3	Coordinate System for REVISED Drawings	54
9	‘AS CONSTRUCTED’ DRAWING REQUIREMENTS	57
9.1	General Requirements.....	57
9.2	Format of ‘As Constructed’ Drawings.....	57
9.3	Required ‘As Constructed’ Information Detail.....	57
9.3.1	Wastewater Pumping Station &/or Pressure Main.....	58
9.3.2	Wastewater Main Sewers.....	58
9.3.3	Water Supply Distribution Pipelines.....	59
9.3.4	Water Supply Distribution Tanks.....	59
9.3.5	Dams and Dam Safety.....	60
9.3.6	Urban Main Drain & Country Drains	60
9.3.7	Water Supply Reticulation	60
9.3.8	Non Drinking Water Reticulation	60
9.3.9	Wastewater Reticulation	60
9.3.10	Water and Water Resource Recovery Facility or Wastewater Treatment Plants.....	61
10	Water Conveyance Equipment Identification Numbers	62
10.1.1	General.....	62
10.1.2	Valves and Flow Meters	62

1 INTRODUCTION

1.1 Purpose

The WCX CAD Standard DS 80 is prepared to ensure that the Water Corporation's staff, external designers, Alliance partners and contractors are informed as to the Water Corporation's drawing requirements. *It should be used in conjunction with design standards relevant to each project.*

Enquiries relating to Drawing Management and DMS processes should be emailed to pmbdrawing.management@watercorporation.com.au.

1.2 Scope

This standard covers General Drafting, Drawing Management, Drawing format, titleblock compliance and Drawing submission requirements. It is to be used in conjunction with the WCX (Water Corporation eXternal) software for AutoCAD and MicroStation, available as a download by emailing Engineering.StandardsEnquiries@watercorporation.com.au.

1.3 Mandatory Requirements

1.3.1 Titleblock

Standard Water Corporation drawing sheets are supplied in electronic form in the WCX (Water Corporation eXternal) download, for AutoCAD or MicroStation. The Contractor shall ensure that the standard electronic drawing sheet is used for all CAD produced drawings and shall ensure that all the appropriate fields within the titleblock are completed.

Each drawing prepared by the Contractor shall carry a suitable identification label (eg electronic insert) stating the title of the Contractor's firm, separate from the titleblock, but positioned within or as close to the titleblock as possible. For example, refer 'Section 5 - Drawing AA99-1-2-3A'.

The titleblock integrity shall not be changed in any way. Drawings, which fail titleblock integrity checking by the Water Corporation, will be rejected, and returned to the Contractor for correction.

1.3.2 Units and Coordinate system

All drawings produced for the Water Corporation shall be metric, in accordance with AS 1100 and drawn on A0, A1, A2, A3 or A4 sheets.

All NEW drawings and maps containing geo-spatial data, shall be drawn using the Coordinate System - Map Grid of Australia (MGA94). (The unit of measure of MGA94 is the metre; drawings in mm are not considered MGA94.)

1.3.3 CAD software and Interdependencies

Drawings shall be supplied in a version of AutoCAD currently supported by Water Corporation. MicroStation drawings are accepted when existing MicroStation drawings are being revised. Conversion of drawings from MicroStation to AutoCAD is not acceptable unless prior approval is given. Drawings in AutoCAD LT, AutoCAD for Mac, Drafix, DesignCAD, Bricscad or similar format will not be accepted. Where an existing asset has a combination of formats contact the DMS Team for direction. **Note: This does not apply to electrical or I&C drawings which are required to be in AutoCAD only**

Any electronic drawings supplied to the Water Corporation must be independent of any dependencies on software other than AutoCAD or MicroStation. This software includes applications based on AutoCAD or MicroStation, object enablers, third party applications, and so on. The software may be used during the creation and modification of drawings, but any drawing provided to the Water Corporation must not retain any reliance on such software in order to maintain the drawing's completeness or correctness.

1.4 Drawing Submission Requirements:

For all submitted drawings, the DMSOUT routine shall be run from inside AutoCAD or MicroStation and the resultant output (dwg, dgn or zip & tit) files sent as detailed in the drawing submission instructions. The resultant output files can be found in the C:\aquaDRAW\CheckIn folder (although the setting for this location may be user-modified after installation). The DMSOUT routine interrogates the titleblock and verifies that it has been completed correctly and is DMS compliant. Refer 'Section 5'.

The drawings shall include any Xref (AutoCAD) or Reference (MicroStation) files relating to those particular drawings. AutoCAD drawings shall not reference MicroStation drawings and MicroStation drawings shall not reference AutoCAD drawings. It is important to note that no registered drawing submitted to the Water Corporation for final acceptance may attach any other registered drawing as a reference or Xref file.

1.5 General Requirements:

1.5.1 Planset Number and title, and Drawing number placeholder.

A Planset is a collection of drawings which are all related to the same project or asset. Each Planset has a unique number (Planset number) and a two line descriptor (Planset title). The current Planset number format is <double alpha><double numeric> eg AL46 - Refer section 2

The bundle number is a numeric within the complete drawing number, which is used to identify a group of drawings relating to a specific process or portion of the project - Refer section 3

Example: Drawing number **AA99-mmm-nnn-xxA**

Note: It is NOT necessary to zero pad the bundle, sheet, or part sheet numbers within drawing number

Where **AA99** = Planset number

mmm = bundle number

nnn = sheet number

xx = part sheet number (not necessary to show on drawing unless used. Part sheets are to be used for multiple drawings with the same title. The fourth line should include ('SHEET X OF Y') or (PART 1,2 etc on electrical drawings)

A = issue letter (revision issue)

The Water Corporation will supply the formal Planset number, title and Drawing number Placeholder upon request. Refer section 6 – Procedural Flow Charts.

1.5.2 Titleblock Attributes

Standard Drawing templates are provided with the WCX Download.

The following should be read in conjunction with Section 5 including the Sample Titleblock.

The Contractor shall modify and complete the Water Corporation titleblock as follows:-

- (a) Drawing number – Supplied By Water Corporation
- (b) Issue number
- (c) Planset titles 1&2 - Supplied By Water Corporation
- (d) Drawing line 3 & 4 (not mandatory)
- (e) Project Number
- (f) Recommended Name, date and title
- (g) Approved Name, date and title
- (h) DRN & QC CHD

- (i) DES CALC & DES CHK
- (j) Vertical Datum (can be NONE)
- (k) Co-ordinate System (can be NONE)
- (l) For drawings after revision A, The revision issue, Date, Revision description , DRN. REC & APPD

1.5.3 Preliminary Drawings

All preliminary drawings/images submitted for “comment” shall be marked “preliminary” by using the PRELIM PDF routine and Alpha numeric revision numbering used eg A1,A2. Revision clouds should be used to show changes between preliminary revisions. Revision clouds should be removed prior to revision A submissions. **Note: This does not apply to electrical or I&C drawings.**

1.5.4 Concept Design and Engineering Design Report Drawings

All Engineering Summary Report (ESR) and Concept Design Report (CDR) Drawings shall be marked as such with a bold note in the body of the drawing as close to the bottom right as possible. See sample titleblock layout – Section 5. **Note: This does not apply to Electrical Design Summary Drawings (bundle 40)**

1.5.5 Revisions

All new drawings submitted to the Water Corporation for final acceptance and archival into the Water Corporation’s Drawing Management System (DMS) shall be issue ‘A’. ie. no entry to be inserted into the ‘Revision’ field of the titleblock. If the issue ‘A’ drawing contains ‘As Constructed’ information, the drawing shall be identified accordingly with a prominent block within the body of the drawing labelled "As Constructed" or similar and signed and dated by the constructor to certify ‘As Constructed’ data accuracy. **(For electrical drawings refer to Electrical Design Standards.)**

Only previously archived drawings which have been checked-out of the DMS for revision will be accepted with an updated issue in the ‘Revision’ field of the titleblock. When a drawing is required for revision, it shall be requested following the procedural flow charts in section 6, then modified and returned with a new issue (revision) letter. Software to revise titleblocks is provided with the WCX download.

1.5.6 Revision Clouds

Revision clouds can be used to show design changes between revisions or for drawings partially updated to As Constructed. **For electrical drawings refer to Electrical Design Standards.**

1.5.7 Use of Standard Drawings for projects.

If an existing Water Corporation Standard or Example drawing is required to be used (see note) for a project, then the Standard or Example drawing shall be checked out of the DMS for copy and all the titleblock information shall be updated to represent the Project. A bold note shall also be included in the body of the drawing to identify the source Standard or Example drawing. eg. “This drawing has been derived from XY99-99-1A”. It is most important to include the Revision letter of the Standard or Example drawing in the bold note.

Note: It is not a requirement to include Standard Water or Wastewater reticulation or pipe fittings drawings in the project Planset. However, if any reference to a Standard drawing is required, the specific drawing number (including revision) shall be stated.

1.5.8 ‘Hold’ Points

‘Hold’ points can be used on drawings where final dimensions or configurations are unknown or may be subject to change. Items which are impacted by this shall be indicated by use of ‘reverse cloud’ diagrams and the word ‘**Hold**’ with descriptive text to highlight outstanding or vendor specific information required.”.

The ‘Hold’ indicates to the Designer and Design Manager that further information is required or that design may change prior to construction, and the design is not complete. *Reverse clouds are not used or recommended for electrical drawings.*

1.5.9 Point Cloud or Photogrammetry Surveys

These may be used during the creation and modification of drawings, but any drawing provided to the Water Corporation must not retain any reliance on the survey in order to maintain the drawing's completeness or correctness.

1.5.10 Aerial Images

Aerial Images may be used during the creation and modification of drawings. Images must be limited to the area of interest and shall be the minimum resolution required to provide clear presentation.

1.6 Definitions

DMS	Water Corporation’s Drawing Management System.
WCX CAD Standard DS80	WCX Download & WCX Manual
DSBU	Development Services Business Unit

2 PLANSET CREATION - TYPE EXAMPLE PLANSET TITLES

The following example Planset titles are to be used as a guide only. When a user is creating a new Planset, they shall adhere to the examples shown so that consistency will be maintained throughout Planset titles within the Water Corporation's Drawing Management System (DMS).

The mandatory Planset title lines 1 and 2 are system protected and once registered, may only be modified by the System Administrator. Every drawing within a particular Planset will have the same Planset title lines 1 and 2.

2.1 Water Resource Recovery Facility or Wastewater Treatment Plant

Planset Creation - Type Example Planset Titles:

2.1.1 Metropolitan

Line 1 METROPOLITAN WASTEWATER TREATMENT
Line 2 **NAME** WATER RESOURCE RECOVERY FACILITY
OR
Line 2 **NAME** WASTEWATER TREATMENT PLANT

2.1.2 Country

Line 1 **TOWN** WASTEWATER TREATMENT
Line 2 WATER RESOURCE RECOVERY FACILITY
OR
Line 2 WASTEWATER TREATMENT PLANT

2.2 Wastewater Conveyance

Planset Creation - Type Example Planset Titles:

2.2.1 Metropolitan - Reticulation Area, Pumping Station, Pressure Main & Main/Branch Sewer

It is important to remember that Reticulation Area and Pumping Station/Pressure Main Plansets must have separate Planset numbers except for Prerequisites to Works plans.

2.2.1.1 For Reticulation Area With Gravity System Only

Line 1 METROPOLITAN WASTEWATER
Line 2 RETICULATION AREA EAST CANNINGTON 8G

2.2.1.2 For Reticulation Area With Pressure Sewer System Only

Line 1 METROPOLITAN WASTEWATER - PRESSURE SEWER SYSTEM
Line 2 RETICULATION AREA CLAREMONT 1A

2.2.1.3 For Reticulation Area With Both Gravity And Pressure Sewer Systems

Line 1 METROPOLITAN WASTEWATER - GRAVITY & PRESSURE SEWER SYSTEM
Line 2 RETICULATION AREA BASSENDEAN 16A

2.2.1.4 For Pumping Station And Pressure Main

- Line 1 METROPOLITAN WASTEWATER
- Line 2 EAST CANNINGTON PUMPING STATION NO.017-04 - SEVENOAKS ST & PM

2.2.1.5 For Main/Branch Sewer

- Line 1 METROPOLITAN WASTEWATER
- Line 2 DN1200 WANNEROO MAIN SEWER - SECTION 3 - EAST ROAD

2.2.2 Country - Reticulation Area, Pumping Station, Pressure Main & Main/Branch Sewer

2.2.2.1 For Reticulation Area

- Line 1 QUAIRADING WASTEWATER
- Line 2 RETICULATION AREA QUAIRADING 1A

2.2.2.2 For Pumping Station And Pressure Main Within Single Sewer District Town

- Line 1 QUAIRADING WASTEWATER
- Line 2 PUMPING STATION NO.1 - GREAT EASTERN HIGHWAY & PM

2.2.2.3 For Pumping Station And Pressure Main Within Multiple Sewer District Town

- Line 1 MANDURAH WASTEWATER
- Line 2 DAWESVILLE PUMPING STATION NO.14 - ESTUARY RD & PM

2.2.2.4 For Main/Branch Sewer

- Line 1 ALBANY WASTEWATER
- Line 2 DN1200 BAYONET HEAD MAIN SEWER - SECTION 1 - YORK STREET

2.3 Water Supply

Planset Creation - Type Example Planset Titles:

2.3.1 Metropolitan - Distribution or Trunk Main, Water Treatment Plant, Reservoir, Pumping Station & Groundwater Scheme

2.3.1.1 For Distribution or Trunk Main

- Line 1 METROPOLITAN WATER SUPPLY
 - Line 2 DN1000 DISTRIBUTION MAIN - WANNEROO RD WANNEROO
- Drawing Title
- Line 3 CLARKSON AVE TO WANNEROO RESERVOIR

2.3.1.2 For Water Treatment Plant

- Line 1 METROPOLITAN WATER SUPPLY
- Line 2 WANNEROO WATER TREATMENT PLANT PINJAR

2.3.1.3 For Reservoir

- Line 1 METROPOLITAN WATER SUPPLY
- Line 2 NEERABUP RESERVOIR - BURNS BEACH ROAD

2.3.1.4 For Pumping Station

- Line 1 METROPOLITAN WATER SUPPLY
- Line 2 NEERABUP TRANSFER PUMPING STATION - FLYNN DRIVE

2.3.1.5 For Groundwater Scheme

- Line 1 METROPOLITAN WATER SUPPLY
- Line 2 NEERABUP GROUNDWATER SCHEME

2.3.2 Country - Specific Project within Water Supply Scheme, Specific Project on Main Conduit & Aboriginal Community

2.3.2.1 For Specific Project within Water Supply Scheme

- Line 1 DONNYBROOK WATER SUPPLY
- Line 2 WATER TREATMENT PLANT - BRIDGE STREET

2.3.2.2 For Specific Project on Main Conduit

- Line 1 GOLDFIELDS & AGRICULTURAL WATER SUPPLY MAIN CONDUIT
- Line 2 WALGOOLAN BOOSTER PUMPING STATION

2.3.2.3 For Aboriginal Community

- Line 1 WATER SUPPLY TANKS - KALUMBURU ABORIGINAL COMMUNITY
- Line 2 1125M3 RCC TANK – MANGO STREET

2.4 Metropolitan Drainage

It is important to note that each existing Metropolitan Drain has its own Planset number, ie any new drawings created for an existing drain will maintain the current Planset number.

Planset Creation - Type Example Planset Titles:

2.4.1 Main Drain, Branch Drain, Pumping Station & Pressure Main, Declared Drainage Area Alteration & Declared Drainage Area Alteration (Ministerial)

2.4.1.1 For Main Drain

- Line 1 METROPOLITAN DRAINAGE
- Line 2 WILLIAM ROAD MAIN DRAIN 61701

2.4.1.2 For Branch Drain

- Line 1 METROPOLITAN DRAINAGE
- Line 2 HIRD ROAD BRANCH DRAIN 80504

2.4.1.3 For Branch Drain Pumping Station & Pressure Main

- Line 1 METROPOLITAN DRAINAGE
- Line 2 MERRICK WAY BRANCH DRAIN 30302 PUMPING STATION & PM

2.4.1.4 For Declared Drainage Area Alteration

- Line 1 METROPOLITAN DRAINAGE - DECLARED DRAINAGE AREA ALTERATION
- Line 2 ELLENBROOK 2000 ADDITIONS
- Drawing Title
- Line 3 LOCALITY PLAN

2.4.1.5 For Declared Drainage Area Alteration (Ministerial)

- Line 1 METROPOLITAN DRAINAGE - DECLARED DRAINAGE AREA ALTERATION
- Line 2 ELLENBROOK 2000 ADDITION
- Drawing Title
- Line 3 SIGNATURE PLAN - SHEET 1 OF X

2.5 SCADA Drawings

All SCADA assets that include connection to the UWSS (Utility Wide SCADA System), shall have an associated set of SCADA drawings created.

2.5.1 The set of SCADA drawings created shall consist of a SCADA Block Diagram, Communications Details and Communication Location Plan drawings.

The drawings shall be allocated to Plansets as shown below:

2.5.1.1 For Metropolitan UWSS - Planset HZ23

- Line 1 METROPOLITAN WATER SUPPLY AND WASTEWATER
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.5.1.2 For G&AWS MicroSCADA & UWSS - Planset CB81

- Line 1 GOLDFIELDS & AGRICULTURAL REGION
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.5.1.3 For North West Region - Planset FW54

- Line 1 NORTH WEST REGION
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.5.1.4 For Mid West Region - Planset EQ42

- Line 1 MID WEST REGION
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.5.1.5 For South West Region - Planset HY74

- Line 1 SOUTH WEST REGION
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.5.1.6 For Great Southern Region - Planset IB24

- Line 1 GREAT SOUTHERN REGION
- Line 2 SCADA CONTROL AND COMMUNICATIONS

2.6 Dams & Dam Safety

Planset Creation - Type Example Planset Titles:

2.6.1.1 For Metropolitan

- Line 1 METROPOLITAN WATER SUPPLY
- Line 2 CANNING DAM

2.6.1.2 For Regional

- Line 1 SOUTH WEST REGION
- Line 2 HARRIS DAM

2.7 Development Services

Planset Creation - Type Example Planset Titles:

2.7.1 Wastewater Reticulation Area & Extension, Pumping Station, Pressure Main & Main/Branch Sewer

2.7.1.1 For Wastewater Reticulation Area - Subdivision Including Vacant Strata of Small Landholdings Involving a Single Stage

- Line 1 METROPOLITAN SUBDIVISION WAPC 105861 [OR VS 445-07]
 - Line 2 LOT 13 CNR GAY & HARPENDEN STS HUNTINGDALE
- Drawing Title
- Line 3 WASTEWATER - HUNTINGDALE 6

2.7.1.2 For Wastewater Reticulation Area - Staged Subdivisions

- Line 1 METROPOLITAN SUBDIVISION WAPC 105862
 - Line 2 LIVINGSTONE GARDENS THORN LIE - STAGE 2
- Drawing Title
- Line 3 WASTEWATER - HUNTINGDALE 6

2.7.1.3 For Wastewater Reticulation Area – Subdivision with Advanced Works Agreement (AWA) – Concept Plans

Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 AWA
Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – CONCEPT PLANS
Drawing Title
Line 3 WASTEWATER – YANCHEP 1

2.7.1.4 For Wastewater Reticulation Area – Subdivision with Advanced Works Agreement (AWA) – Stages

Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 AWA
Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – STAGE ‘X’

2.7.1.5 For Wastewater Reticulation Area – Subdivision with Multi Staged Works Agreement (MSWA) – Concept Plans

Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 MSWA
Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – CONCEPT PLANS
Drawing Title
Line 3 WASTEWATER – YANCHEP 1

2.7.1.6 For Wastewater Reticulation Area – Subdivision with Multi Staged Works Agreement (MSWA) – Stages

Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 MSWA
Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – STAGE ‘X’

2.7.1.7 For Wastewater Reticulation Extension - Subdivision of Existing Serviced Lots

Line 1 METROPOLITAN SUBDIVISION WAPC 100830
Line 2 LOT 14 CNR MITFORD & SERVETUS STS CLAREMONT
Drawing Title
Line 3 WASTEWATER - CLAREMONT 1D - EXTENSION

2.7.2 Water Supply Reticulation, Pumping Station & Distribution or Trunk Main

2.7.2.1 For Water Reticulation - Subdivision Including Vacant Strata of Small Landholdings Involving a Single Stage

Line 1 METROPOLITAN SUBDIVISION WAPC 105861 [OR VS 445-07]
Line 2 LOT 13 CNR GAY & HARPENDEN STS HUNTINGDALE
Drawing Title
Line 3 WATER SUPPLY - GOSNELLS RIVERTON GRAVITY

2.7.2.2 For Water Supply Reticulation

- Line 1 METROPOLITAN SUBDIVISION WAPC 100000
- Line 2 LIVINGSTONE GARDENS THORNIE - STAGE 2
- Drawing Title
- Line 3 WATER SUPPLY - GOSNELLS RIVERTON GRAVITY

2.7.2.3 For Water Supply Reticulation – Subdivision with Advanced Works Agreement (AWA) – Concept Plans

- Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 AWA
- Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – CONCEPT PLANS
- Drawing Title
- Line 3 WATER SUPPLY – YANCHEP GRAVITY

2.7.2.4 For Water Supply Reticulation – Subdivision with Advanced Works Agreement (AWA) – Stages

- Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 AWA
- Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – STAGE ‘X’

2.7.2.5 For Water Supply Reticulation – Subdivision with Multi Staged Works Agreement (MSWA) – Concept Plans

- Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 MSWA
- Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – CONCEPT PLANS
- Drawing Title
- Line 3 WATER SUPPLY – YANCHEP GRAVITY

2.7.2.6 For Water Supply Reticulation – Subdivision with Multi Staged Works Agreement (MSWA) – Stages

- Line 1 METROPOLITAN SUBDIVISION WAPC 143298 123456 MSWA
- Line 2 LOT 609 YANCHEP BEACH ROAD YANCHEP – STAGE ‘X’

2.7.3 Network Expansion - Wastewater & Water Extension, Private Wastewater Pumping Station & Drainage

2.7.3.1 For Wastewater Extension

- Line 1 WASTEWATER SCARBOROUGH 19F - EXTENSION
- Line 2 LOT 264 SOUTHBOURNE STREET SCARBOROUGH

2.7.3.2 For Water Supply Extension

- Line 1 WATER SUPPLY - THOMPSONS LAKE GRAVITY - EXTENSION
- Line 2 LOT 226 JANDAKOT ROAD SOUTH LAKE

2.7.3.3 For Private Wastewater Pumping Station

- Line 1 WASTEWATER BALCATT 15C - PRIVATE PUMPING STATION
- Line 2 LOT 2 KING EDWARD ROAD OSBORNE PARK

2.8 Country Region

Planset Creation - Type Example Planset Titles:

2.8.1 Subdivision, Wastewater Extension, Water Supply Extension, Wastewater Private Pumping Station & Drainage

2.8.1.1 For Subdivision

- Line 1 SOUTH WEST REGION SUBDIVISION WAPC 109836
- Line 2 LOT 1 LESLIE STREET EATON

2.8.1.2 For Staged Subdivision

- Line 1 MID WEST REGION SUBDIVISION WAPC 126424
- Line 2 LOTS 2113 & 2114 CHAPMAN ROAD SUNSET BEACH - STAGE 1B

2.8.1.3 For Wastewater Extension

- Line 1 SOUTH WEST REGION WASTEWATER EXTENSION
- Line 2 LOT 500 COLLEGE AVENUE BUSSELTON

2.8.1.4 For Water Supply Extension

- Line 1 SOUTH WEST REGION WATER SUPPLY EXTENSION
- Line 2 LOT 811 CASUARINA DRIVE BUNBURY

2.8.1.5 For Wastewater & Water Supply Extension

- Line 1 GOLDFIELDS & AGRIC REGION WATER & WASTEWATER EXTENSION
- Line 2 LOTS 159, 161 & 163 CNR DUKE & MORRELL STREETS NORTHAM

2.8.1.6 For Wastewater Private Pumping Station

- Line 1 MID WEST REGION WASTEWATER PRIVATE PUMPING STATION
- Line 2 LOT 227 CADIZ STREET CERVANTES

2.8.1.7 For Drainage

- Line 1 SOUTH WEST REGION - BUSSELTON DRAINAGE DISTRICT
- Line 2 VASSE RIVER DIVERSION UPGRADE TO 100 YEAR FLOOD LEVEL

2.9 Facilities Management

2.9.1 For Water Corporation Depots and Offices

- Line 1 WATER CORPORATION - FACILITIES MANAGEMENT
- Line 2 WYNDHAM DEPOT OFFICE & WORKSHOP - COVERLEY STREET

3 BUNDLE NUMBERING CONVENTION

This is a numeric within the complete drawing number, which is used to identify a group of drawings relating to a specific process or portion of the project.

External Contractors producing drawings for an existing Planset number, shall seek confirmation from the Water Corporation's Project Manager, Design Manager, DSBU Advisor for the next available drawing number in the appropriate bundle.

All drawings being produced externally with a new Planset number will have the bundle number allocated by the External Contractor. A copy of the drawing list should be sent to the Water Corporation's Project Manager, Design Manager, DSBU Advisor for registration of placeholders, following the procedural flow charts in section 6.

Important note: For ELECTRICAL and/or INSTRUMENTATION drawings of existing assets only.

Where an existing site is to be upgraded or new assets are to be added to an existing site, it is essential the existing planset(s) for the site be considered first and that the final drawing package incorporates drawings of both existing and new works/assets. The new works can be separated from existing drawings by using new drawing numbers under an existing bundle, or by adding new bundle numbers to the Planset.

The designer shall consider the extent of the works and liaise with the Water Corporation's project Design Manager and/or Electrical Advisor to agree a suitable approach to the numbering system. The numbering systems for existing assets shall be strictly adhered to.

The designer shall update existing drawings where applicable to describe assets and circuits that are to be modified during the new works and shall arrange with the Water Corporation's Project Manager, for the cancellation of obsolete drawings where assets are to be removed or made obsolete by the project. However, the designer will not be held responsible for the validity of previous existing drawing information unless specifically directed by the Project Manager to carry out a site audit and update of the existing drawings.

All proposed drawing numbers for ELECTRICAL and INSTRUMENTATION drawings shall be approved by the Water Corporation's project Design Manager and/or Electrical Advisor prior to the creation of drawing/s.

The person responsible for allocating a new bundle number/s, shall adhere to the lists shown so that consistency will be maintained throughout drawing numbering within the Drawing Management System (DMS).

3.1 Major Water Resource Recovery Facility or Wastewater Treatment Plant

Drawing Contents Description	Bundle No.
Prerequisites to Works plan.....	0
Site location plan.....	1
Inlet works. All structures & equipment up to screen.....	1
Pre-chlorination/chemical conditioning.....	2
Screens/comminutor/macerator etc.....	3
Grit channels/tanks/chambers.....	4
Pre-aeration.....	5
Primary sedimentation tanks & raw sludge pumping station.....	6
Raw sludge pumping station (if separate).....	7
Aeration tanks.....	8
Blower house.....	9
Final sedimentation tanks & activated sludge pumping station.....	10
Activated sludge pump station (if separate).....	11
Prevention of falls.....	14
Tertiary treatment.....	12, 13 & 15
Effluent pump station/sprinkler system/soakage basin/reclaimed effluent.....	16
Ocean outfall.....	17
Sundry.....	18
Odour control.....	19
Sludge treatment.....	20 - 24
Admin./admin. control/admin. laboratories/admin. amenities building.....	25
Workshop/workshop & amenities/workshop store building.....	26
Amenities building.....	27
Control building.....	28
Store building.....	29
Gas compressors building.....	30
Service ducts (including pipe & cable ducts).....	31
Roads/security fencing/security.....	32
Solids disposal plant.....	33
Hydraulic profile.....	34
Functional Control Diagrams (FCD's).....	35
Central compressor station (if separate).....	36
Buildings for electrical equipment.....	37 - 39
Electrical	
Primary design drawings (Minor designs).....	40
Design summary drawings (Major designs).....	40
Detail Design Drawings.....	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1).....	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs).....	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams.....	59
Cathodic protection.....	54
Process & Instrumentation Diagrams (P&ID's).....	60
Control (Binary) Logic Diagrams.....	61
Schedules.....	62 – 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework.....	70
Construction staging.....	71

Profibus Topology	72
Process Safety Plans	73
Energy recovery facility	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process... ..	95–99, 950-990

The Principal Engineer, Wastewater Treatment shall first approve any variation from this list.

3.2 Minor Water Resource Recovery Facility or Wastewater Treatment Plant

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan.....	1
Site plan and/or general arrangement / plant layouts	2
Cross sections / earthworks	3
Access chamber details	4
Discharge tower details	5
Effluent flow measurement structure details.....	6
Roads/security fencing/security	7
Aeration arrangement and details.....	8
Prevention of falls	14
Effluent pump station/sprinkler system/soakage basin/reclaimed effluent	16
Hydraulic profile	34
Functional Control Diagrams (FCD's).....	35

Note: drawings for new later works shall be numbered consecutively from the last existing number.

Buildings for electrical equipment	37- 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62- 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Profibus Topology.....	72
Process Safety Plans	73
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process... ..	95–99, 950-990

3.3 Wastewater Conveyance - Reticulation Area (Gravity &/or Pressure Sewer System)

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan.....	1
Reticulation design data plan	2
Reticulation layout plans.....	3
Miscellaneous.....	4
Detailed site survey plans.....	5
Property sewer service diagram for connection to pressure sewer system	6
Reticulation ‘As Constructed’ survey data.....	7

3.4 Wastewater Conveyance - Pumping Station & Pressure Main

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Pumping station catchment plan.....	1
Site location plan.....	1
Pressure main characteristic curve.....	1
Penstock requirements.....	1
Land requirements plan.....	1
Pressure main plan & longitudinal sections.....	2
Pressure main details	2
Air/scour valve and mobile pump pit details.....	2
Pumping station site layout plans.....	3
Pumping station site access and landscaping plans.....	3
Emergency overflow storage arrangement and details.....	3
Air Vent Arrangement.....	3
Pumping station connecting reticulation works and details.....	3
Pumping station general arrangements	4
Penstock general arrangements	4
Access chamber structural, reinforcing and ladder details.....	5
Access chamber reinforcing bar bending schedules	5
Pumping station structural details.....	5
Pumping station reinforcing details.....	5
Pumping station reinforcing bar bending schedules (if required).....	5
Pumping station reinforced concrete electrical slab	5
Pumping station superstructure structural details.....	6
Pumping station superstructure reinforcing details.....	6
Pumping station building superstructure steelwork details.....	6
Pumping station door, window and general details.....	6
Pumping station valve, control and alarm hole cover	6
Pumping station landing and support beam details.....	7
Pumping station ladder details.....	7
Pumping station overhead traveling crane details.....	7
Pumping station crane and hoist electrics maintenance platform details.....	7
Pumping station electrical conduit and support details.....	7
Pumping station pipe support and lifting chain hook details.....	7
Fabricated pipe specials details (MS, SS, CI, DI etc.).....	8
Oxygen dissolver general arrangements.....	9
Oxygen storage vessel details.....	9

Oxygen dissolver structural and reinforcing details.....	9
Oxygen dissolver ladder and platform details.....	9
Pressure main bypass pumping - pipe and valve pit general arrangement.....	10
Valve pit structural, reinforcing and ladder details	10
Flowmeter and valve pit general arrangements	11
Pit structural, reinforcing, ladder and cover details	11
Pumping station RPZ backflow prevention device	12
Pumping station ancillary drawings incl. Valve pit drain, ultrasonic support, lanyard etc	13
Prevention of falls	14
Odour Control	19
Roads/security fencing/security	32
Hydraulic profile.....	34
Functional Control Diagrams (FCD's).....	35
Buildings for electrical equipment.....	37 – 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Profibus Topology.....	72
Process Safety Plans	73
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process....	95–99, 950-990

3.5 Wastewater Conveyance - Main & Branch Sewer

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location and/or design data plan	1
Main or Branch Sewer plans and longitudinal sections	2
Access chamber structural, reinforcing and ladder details.....	3
Bend and pipe details	4
Miscellaneous details	5
Prevention of falls	14

The Principal Engineer, Wastewater Conveyance shall first approve any variation from this list.

3.6 Water Treatment Plants & Membrane Treatment Plants

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan.....	1
Chlorine building and dosing.....	2
Aeration and feedwater pumping	3
Clarifiers/Screens	4
Intermediate pumping	5
Chemical building/chemical bund/chemical dosing	6
Chemical building/chemical bund/chemical dosing	7
Chemical building/chemical bund/chemical dosing	8
Blowers/blower room.....	9
Filters (including control weir) or MF/UF (including feed/permeate pumps)	10
Reverse Osmosis (including high pressure pumps)	11
Clear water tank/Product water tank	12
Prevention of falls	14
Lime building/lime bund/lime dosing.....	13 & 15
Clear water pump station (incl. backwash pumps & surge vessels)/Product water PS.....	16
General works (earthworks, drainage, soak away etc.).....	17 - 18
Taste and odour control/DMTS treatment/Degassing tower.....	19
Washwater recovery/sludge treatment/sludge thickening/drying beds/Neutralisation	20
Membrane cleaning chemicals/Antiscalants	21 - 25
Disinfection.....	26
Amenities building	27
Operations building	28
Store building	29
Spare	30
Service ducts (including pipe & cable ducts)	31
Roads/security fencing/security	32
Spare	33
Hydraulic profile.....	34
Functional Control Diagrams (FCD's).....	35
Compressors/compressor room.....	36
Buildings for electrical equipment.....	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Profibus Topology	72

Process Safety Plans	73
Spare	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process....	95–99, 950-990

The Principal Engineer, Water Treatment shall first approve a request from a designer for alternative uses of bundle numbers 1 - 39, whereas numbers 40 - 99 are not permitted to be varied.

3.7 Water Supply - Reticulation

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan	1
Reticulation design data plan	2
Reticulation layout plans.....	3
Structural details	4
Water Reticulation ‘As Constructed’ survey data.....	7

3.8 Water Supply - Tank & Reservoir

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan	1
General arrangement (incl. Inlet & outlet pipework).....	2
Cross sections.....	3
Structural details.	4
Reinforcing details	5
Disinfection.....	6
Miscellaneous details	7
Prevention of falls	14
Roads/security fencing/security	32
Functional Control Diagrams (FCD’s).....	35
Buildings for electrical equipment	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID’s)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework.....	70
Construction staging	71

Profibus Topology	72
Process Safety Plans	73
Energy recovery facility	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process	95–99, 950-990

3.9 Water Supply - Pumping Station

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan	1
Overview maps	1
Pumping station supply limits plan	1
Suction and/or delivery main characteristic curve	1
Suction and/or delivery main plan & longitudinal sections	2
Suction and/or delivery main details	2
Air/scour valve and pit details	2
Pumping station site layout plans	3
Pumping station site access and landscaping plans	3
Pumping station general arrangements	4
Pumping station structural details	5
Pumping station reinforcing details	5
Pumping station reinforcing bar bending schedules (if required)	5
Pumping station superstructure structural details	6
Pumping station superstructure reinforcing details	6
Pumping station building superstructure steelwork details	6
Pumping station door, window and general details	6
Pumping station landing and support beam details	7
Pumping station ladder details	7
Pumping station overhead traveling crane details	7
Crane and hoist electrics maintenance platform details	7
Pumping station electrical conduit and support details	7
Fabricated pipe specials details (MS, SS, CI, DI etc.)	8
Oxygen dissolver general arrangements	9
Oxygen storage vessel details	9
Oxygen dissolver structural and reinforcing details	9
Oxygen dissolver ladder and platform details	9
Pressure main bypass pipe and valve pit general arrangement	10
Valve pit structural, reinforcing and ladder details	10
Flowmeter and valve pit general arrangements	11
Pit structural, reinforcing, ladder and cover details	11
Disinfection	12
Prevention of falls	14
Roads/security fencing/security	32
Hydraulic profile	34
Functional Control Diagrams (FCD's)	35
Buildings for electrical equipment	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs)	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings	49
Detail Design Drawings (see note 1)	401-499

SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework.....	70
Construction staging	71
Profibus Topology	72
Process Safety Plans	73
Engineering Summary Report Drawings (ESR) civil / structural / process	85-89, 850-890
Mechanical - Design summary drawings.....	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process....	95-99, 950-990

3.10 Water Supply - Distribution, Bore or Trunk Main

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan.....	1
Overview maps.	1
Plan and longitudinal sections.....	2
Reinforcing details	3
Miscellaneous details (incl. Underlaying)	4
Fabricated pipe specials details (MS, SS, CI, DI etc.)	8
Prevention of falls	14
Roads/security fencing/security.....	32
Hydraulic profile.....	34
Functional Control Diagrams (FCD's).....	35
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework.....	70
Construction staging	71
Profibus Topology	72
Process Safety Plans	73
Engineering Summary Report Drawings (ESR) civil / structural / process	85-89, 850-890
Mechanical - Design summary drawings.....	90

Concept Design Report Drawings (CDR) civil/structural/mechanical/process... . 95–99, 950-990

The Principal Engineer, Water Conveyance shall first approve any variation from this list.

3.11 Drainage & Irrigation - Urban & Country Main Drain

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Formalities & declaration plans	0
Site location plans & scheme plans etc	1
Longitudinal sections	2
Structures (includes access chambers)	3
Compensating basin	4
Pumping station	5
Roads/security fencing/security	6
Flow gauging	7
Criteria	8
Miscellaneous	9
Connections	10
Landscaping	11
Prevention of falls	14
Hydraulic profile	34
Functional Control Diagrams (FCD's).....	35
Buildings for electrical equipment	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process... .	95–99, 950-990

It is important to note that each existing Metropolitan Drain has its own Planset number. ie any new drawings created for an existing drain, will maintain the current Planset number.

The Principal Engineer, Water Conveyance shall first approve any variation from this list.

3.12 Supervisory Control & Data Acquisition (SCADA)

Bundle numbering convention:

3.12.1 Metropolitan – Specific Site & Country (Town & Regional) – Specific Site Drawings

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plans & scheme plans etc	1
Prevention of falls	14
Functional Control Diagrams (FCD's).....	35
Buildings for electrical equipment	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Profibus Topology	72
Energy recovery facility.....	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85–89, 850-890
Mechanical - Design summary drawings.....	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process....	95–99, 950-990

3.12.2 SCADA Block Diagrams

3.12.2.1 For Metropolitan UWSS - Planset HZ23

Drawing Contents Description	Bundle No.
General.....	56
Wastewater conveyance.....	57
Water conveyance	58
Water reticulation.....	59

3.12.2.2 For Goldfields and Agricultural Region - Planset CB81

Drawing Contents Description	Bundle No.
ABB MicroSCADA	40 - 43
Main Conduit	55
Goldfields district.....	56
Agricultural East district	57
Agricultural West district.....	58

3.12.2.3 For North West Region - Planset FW54

Drawing Contents Description	Bundle No.
West Pilbara district.....	56
West Kimberley district.....	57
East Kimberley district.....	58
East Pilbara district.....	59

3.12.2.4 For Mid West Region - Planset EQ42

Drawing Contents Description	Bundle No.
Gascoyne district.....	56
Coastal Midlands district.....	57
Geraldton Murchison district.....	58

3.12.2.5 For South West Region - Planset HY74

Drawing Contents Description	Bundle No.
Leeuwin district.....	58
Wellington district.....	59
Warren district.....	60

3.12.2.6 For Great Southern Region - Planset IB24

Drawing Contents Description	Bundle No.
Lower Great Southern/Albany district.....	57
Upper Great Southern/Katanning district.....	58
Upper Great Southern/Narrogin district.....	59
South Coastal district.....	60

3.12.2.7 Drawing Titles - SCADA

It is important that

Drawing Titles - SCADA drawings for a particular scheme, zone(s) or other grouping, within a district shall follow the following naming convention:

- Line 3 <DISTRICT> - <SCHEME> eg 'KATANNING - HOPETOON' or
- Line 3 <DISTRICT> - <ZONE(S)> eg 'ALBANY - ZONES 1 TO 9' or
- Line 3 <DISTRICT> - <GROUP NAME> eg 'ALBANY - WASTEWATER PUMP STATION'
- Line 4 'SCADA BLOCK DIAGRAM' or
- Line 4 'COMMUNICATIONS DETAILS' or
- Line 4 'COMMUNICATIONS LOCATION PLAN'

The Principal Engineer, Operational Technology shall first approve any variation from these lists.

3.13 Dams & Dam Safety

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Order in Council, land tenure and other legal topics.....	0
Preliminary investigations.....	1 - 2
Contours and topographical information.....	3
Cadastral information.....	4
Survey pick-ups.....	5

Geotechnical investigations	6
Construction materials investigations	7
Civil works standards	8
Spare	9
Report figures, schematics	10
General arrangements	11
Embankment (main)	12
Embankment (saddles)	13
Prevention of falls	14
Spillway	15
Instrumentation	16
Access bridge	17
Intake tower	18
Spare	19
Outlet works (conduit)	20
Valve pit	21
Pumping station	22
Spare	23
Water treatment	24
Spare	25
Operations building	26
Flow meter pit	27
Pressure (rising) main	28
Pipeline	29
Access Roads/security fencing/security	30
Drainage	31
Services	32
Miscellaneous details	33
Public facilities	34
Landscaping	35
Environmental management.....	36
Operation, inspection and maintenance manual.....	37
As constructed/existing (including aerial photography capture).....	38
Dam break and flood inundation study (safety review)	39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48
Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework.....	70
Construction staging	71
Profibus Topology	72
Process Safety Plans	73
Energy recovery facility.....	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85-89, 850-890

Mechanical - Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process... .	95–99, 950-990

The Principal Engineer Dams & Dam Safety must first approve any variation from this list.

3.14 Development Services Branch & Regions - Design Submissions - Water - Reticulation (for subdivisional, MSWA and AWA projects only)

Drawing Contents Description	Bundle No.
Pre-calculation survey of subdivision	000
Prerequisites to Works plan	100
Water reticulation site location plan & supply limit plan	101
Water reticulation hydraulic design data plan.....	102
Water reticulation layout plan.....	103
Miscellaneous	104
Specific project eg non drinking water	105
Water reticulation ‘As Constructed’ survey.....	107
Non drinking water reticulation ‘As Constructed’ survey data.....	107

3.15 Development Services Branch & Regions - Design Submissions - Wastewater - Reticulation (for subdivisional, MSWA & AWA projects only)

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Pre-calculation survey of subdivision	000
Prerequisites to Works plan	200
Wastewater reticulation site location plan	201
Wastewater reticulation hydraulic design data plan.....	202
Wastewater reticulation layout plan.....	203
Miscellaneous	204
Specific project	205
Wastewater reticulation ‘As Constructed’ survey data.....	207

3.16 Development Services Branch & Regions – MSWA & AWA Design Submissions – Concept Plans

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Water reticulation – Concept Plan	100-000
Water reticulation – Staging Plan	100-001
Wastewater reticulation – Concept Plan	200-000
Wastewater reticulation – Staging Plan	200-001

3.17 Development Services Branch & Regions - Design Submissions - Wastewater - Private Pumping Station, Pressure Main & Associated Reticulation

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0

Site location plan.....	1
Pressure main plan, longitudinal section and details.....	2
Pumping station connecting reticulation works and details	3
Pumping station general arrangements	4
Wastewater reticulation ‘As Constructed’ survey data	7

3.18 Development Services Branch & Network Expansion - Design Submissions – Drainage & Irrigation

All drainage Design Submissions shall conform to the Water Corporation’s standard

Planset and bundle numbering convention, refer ‘Section 3.11’

3.19 Water Reclamation Plant

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Prerequisites to Works plan	0
Site location plan	1
Feed Pumping Station	3
Contrashear Screens (including pumps for sprays).....	4
Contact Tank.....	4
Hypochlorite Dosing System	5
Ammonium Chloride Dosing System	6
Acid Dosing System.....	7
Caustic Dosing System	8
Air Blowers.....	9
Crossflow Microfiltration - S Trains (incl permeate pumps).....	10
Reverse Osmosis Trains (includes HP pumps) and RO Flush Pumps	11
Product Water Tank	12
Product Water Forwarding Pumps.....	13
Prevention of falls	14
Product Water Pumping Station (ex ponds)	16
General works (earthworks, drainage, soak away etc.)	17 - 18
Degasser Tower (includes degasser fans)	19
Neutralisation System	20
Wastewater Handling System	20
Antiscalant Dosing System.....	21
Microfiltration Acid Clean in Place System	22
Microfiltration Caustic Clean in Place System	23
Reverse Osmosis Clean in Place System	24
EDTA Dosing System.....	25
Membrane Cleaning Solution Dosing System	26
Hydrogen Peroxide Dosing System	27
Operations building	28
Service ducts (including pipe & cable ducts)	31
Roads/security fencing/security	32
General arrangements	33
Hydraulic profile	34
Functional Control Diagrams (FCD’s)	35
Air Compressors	36
Buildings for electrical equipment.....	37 - 39
Electrical	
Primary design drawings (Minor designs)	40
Design summary drawings (Major designs).....	40
Detail Design Drawings	41 - 48

Concept design and electrical installation staging drawings.....	49
Detail Design Drawings (see note 1)	401-499
SCADA, Control, Instrumentation and Communications	
Primary design drawings (Minor designs)	50
Design summary drawings (Major designs).....	50
Detail Design Drawings-Readily identifiable project areas/components..	51-53,55-58
Instrumentation Loop Diagrams	59
Cathodic protection	54
Process & Instrumentation Diagrams (P&ID's)	60
Control (Binary) Logic Diagrams	61
Schedules	62 - 68
Site Configuration Diagrams.....	69
General arrangements, isometrics, layouts & sections showing process units & pipework	70
Construction staging	71
Profibus Topology	72
Process Safety Plans	73
Energy recovery facility.....	80
Engineering Summary Report Drawings (ESR) civil / structural / process	85-89, 850-890
Mechanical – Design summary drawings	90
Concept Design Report Drawings (CDR) civil/structural/mechanical/process....	95-99, 950-990

The Principal Engineer, Water Treatment shall first approve a request from a designer for alternative uses of bundle numbers 1 - 39, whereas numbers 40 - 99 are not permitted to be varied.

3.20 Procurement and Property Branch - Water Corporation Non Operation Facilities -Design Submissions

Bundle numbering convention:

Drawing Contents Description	Bundle No.
Architectural	300
Civil / Structural	301
Electrical	302
Mechanical	303
Hydraulic.....	304

***Note 1** : Separately identifiable locations within the plant/scheme shall be allocated different bundle numbers within the 41 to 48 group (e.g. different treatment plant areas or different bores in a borefield). Should there be more than 8 separately identifiable locations, the 41-48 series bundles shall be used first, followed by the 401-499 series bundles.*

Separately identifiable switchboards and associated field equipment at a particular location (and therefore within a particular 41-48 or 401-499 bundle number) shall be allocated sheet numbers within the 1-99, 101-199 etc groups, (e.g. Main Switchboard and Pump Station Switchboard).

4 DRAWING DEFAULT LAYERING SYSTEMS

The following information applies to the Water Corporation's stipulated drawing software packages AutoCAD and MicroStation. It is most important to follow these linework guidelines, as successful plotting of drawings submitted from all external sources, is critical.

AUTOCAD LAYER		MICROSTATION		DESCRIPTION	LINETYPE	PROPERTIES
COLOUR	WEIGHT	STYLE	WEIGHT			
0	WHITE	0	0	0.25 LINE		Continuous
1**	122	N/A	N/A	0.35 CONTROL WIRES		Continuous
2***	GREEN	N/A	N/A	0.25 SYMBOL - WIRE NUMBERS, TERMINAL ATTRIBUTES		Continuous
3***	YELLOW	N/A	N/A	0.35 SYMBOL - CODE ATTRIBUTES		Continuous
4***	CYAN	N/A	N/A	0.25 SYMBOL - CROSS-REFERENCE ATTRIBUTE		Continuous
5***	GREEN	N/A	N/A	0.25 SYMBOL - ALL OTHER ATTRIBUTES		Continuous
6***	BLUE	N/A	N/A	0.25 SYMBOL - STAND ALONE CONNECT NODES AND ARROW NODES		Continuous
7***	RED	N/A	N/A	0.25 SYMBOL - SYMBOL CONNECT NODES AND ARROW NODES		Continuous
9	9	0	0	0.1 LINE		Continuous
10	11	5	0	1.0 LINE		Continuous
18	13	0	0	0.18 LINE		Continuous
13**	202	N/A	N/A	0.7 POWER WIRES		Continuous
19**	WHITE	N/A	N/A	0.25 LINE		Continuous
21	GREEN	1	0	0.25 LINE & 0.25 TEXT		Continuous
22	YELLOW	2	0	0.35 LINE		Continuous
24	MAGENTA	3	0	0.5 LINE		Continuous
25	14	4	0	0.7 LINE		Continuous
30	9	0	0	0.10 CONTOURS		Continuous
40	10	1	0	0.25 CONTOUR NO.'S		Continuous
58	GREEN	1	0	CADASTRAL LINES		Continuous
59	GREEN	1	0	CADASTRAL NO.'S		Continuous
72**	40	N/A	N/A	0.35 INTERCONNECTION & SIGNAL	[WC-DASH] 3 dash, 1.5 gap	
74**	122	N/A	N/A	0.35 PROCESS PIPE		Continuous
75**	MAGENTA	N/A	N/A	0.5 MINOR PIPE		Continuous
76**	202	N/A	N/A	0.7 MAJOR PIPE		Continuous
77**	11	N/A	N/A	1.0 TRUNK MAIN		Continuous
78**	122	N/A	N/A	0.35 DATA LINE		Continuous
100***	YELLOW	N/A	N/A	0.35 SWITCHBOARD - EQUIPMENT GRAPHICS - FRONT		Continuous
101***	GREEN	N/A	N/A	0.25 SWITCHBOARD - EQUIPMENT GRAPHICS - FRONT		Continuous
102***	GREEN	N/A	N/A	0.25 SWITCHBOARD - ITEM NUMBER ATTRIBUTES		Continuous
103***	RED	N/A	N/A	0.25 SWITCHBOARD - EQUIPMENT GRAPHICS - CENTERLINE - LONG	[WC-CENT] 20 dash, 1.5 gap, 2 dash, 1.5 gap	
104***	N/A	N/A	N/A	RESERVED		Continuous
105***	GREEN	N/A	N/A	0.25 SWITCHBOARD - LABEL NUMBERS		Continuous
106***	BLUE	N/A	N/A	0.25 SWITCHBOARD - EQUIPMENT GRAPHICS - REAR	[WC-DASH] 3 dash, 1.5 gap	
107***	N/A	N/A	N/A	RESERVED		Continuous
108***	YELLOW	N/A	N/A	0.35 SWITCHBOARD - EQUIPMENT GRAPHICS - CUTOUS		Continuous
109***	RED	N/A	N/A	0.25 SWITCHBOARD - EQUIPMENT GRAPHICS - CENTERLINE - SHORT	[WC-CENT] 5 dash, 1.0 gap, 2 dash, 1.0 gap	
110	BLUE	1	2	0.25 DASHED LINE	[WC-DASH] 3 dash, 1.5 gap	
111	RED	1	7	0.25 centerline	[WC-CENT] 20 dash, 1.5 gap, 2 dash, 1.5 gap	
112**	RED	1	7	0.25 centerline SHORT	[WC-CENT] 5 dash, 1.0 gap, 2 dash, 1.0 gap	
113**	14	1	7	0.7 CENTERLINE	[WC-CENT] 20 dash, 1.5 gap, 2 dash, 1.5 gap	
200*	GREY	1	0	CONSTRUCTION		Continuous
22B	RED	1	0	0.25 DIMENSIONS/LABELS		Continuous
230	GREEN	1	0	STD SYMBOLS/NOTES		Continuous
231	YELLOW	2	0	STD SYMBOLS		Continuous
CHECK*	WHITE	1	0	GENERAL COMMENTS		Continuous
HATCH	13	1	0	0.18 HATCHING		Continuous
HATCH2	YELLOW	2	0	0.35 HATCHING		Continuous
RL	RED	1	0	REDUCED LEVELS		Continuous
VP	GREY	1	0	VIEWPORT BORDERS		Continuous
SHEET	VARIES	VARIES	0	TITLE BLOCK		Continuous
WC-DOT10	YELLOW	2	1	DOT	[WC-DOT10] dot, 1 gap	
WC-DASH	GREEN	1	2	MEDIUM DASH	[WC-DASH] 3 dash, 1.5 gap	
WC-DASH-L	GREEN	1	3	LONG DASH	[WC-DASH-L] 9 dash, 3.5 gap	
WC-DDS	GREEN	1	4	DOT-DASH	[WC-DDS] 2 dash, 1 gap, dot, 1 gap	
WC-DASH5	GREEN	1	5	SHORT-DASH	[WC-DASH5] 1.5 dash, 1.0 gap	
WC-DIV	GREEN	1	5	DOT-DASH-DOT	[WC-DIV] 5 dash, 1 gap, dot, 1 gap, dot, 1 gap	
WC-CHAIN-L	GREEN	1	7	LONG DASH-SHORT DASH	[WC-CHAIN-L] 20 dash, 2.3 gap, 4 dash, 2.3 gap	

* These layers turn OFF automatically at time of plotting
 ** These layers are for Electrical, Mechanical & SCADA use only.
 *** These layers are for Electrical use only.

Note:
 The WC-* line types specified above are loaded into the AutoCAD WCX prototype/template drawing.
 The complex line types shown above are included in the WCX CAD Standard and can be loaded into AutoCAD using the ACAD.LIN or ACADISO.LIN files.

H	06/2020	REFERENCE TO CD REMOVED	KLM	KLM	KLM	WATER CORPORATION STANDARD DRAWING LAYER CONVENTION GENERAL DRAWING DEFAULT - AUTOCAD & MICROSTATION CAD LAYERS SHEET 1 OF 3	ORIGINAL SHEET SIZE A3
ISSUE	DATE	GRID	DRN	REC	APPD		
DES CALC			RECOMMENDED	15/12/1999			FILE CAD_LAYERS 4.1
DES CHD			S JOHNSON				
DRN			CSC, AUTOCAD SUPPORT				CAD
G CLEAVER			APPROVED	15/12/1999			ISSUE
Q.C. CHD			M BRIGGS				H
G CLEAVER			CSC, MICROSTATION SUPPORT				MF

394 © THIS DRAWING IS THE PROPERTY OF THE WATER CORPORATION. IT SHALL NOT BE COPIED WITHOUT PERMISSION. CAD MANAGEMENT_NOT READ ONLY\DRS\IT_SUPPORT\WCX 8.0\CAD_LAYERS_4.1F 15:58 24/05/2022 MCGREGOR\MS51939

WASTEWATER RETICULATION DRAWINGS *

AUTOCAD LAYER	AUTOCAD COLOUR	MICROSTATION WEIGHT	MICROSTATION STYLE	DESCRIPTION	LINETYPE	PROPERTIES
WC-DOT5	9	0	0	CONTOURS AND BUILDINGS	—————	Continuous
WC-DOT5	13	0	1	ROAD KERBS, DRIVEWAYS & SWIMMING POOLS	[WC-DOT5] dot, 0.5 gap
WC-DO10	13	0	WC-DO10	WC OPEN MAIN/BRANCH DRAIN	——— DO ——— DO ——— DO ——— DO ——— DO ———	[WC-DO10] 10 dash, 4.6 gap with 1.5 high "DO"
WC-DP10	13	0	WC-DP10	WC PIPED MAIN/BRANCH DRAIN	——— DP ——— DP ——— DP ——— DP ——— DP ——— DP ———	[WC-DP10] 2 dash, 1 gap, 2 dash, 5.4 gap with 1.5 high "DP", 2 dash, 1 gap
WC-DLA010	13	0	WC-DLA010	LOCAL AUTHORITY/PRIVATE OPEN DRAIN	——— DLA0 ——— DLA0 ——— DLA0 ——— DLA0 ——— DLA0 ———	[WC-DLA010] 10 dash, 7.1 gap with 1.5 high "DLA0"
WC-DLAP10	13	0	WC-DLAP10	LOCAL AUTHORITY/PRIVATE PIPED DRAIN	——— DLAP ——— DLAP ——— DLAP ——— DLAP ——— DLAP ———	[WC-DLAP10] 2 dash, 1 gap, 2 dash, 7.9 gap with 1.5 high "DLAP", 2 dash, 1 gap
WC-G10	13	0	WC-G10	ABOVE GROUND GAS	——— G ——— G ——— G ——— G ——— G ——— G ———	[WC-G10] 10 dash, 3.1 gap with 1.5 high "G"
WC-G10BG	13	0	WC-G10BG	BELOW GROUND GAS	——— G ——— G ——— G ——— G ——— G ——— G ———	[WC-G10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "G", 2 dash, 1 gap
WC-HVE10	13	0	WC-HVE10	ABOVE GROUND ELEC (HIGH VOLTAGE)	——— HVE ——— HVE ——— HVE ——— HVE ——— HVE ———	[WC-HVE10] 10 dash, 5.9 gap with 1.5 high "HVE"
WC-HVE10BG	13	0	WC-HVE10BG	BELOW GROUND ELEC (HIGH VOLTAGE)	——— HVE ——— HVE ——— HVE ——— HVE ——— HVE ———	[WC-HVE10BG] 2 dash, 1 gap, 2 dash, 6.7 gap with 1.5 high "HVE", 2 dash, 1 gap
WC-E10	13	0	WC-E10	ABOVE GROUND ELEC (LOW VOLTAGE)	——— E ——— E ——— E ——— E ——— E ——— E ———	[WC-E10] 10 dash, 3.1 gap with 1.5 high "E"
WC-E10BG	13	0	WC-E10BG	BELOW GROUND ELEC (LOW VOLTAGE)	——— E ——— E ——— E ——— E ——— E ——— E ———	[WC-E10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "E", 2 dash, 1 gap
WC-C10	13	0	WC-C10	COMMUNICATIONS (OVERHEAD)	——— C ——— C ——— C ——— C ——— C ——— C ———	[WC-C10] 10 dash, 3.1 gap with 1.5 high "C"
WC-C10BG	13	0	WC-C10BG	COMMUNICATIONS (UNDERGROUND)	——— C ——— C ——— C ——— C ——— C ——— C ———	[WC-C10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "C", 2 dash, 1 gap
WC-PM10	13	0	WC-PM10	ABOVE GROUND PRESSURE MAIN	——— PM ——— PM ——— PM ——— PM ——— PM ———	[WC-PM10] 10 dash, 4.8 gap with 1.5 high "PM"
WC-PM10BG	13	0	WC-PM10BG	BELOW GROUND PRESSURE MAIN	——— PM ——— PM ——— PM ——— PM ——— PM ———	[WC-PM10BG] 2 dash, 1 gap, 2 dash, 5.6 gap with 1.5 high "PM", 2 dash, 1 gap
WC-S10	25	4	0	SEWER (PROPOSED)	—————	Continuous
WC-S10BG	GREEN	0	WC-S10	ABOVE GROUND SEWER (EXISTING)	——— S ——— S ——— S ——— S ——— S ——— S ———	[WC-S10] 10 dash, 3.1 gap with 1.5 high "S"
WC-S10BG	GREEN	0	WC-S10BG	BELOW GROUND SEWER (EXISTING)	——— S ——— S ——— S ——— S ——— S ——— S ———	[WC-S10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "S", 2 dash, 1 gap
WC-T10	13	0	WC-T10	ABOVE GROUND TELEPHONE	——— T ——— T ——— T ——— T ——— T ——— T ———	[WC-T10] 10 dash, 3.1 gap with 1.5 high "T"
WC-T10BG	13	0	WC-T10BG	BELOW GROUND TELEPHONE	——— T ——— T ——— T ——— T ——— T ——— T ———	[WC-T10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "T", 2 dash, 1 gap
WC-OF10	13	0	WC-OF10	ABOVE GROUND OPTIC FIBRE	——— OF ——— OF ——— OF ——— OF ——— OF ———	[WC-OF10] 10 dash, 4.6 gap with 1.5 high "OF"
WC-OF10BG	13	0	WC-OF10BG	BELOW GROUND OPTIC FIBRE	——— OF ——— OF ——— OF ——— OF ——— OF ———	[WC-OF10BG] 2 dash, 1 gap, 2 dash, 5.4 gap with 1.5 high "OF", 2 dash, 1 gap
WC-W10	13	0	WC-W10	ABOVE GROUND WATER	——— W ——— W ——— W ——— W ——— W ——— W ———	[WC-W10] 10 dash, 3.1 gap with 1.5 high "W"
WC-W10BG	13	0	WC-W10BG	BELOW GROUND WATER	——— W ——— W ——— W ——— W ——— W ——— W ———	[WC-W10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "W", 2 dash, 1 gap
WC-A10	13	0	WC-A10	ABOVE GROUND COMPRESSED AIR	——— A ——— A ——— A ——— A ——— A ——— A ———	[WC-A10] 10 dash, 3.1 gap with 1.5 high "A"
WC-A10BG	13	0	WC-A10BG	BELOW GROUND COMPRESSED AIR	——— A ——— A ——— A ——— A ——— A ——— A ———	[WC-A10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "A", 2 dash, 1 gap
WC-F10	13	0	WC-F10	ABOVE GROUND FUEL	——— F ——— F ——— F ——— F ——— F ——— F ———	[WC-F10] 10 dash, 3.1 gap with 1.5 high "F"
WC-F10BG	13	0	WC-F10BG	BELOW GROUND FUEL	——— F ——— F ——— F ——— F ——— F ——— F ———	[WC-F10BG] 2 dash, 1 gap, 2 dash, 3.9 gap with 1.5 high "F", 2 dash, 1 gap
WC-FENCEA10	13	0	WC-FENCEA10	FENCE	——— / ——— / ——— / ——— / ——— / ——— / ———	[WC-FENCEA10] 10 dash, 2.6 gap with 1.5 high "/"
WC-MAGENTA	18	0	0	ROAD RESERVES & LOT BOUNDARIES	—————	Continuous
WC-DASH	24	3	0	PROPOSED PROPERTY CONNECTIONS	—————	Continuous
WC-DASH	2.0 WIDE POLYLINE	6	2	RETICULATION AREA BOUNDARY	—————	[WC-DASH] 3 dash, 1.5 gap

* NOTE:
THESE LAYERS CAN ALSO BE USED ON
DRAWINGS OTHER THAN WASTEWATER
RETICULATION

G	04/2009	SPELLING OF AUTOCAD LAYER WC-DLA010 CORRECTED		GRC	GRC	GRC
ISSUE	DATE	GRID	REVISION	DRN	REC	APPD

DES CALC	RECOMMENDED	10/03/2003
DES CHD	S JOHNSON	
DRN	CSC, AUTOCAD SUPPORT	
G CLEAVER	APPROVED	15/12/1999
Q.C. CHD	M BRIGGS	
G CLEAVER	CSC, MICROSTATION SUPPORT	




WATER CORPORATION STANDARD DRAWING LAYER CONVENTION WASTEWATER RETICULATION - AUTOCAD & MICROSTATION CAD LAYERS SHEET 2 OF 3				ORIGINAL SHEET SIZE
FILE	PLAN	CAD	ISSUE	A3
PROJECT	CAD_LAYERS 4.2	G	MF	

283

394 © THIS DRAWING IS THE PROPERTY OF THE WATER CORPORATION. IT SHALL NOT BE COPIED WITHOUT PERMISSION.

CAD MANAGEMENT_NOT READ ONLY\IT_SUPPORT\WCX_61\CAD_LAYERS_4_26 08/04/2009

1		2		3		4		5		6	
GENERAL: 012 TENDERING 013 GENERIC PRELIMINARIES 014 CONTRACT PRELIMINARIES 016 QUALITY ASSURANCE 017 GENERAL REQUIREMENTS 018 COMMON REQUIREMENTS SITE: 020 DEMOLITION 022 PREPARATION AND GROUNDWORK 024 LANDSCAPE STRUCTURES 025 LANDSCAPE CULTIVATION 026 LANDSCAPE FINISHES 027 PAVEMENTS STRUCTURE: 030 FOUNDATIONS 031 CONCRETE 032 EARTH 033 MASONRY 034 STEEL 038 TIMBER ENCLOSURE: 041 TANKING AND DAMP-PROOFING 042 ROOFING 043 CLADDING 045 DOORS AND WINDOWS 046 GLASS 047 INSULATION			INTERIOR: 050 INTERIOR DEMOLITION 051 LININGS 052 PARTITIONS 053 CEILINGS 054 ACCESS FLOORS 055 FIXTURES 057 FURNITURE AND 058 SIGNS AND FEATURES FINISH: 061 TROWELLED AND SPRAYED COATINGS 062 WET AREAS 063 TILING 064 WALL SURFACING 065 FLOOR SURFACING 067 PAINTING AND PAPERHANGING MECHANICAL: 070 MECHANICAL GENERAL 071 WATER PLANT 072 AIR PLANT 073 AIR HANDLING COMPONENTS 074 DUCTWORK AND COMPONENTS 075 PIPING 076 REFRIGERATION SYSTEMS 077 CONTROL 078 MECHANICAL ELECTRICAL 079 MECHANICAL COMMISSIONING AND MAINTENANCE			HYDRAULIC: 080 HYDRAULIC GENERAL 081 HYDRAULIC COMPONENTS 082 HYDRAULIC SYSTEMS 083 FIRE SYSTEMS ELECTRICAL: 090 ELECTRICAL GENERAL 091 ELECTRICAL EQUIPMENT 092 POWER SYSTEMS 093 POWER SUPPLY EQUIPMENT 094 POWER DISTRIBUTION EQUIPMENT 095 LIGHTING SYSTEMS 096 COMMUNICATIONS SYSTEMS 097 SAFETY SYSTEMS 098 SECURITY SYSTEMS IMPORTANT NOTES: 1. SAMPLE LAYERING CONVENTION – '0751_PIPING' (FOR MECHANICAL PIPING) '0752_INSULATION' (FOR MECHANICAL PIPING INSULATION) 2. COLOUR SELECTION FOR EACH LAYER SHALL COMPLY WITH THE WC COLOUR TABLE REFERENCED IN THE FILES 'WCX BLACK FINAL.CTB' OR 'WCX COLOUR FINAL.CTB' FOUND IN THE WCX CD. 3. THIS LAYERING CONVENTION HAS BEEN DERIVED FROM THE NATSPEC CLASSIFICATION SYSTEM. FOR LOWER LEVEL OF CLARIFICATION REFER TO WEBSITE: WWW.NATSPEC.INFO/TOOLBOX/SPECIFICATIONS/NATSPEC/WORKSECTIONS/ NAT_WORKSECTIONLIST.HTML 4. FOR FURTHER CLARIFICATION OF THIS LAYERING CONVENTION, CONTACT WC FACILITIES PROJECT MANAGER, AT damien.james@watercorporation.com.au					
DES CALC		RECOMMENDED	15/04/2005					WATER CORPORATION		ORIGINAL SHEET SIZE	
DES CHD		D JAMES (SIGNED)						STANDARD DRAWING LAYER CONVENTION		ARCHITECTURAL DRAWING DEFAULT – AUTOCAD CAD LAYERS	
DRN		FACILITIES PROJECT MANAGER		FILE	PLAN	CAD	ISSUE				
G CLEAVER		APPROVED	15/05/2005	PROJECT	CAD_LAYERS 4.3	A	MF				
Q.C. CHD		R MACRI (SIGNED)									
G CLEAVER		CORP. ACCOMMODATION MANAGER									
394 © THIS DRAWING IS THE PROPERTY OF THE WATER CORPORATION. IT SHALL NOT BE COPIED WITHOUT PERMISSION.											

5 WATER CORPORATION – DRAWING CHECKING, APPROVAL AND CANCELLING REQUIREMENTS

5.1.1 Drawing Checking and Approval

Drawings shall be checked and approved in accordance with sub-sections below.

5.1.1.1 Draftsperson and Drafting Check

The draftsperson who produced the drawing shall enter the first initial and full surname at "DRN" eg N DIAMOND

The person nominated to carry out the drafting check shall be independent of the drawing to be checked.

The checker shall ensure that the drawing satisfies the customer's requirements, and the drafting check shall be verified by entering the first initial and full surname of the checker at "Q.C. CHD" eg J DENVER

5.1.1.2 Design Calculations and Check (If Design Input Within Drawing)

The designer who produced the design calculations for the drafting of the drawing is verified by entering the first initial and full surname at "DES CALC" eg J FARNHAM.

When the design for the drawing has been checked this is verified by entering the first initial and full surname of the design checker at "DES CHD" eg B STREISAND

If there is no design input into the drawing, these fields can be left blank.

5.1.1.3 Review and Recommendation

The review and recommendation is carried out by a person qualified in the appropriate discipline. The position of Recommender shall be indicated in "RECOMMENDED TITLE" field eg DESIGNER PROJECT MANAGER.

5.1.1.4 Review and Approval

The person approving the drawing accepts liability for the design and the content of the drawing. The position of Approver shall be indicated in "APPROVED TITLE" field eg DESIGNER PROJECT DIRECTOR. The Recommender and Approver cannot be the same person.

5.1.1.5 Revision Responsibilities

When a drawing is revised, it shall contain an entry in the 'Revision' block of the titleblock. This entry shall include the following

"ISSUE" eg B

"DATE" eg 02/2002

"GRID" eg B-10. Note: if revision modifications are generally over the entire drawing, this field shall be left blank. This field is NOT mandatory.

"REVISION" description shall depend on type of revision:

(a) General type (not 'As Constructed') eg OUTLET PIPE INCREASED TO DN600

(b) AS CONSTRUCTED

"DRN" eg GRC

“REC” eg MAR

“APPD” eg GKB

When a drawing is revised, it is important to note that the existing identification label and all other existing names from the previous version of the drawing within the titleblock are NOT removed.

For drawings at revisions above Y please contact DMS Team for instructions.

5.1.1.6 Design Survey and ‘As Constructed’ Survey Recording

The 'Design Survey' and 'AsCon Survey' fields in the titleblock are used for recording the

- Designer’s Company name and the Design Survey Book number/s and/or
- Survey Company’s name and the 'As Constructed’ Survey Book number/s used for the creation of the drawing.

Where the drawing does not contain Design and/or ‘As Constructed’ survey information, the fields are left blank.

Example Entries: Design Survey GHD SB 12345

AsCon Survey Whelans SB 6789

5.1.2 Drawing Revision to Cancelled Status

When it is necessary to have an existing drawing from the DMS cancelled, the process is as per a normal drawing revision with some minor additional requirements.

The reason for the drawing being cancelled will determine which of the following cases is applicable.

5.1.2.1 Case 1

The drawing is being cancelled because its contents have been made redundant, no longer applicable to the project and there is not another new drawing created to replace the cancelled drawing.

The statement ‘DRAWING CANCELLED’ is to be placed diagonally across the body of the drawing and also in the revision description field of the titleblock.

5.1.2.2 Case 2

The drawing is being cancelled because its contents have been made redundant, no longer applicable to the project and there is another new drawing (with new drawing number) created to replace it.

The statement ‘DRAWING CANCELLED – REFER TO DRAWING XX99-?-?’ is to be placed diagonally across the body of the drawing and also in the revision description field of the titleblock. i.e. XX99-?-? represents the new replacement drawing number.

In either case mentioned above, the revised cancelled WCX CAD Standard compliant drawing shall be submitted to the Water Corporation.

WATER CORPORATION - SAMPLE TITLEBLOCK LAYOUT

IMPORTANT NOTES:

THIS SAMPLE IS FROM THE 'AUTOCAD' CAD PACKAGE. THE ONLY OTHER MAJOR CAD PACKAGE USED BY THE WATER CORPORATION IS 'MICROSTATION'. ALL THE DETAILS FOR MICROSTATION ARE IDENTICAL.

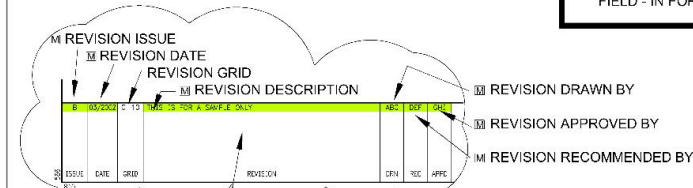
THE INFORMATION SHOWN ON THIS SHEET IS COMMON FOR ALL DRAWING SHEET SIZES, (EXCEPT A3 & A4, WHERE THE DATUM ATTRIBUTE ENTRIES ARE INVISIBLE). THIS IS THE ONLY EXCEPTION. IF VERTICAL DATUM AND/OR COORDINATE SYSTEM EXIST ON AN A3 OR A4 SHEET, THE DESCRIPTION MUST BE INCLUDED WITHIN THE BODY OF THE DRAWING.

ALL NEW DRAWINGS SUBMITTED TO THE WATER CORPORATION FOR FINAL ACCEPTANCE & ARCHIVAL INTO THE CORPORATE DOCUMENT MANAGEMENT SYSTEM (CDMS) MUST BE ISSUE 'A' IE. NO ENTRIES IN THE REVISION BLOCK. ONLY PREVIOUSLY ARCHIVED DRAWINGS WHICH HAVE BEEN CHECKED-OUT OF THE CDMS FOR REVISION, WILL BE ACCEPTED WITH AN ISSUE IN THE 'REVISION' FIELD OF THE TITLEBLOCK. SEE REVISION BLOCK INSERT

M MANDATORY FIELD IE. MUST HAVE VALID ENTRY IN THIS FIELD - IN FORMAT **AS SHOWN**

EXAMPLE STAMP FOR ENGINEERING SUMMARY AND CONCEPT DESIGN REPORT DRAWINGS ONLY

ENGINEERING SUMMARY REPORT
NOT TO BE USED FOR CONSTRUCTION



REVISION BLOCK INSERT
ONLY TO BE USED WHEN DRAWING HAS BEEN CHECKED OUT OF CDMS FOR REVISION. SEE 'IMPORTANT NOTES'

M REVISION ISSUE M REVISION DATE REVISION GRID M REVISION DESCRIPTION M REVISION DRAWN BY M REVISION APPROVED BY M REVISION RECOMMENDED BY		M RECOMMENDED DATE M RECOMMENDED TITLE M APPROVED DATE M APPROVED BY M CHECKED BY M CHECKED DATE M DESIGNER'S IDENTIFICATION LABEL		M DRAWING TITLE LINES 1, 2 & 3 MINIMUM WC FILE NUMBER WC PROJECT NUMBER DMS FORMAT WAW eg AA99 MWA eg 12345 PWD eg 56789		M DRAWING NUMBER (AA99-1-2.3) M PLANSET NO. (AA99) M BUNDLE NO. (1) M SHEET NO. (2) M PART SHEET NO. (3) SELDOM USED	
M VERTICAL DATUM M COORDINATE SYSTEM DESIGN BOOK REF. IF DESIGN INPUT DESIGN SURVEY REF. DEFAULT = NONE AS CONSTRUCTED SURVEY REF. DEFAULT = NONE		DESIGN CALC. BY IF DESIGN INPUT DESIGN CHECKED BY IF DESIGN INPUT DRAWN BY CHECKED BY APPROVED BY APPROVED DATE RECOMMENDED DATE RECOMMENDED TITLE APPROVED DATE APPROVED BY CHECKED BY CHECKED DATE DESIGNER'S IDENTIFICATION LABEL		WC FILE NUMBER WC PROJECT NUMBER DMS FORMAT WAW eg AA99 MWA eg 12345 PWD eg 56789		M DRAWING NUMBER (AA99-1-2.3) M PLANSET NO. (AA99) M BUNDLE NO. (1) M SHEET NO. (2) M PART SHEET NO. (3) SELDOM USED M SYSTEM PATH, DRAWING NAME & DATE M ISSUE	
THIS REVISION BLOCK TO BE LEFT BLANK IF DRAWING IS AT ISSUE 'A'		DESIGNER'S IDENTIFICATION LABEL		WATER CORPORATION		A1	

6 WATER CORPORATION - DRAWING MANAGEMENT SYSTEM PROCEDURAL FLOW CHARTS

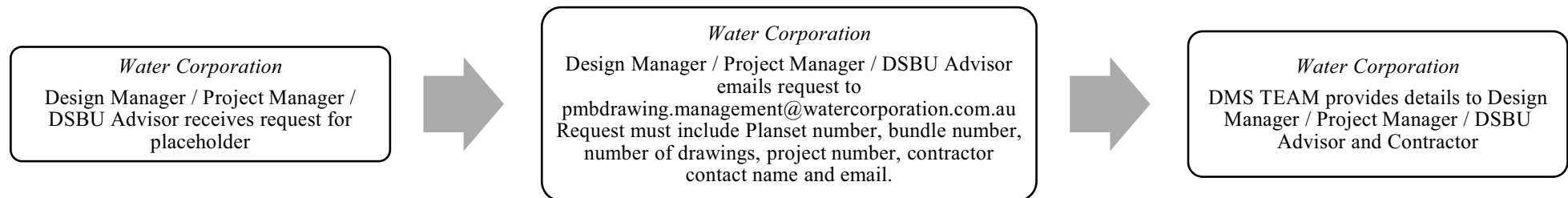
The following Drawing Management System (DMS) procedural flow charts are representative of the Water Corporation's various processes required for handling drawings created either internally by Water Corporation or external Contractor.

DMS PROCEDURE 1 - REGISTRATION OF NEW PLANSET



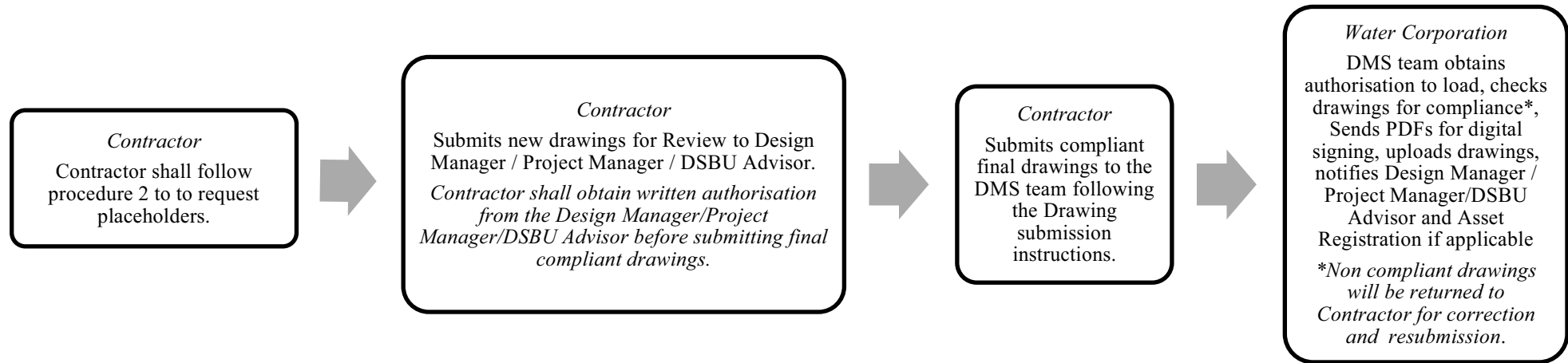
DMS PROCEDURE 2 - REGISTRATION OF DRAWING PLACEHOLDER

Excludes Water and Wastewater reticulation drawings submitted to Development Services



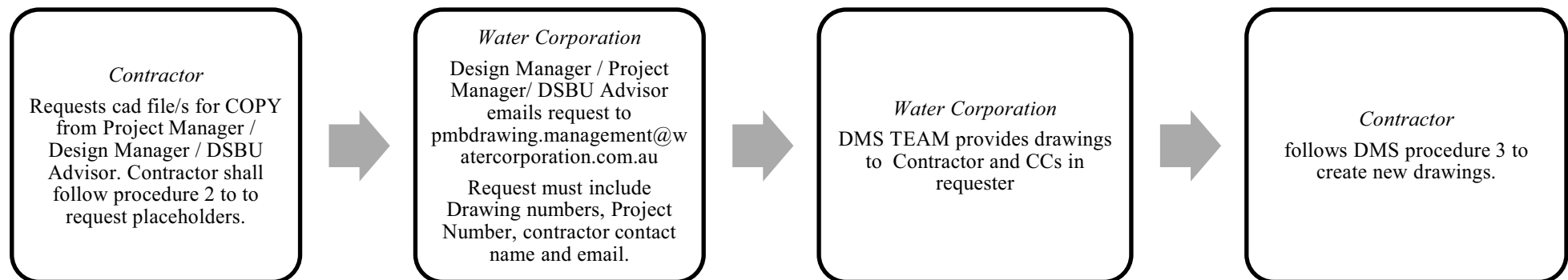
DMS PROCEDURE 3 - NEW DRAWING

Excludes Water and Wastewater reticulation drawings submitted to Development Services



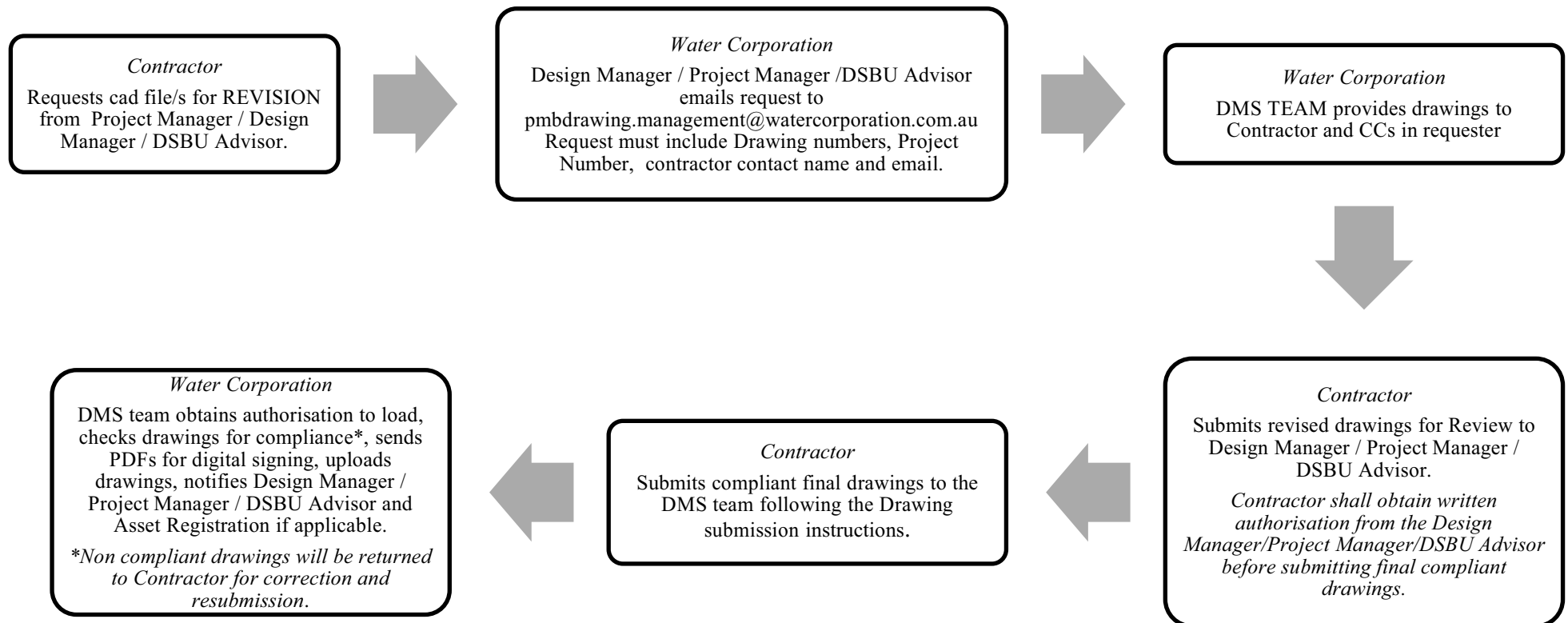
DMS PROCEDURE 4 - NEW DRAWING USING EXISTING DRAWINGS FOR CUT AND PASTE

Excludes Water and Wastewater reticulation drawings submitted to Development Services



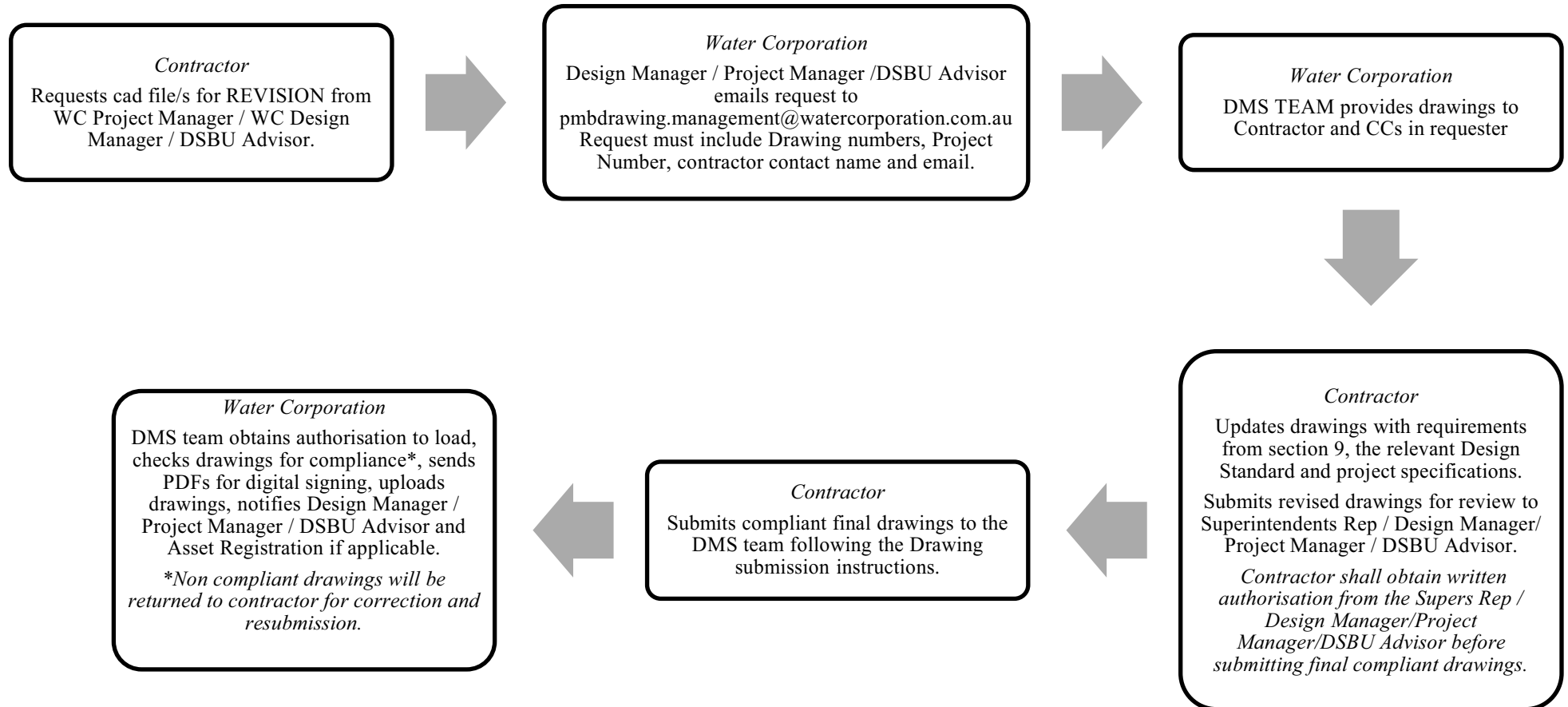
DMS PROCEDURE 5 - DRAWING REVISION (NOT AS CONSTRUCTED)

Excludes Water and Wastewater reticulation drawings submitted to Development Services



DMS PROCEDURE 6 – DRAWING REVISION (AS CONSTRUCTED)

Excludes Water and Wastewater reticulation drawings submitted to Development Services



7 STANDARD WATER, WASTEWATER & TREATMENT PROCESS PIPEWORK DESIGNATIONS

The following comprehensive Tables detailing the standard water, wastewater and treatment process pipework designations have been compiled by the Program Manager Standards in consultation with specialists from Water Treatment, Wastewater Treatment, Mechanical and SCADA sections.

7.1 Pipe Type Designations

TABLE 1 MILD STEEL PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
Nominal diameter (DN)	DN900	AS 1579 DN100 to DN1600
Outside diameter	914	(Allow for coating thickness)
Mild steel plate thickness	7	
Inside diameter	868	(Allow for lining thickness)
Pipe structural material	MS	AS 1574 and AS/NZS368
Coating material	MDP	Refer Table 1 Part B
Lining material	CL	Refer Table 1 Part B
Jointing system	RRJ	Elastomeric or weld jointed options (See Table 1 Part A)
Flanged pressure classification	PN21	PN14, PN21, PN35 (AS 4087 Figures B7, B8, B9)
Working Drawing Example Designation: DN900 (914/7/868) MDP MSCL ESJ PIPE to AS 1579		
Plant Layout Drawing Example Designation: DN150 (168/5/140) MDP MSCL PIPE to AS 1579 FJ PN14 SE		

TABLE 2 STAINLESS STEEL PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
Nominal diameter (DN)	DN50	DN20 to DN150 to ASTM A312
Pipe structural material & grade	SS316L	SS 316L or SS Alloy 20 (UNS N08020) to ASTM A240
Jointing system	FJ	Seamless. Butt joint welded or flange jointed
Flanged pressure classification	PN14	PN14, PN21, PN35(AS 4087 Figures B7, B8, B9)
Working Drawing Example Designation: DN50 SS316L BJ PIPE to ASTM A312		
Plant Layout Drawing Example Designation 1: DN50 SSA20 PIPE to ASTM A312 FJ PN21 SA		
Plant Layout Drawing Example Designation 2: DN80 SS316L PIPE to ASTM A312 FJ PN14 NH3		

TABLE 3 REINFORCED CONCRETE NON-PRESSURE PIPEWORK (RC)		
Pipeline Characteristic	Example Notation	Notes or Comments
Nominal diameter (DN)	DN1500	DN600 to DN3000
Outside diameter	1714	Supplier to confirm
Concrete thickness	105	Supplier to confirm
Inside diameter	1496	(Allow for lining thickness – 4mm thickness assumed)
Pipe structural material	RC	RC for steel reinforced concrete; RA for resin aggregate (e.g. Polycrete)
Pipe load classification	Class 4	AS 4058 classes 4 to 10; Jacking class (Special design)
Lining material	PL	Only where plastics lined
Jointing system	RRJ	RRJ for rubber (skid) ring (spigot and socket) joint (usually \leq DN1800) IFJ for internal flush jointed (usually $>$ DN1800)
Working Drawing Example Designation: DN1500 (1714/105/1504) Class 4 RCPL RRJ PIPE to AS 4058		
Working Drawing Example Designation: DN800 (960/80/800) JACKING RA RRJ PIPE (e.g. Polycrete)		
Site Layout Drawing Example Designation: DN1200 (1372/92/1187) Class 4 RCPL RRJ PIPE to AS 4058 RWW		

TABLE 4 PVC NON-PRESSURE PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal diameter (DN)</i>	<i>DN150</i>	<i>DN100 to 375</i>
<i>Pipe stiffness classification</i>	<i>SN8</i>	<i>SN6 if < DN100; SN8 or 16 if > DN100</i>
<i>Pipe structure/profile</i>	<i>Plain</i>	<i>Plain, sandwich, or profiled wall</i>
<i>Pipe material composition</i>	<i>UPVC</i>	<i>Unplasticised PVC</i>
<i>Pipeline jointing system</i>	<i>SWJ</i>	<i>SWJ if < DN300; ESJ if > DN300</i>
<i>Pipe pressure classification</i>		<i>Non-pressure</i>
Working Drawing Example Designation: DN225 SN8 Plain UPVC SWJ PIPE to AS/NZS1260		
Plant Layout Drawing Example Designation: DN100 SN6 Plain UPVC SWJ PIPE to AS/NZS1260 RE		

TABLE 5 PVC PRESSURE PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal diameter (DN)</i>	<i>DN150</i>	<i>DN100 to 450</i>
<i>Pipe diameter series</i>	<i>S2</i>	<i>Series 1 Metric/ISO=S1 ; Series 2 CIOD=S2</i>
<i>Pipe material composition</i>	<i>MPVC</i>	<i>(Molecular Oriented) PVC-O to AS/NZS 4441 (Int.); (Modified) PVC-M to AS/NZS4765; (Unplasticised) PVC-U to AS/NZS1477</i>
<i>Pipeline jointing system</i>	<i>ESJ</i>	<i>Elastomeric seal joint – used to be RRJ (S1 & S2); Solvent weld joint (S1 only)</i>
<i>Pipe pressure classification</i>	<i>PN12</i>	<i>PN12, PN18(S1); PN12, PN16(S2)</i>
Working Drawing Example Designation: DN150 S2 MPVC ESJ PIPE PN12 to AS/NZS4765		
Plant Layout Drawing Example Designation: DN100 S1 MPVC SWJ PIPE PN18 to AS4441 BWW		

TABLE 6 PE PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal outside diameter (DN)</i>	<i>DN180</i>	<i>DN63, DN125, DN180, DN250, DN315, DN355 or DN450</i>
<i>Pipe compound classification</i>	<i>PE100</i>	<i>PE80B or PE100</i>
<i>Standard dimension ratio</i>	<i>SDR13.6</i>	<i>SDR7.4 to SDR13.6</i>
<i>Pipeline jointing system</i>	<i>EFJ</i>	<i>Electro-fusion, butt-fusion or mechanical compression jointed</i>
<i>Pipe pressure classification</i>	<i>PN12.5</i>	<i>PN 12.5; PN16</i>
Working Drawing Example Designation: DN150 PE100 EFJ PIPE SDR13.6 PN12.5 to AS/NZS4130		
Plant Layout Drawing Example Designation: DN100 PE100 EFJ PIPE SDR11 PN16 to AS/NZS4130 RW		

TABLE 7 GRP PRESSURE and NON-PRESSURE PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal diameter (DN)</i>	<i>DN900</i>	<i>AS 3571 (drainage/sewerage), AS 3571.2 (water supply)</i>
<i>Outside diameter</i>	<i>923</i>	
<i>Pipe wall thickness</i>	<i>16.2</i>	
<i>Inside diameter</i>	<i>891</i>	
<i>Pipe stiffness class</i>	<i>SN10 000</i>	<i>SN5 000, SN10 000</i>
<i>Pipe structural material</i>	<i>GRP/FW GRP</i>	<i>Glass reinforced plastics filament wound (e.g. Flowtite) Glass reinforced plastics centrifugally cast (e.g. Hobas)</i>
<i>Jointing system</i>	<i>ESJ</i>	<i>Used to be RRJ</i>
<i>Pipe pressure class</i>	<i>PN16</i>	<i>PN1 (Non-pressure), PN16, PN20, PN25, PN32</i>
Working Drawing Example Designation: DN900 (923/16.2/891) SN10000 GRP/FW ESJ PN16 PIPE		
Plant Layout Drawing Example Designation: DN450 (507/7.3/492) SN10000 GRP ESJ PN10 PIPE STL		
Site Layout Drawing Example Designation: DN600 (667/9.3/648) SN5000 GRP/FW PN1 RWW		

TABLE 8 ABS PRESSURE PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal diameter (DN)</i>	<i>DN150</i>	<i>DN25 to DN750</i>
<i>Pipe diameter series</i>	<i>S2</i>	<i>Series 1 Metric; Series 2 CIOD</i>
<i>Pipe compound classification</i>	<i>ABS160</i>	<i>ABS120, ABS140, ABS160, ABS180</i>
<i>Standard dimension ratio</i>	<i>SDR17.7</i>	<i>SDR9.3 to SDR19.8</i>
<i>Pipeline jointing system</i>	<i>SWJ</i>	<i>Elastomeric seal joint – used to be RRJ or Solvent weld jointed</i>
<i>Pipe pressure classification</i>	<i>PN12</i>	<i>PN12, PN18, PN20</i>
Working Drawing Example Designation: DN150 S2 ABS160 SWJ PIPE SDR17.7 PN12 to AS/NZS3518		
Plant Layout Drawing Example Designation: DN65 S2 ABS180 SWJ PIPE SDR13.5 PN18 to AS/NZS3518 LW		

TABLE 9 COPPER PIPEWORK		
Pipeline Characteristic	Example Notation	Notes or Comments
<i>Nominal diameter (DN)</i>	<i>DN100</i>	<i>DN20, DN25, DN40, DN50, DN80, DN100, DN150</i>
<i>Tube thickness type</i>	<i>A</i>	<i>- AS 1432 Table 2</i>
<i>Pipe structural material</i>	<i>COPPER</i>	<i>Alloy 122 (AS 2738.2)</i>
<i>Jointing system</i>	<i>CJ</i>	<i>CJ (MCJ or FJ not permissible in buried/concealed applications)</i>
<i>Flanged joint pressure class</i>	<i>PN14</i>	<i>PN14 (AS 4087 Figure B1)</i>
Working Drawing Example Designation: DN100 A COPPER CJ PIPE to AS1432		
Plant Layout Drawing Example Designation: DN50 A COPPER MCJ PIPE to AS1432 XW		

Plant/Site Layout and Working Drawing Designations vary in that Plant or Site Layout Drawings contain designated pipe contents or process abbreviations. Jointing, coating and lining system and pipe contents or process abbreviations are tabulated in Parts A, B and C of TABLE 1 respectively.

General information and criteria for mechanical design of pipework may be referenced in Mechanical Design Standards.

7.2 Joint, Coating and Lining Designations

PART A: JOINTING SYSTEM ABBREVIATIONS		
Jointing System Description	Example Notation	Notes or Comments
MILD STEEL PIPE		
Rubber ring jointed	RRJ	Rubber ring joint – also known as elastomeric seal joint (ESJ)
Rubber ring jointed with welded restraint	RRJ – WR	e.g. Tyco Sintalok
Band weld jointed	WJ – BJ	Plain ended pipe, butt welded (WJ – PE) and fully banded
Slip-in Weld jointed	WJ – SIJ	Pipe slip-in weld jointed (also known as spherical slip-in, expanded and collapsed or ball and socket weld jointed)
Plain end weld jointed	WJ – PE	Butt jointed welded pipe. (Integral to WJ – BJ for procurement purposes but not a stand-alone pipeline joint system)
FLANGED METALLIC PIPE		
Flange jointed and bolted	FJ	Steel, DI & Copper. Includes use of slip-on flanges.
PLASTICS PIPE		
Elastomeric seal jointed	ESJ	DI, PVC, GRP and ABS. Elastomeric seals of EPDM, SBR or NBR to AS 1646.
Solvent weld jointed	SWJ	Primer/cleaner/solvent – to AS 3879 (PVC); to AS 3691 (ABS)
REINFORCED CONCRETE PIPE		
Rubber ring jointed Flush Jointed	RRJ IFJ	Natural rubber skid (or other) rings In wall spigot & socket (flush) jointed >DN1800
POLYETHYLENE PIPE		
Mechanical compression jointed	MCJ	PE pipe joint fittings to AS/NZS 4129
Electro-fusion jointed	EFJ	Joint fittings to AS/NZS 4129
Butt-fusion jointed	BFJ	To WSA-01 (WSAA National Polyethylene Pipeline Code)
COPPER PIPE		
Capillary/Braze welded	CJ	Brazed with silver brazing alloy to AS 1167.1, Table 2
Mechanical compression jointed	MCJ	Cone type washer to Drawing BD62-8-31

PART B: COATING AND LINING ABBREVIATIONS		
Coating or Lining Material	Example Notation	Notes or Comments
Fusion bonded medium density Polyethylene	MDP	AS 4321 (Pipe coating & lining applications)
High density Polyurethane	HDP	AS/NZS 1518 (Pipe coating applications)
Polyurethane	PU	Pipe coating & lining applications
Thermal-bonded polymeric coating and lining system	FBE	AS/NZS 4158
Fusion bonded (powder) epoxy	FBE	AS 3862
Hot-dip galvanising to AS 1650	G	Ferrous pipe
Bitumen coated zinc	B/Z	Medium life expectancy. Bitumen delays leaching of zinc by groundwater.
Bitumen coated	B	Cosmetic but of no corrosion protection value.
Polyethylene Sleeving to AS 3680	PES	Ductile iron pipe applications
Plastics lining to Corporation Specification	PL	Wastewater RC pipe applications
Cement lining	CL	AS 1281 (MS, DI, CI pipe)
Epoxy seal coat for cement mortar lining	E/CL	Aggressive potable water applications
Bitumen seal coated for cement mortar lining	B/CL	Aggressive potable water applications
Natural Rubber lining (6mm thick lining to BS 6374.5)	NR	Conveyance of aggressive contents only.

8 VERTICAL DATUM & COORDINATE SYSTEM DESIGNATIONS

The Water Corporation fully adopted the Geocentric Datum of Australia (GDA) in April 2001.

It is very important to note that all NEW digital drawings and maps containing geo-spatial data, produced for the Water Corporation, shall be drawn using the Coordinate System - Map Grid of Australia (MGA94). New drawings produced using any other Coordinate System other than MGA94 will be rejected. (The unit of measure of MGA94 is the metre; drawings in mm are not considered MGA94.)

Existing drawings within the Drawing Management System (DMS), which have a Coordinate System other than MGA94, may be revised without transformation to MGA94.

Care shall be taken to avoid confusion by combining coordinates based on MGA94 with those of the previous AMG84, as they differ by at least 190 metres. The existing height datum is unaffected.

Some of the information held within the Water Corporation’s Drawing Management System (DMS) may contain coordinates based on the old Australian Map Grid (AMG) or an earlier Datum and shall not be mixed with the MGA based information.

Since December 2000, all Water Corporation standard titleblocks contain both ‘Vertical Datum’ and ‘Coordinate System’ fields. The ‘Vertical Datum’ (if applicable) field remains unchanged and shall have an entry as listed below. The ‘Coordinate System’ field indicates the horizontal datum (if applicable) and shall have an entry as listed below.

It is important to note that both of these fields are mandatory and shall be completed as designated below. The DMSout routine will not recognise any other designated entry and will fail.

8.1.1 Vertical Datum

Description	Designation in Drawing Titleblock
No Datum present within drawing	NONE
Australian Height Datum	AHD
Mean Sea Level.....	MSL
Christmas Island HD92	CIHD92
See note contained within drawing	SEE NOTE

8.1.2 Coordinate System for NEW Drawings

For NEW drawings, the following Coordinate Systems listed below, are the only ones accepted by the Water Corporation. See **Important Note** above

Description	Designation in Drawing Titleblock
No Coordinate System present within drawing	NONE
MGA94 [Zone 48 Extreme West]*	MGA94-48
MGA94 [Zone 49 Extreme West]*	MGA94-49
MGA94 [Zone 50 West]*	MGA94-50
MGA94 [Zone 51 Centre]*	MGA94-51
MGA94 [Zone 52 East]*	MGA94-52

8.1.3 Coordinate System for REVISED Drawings

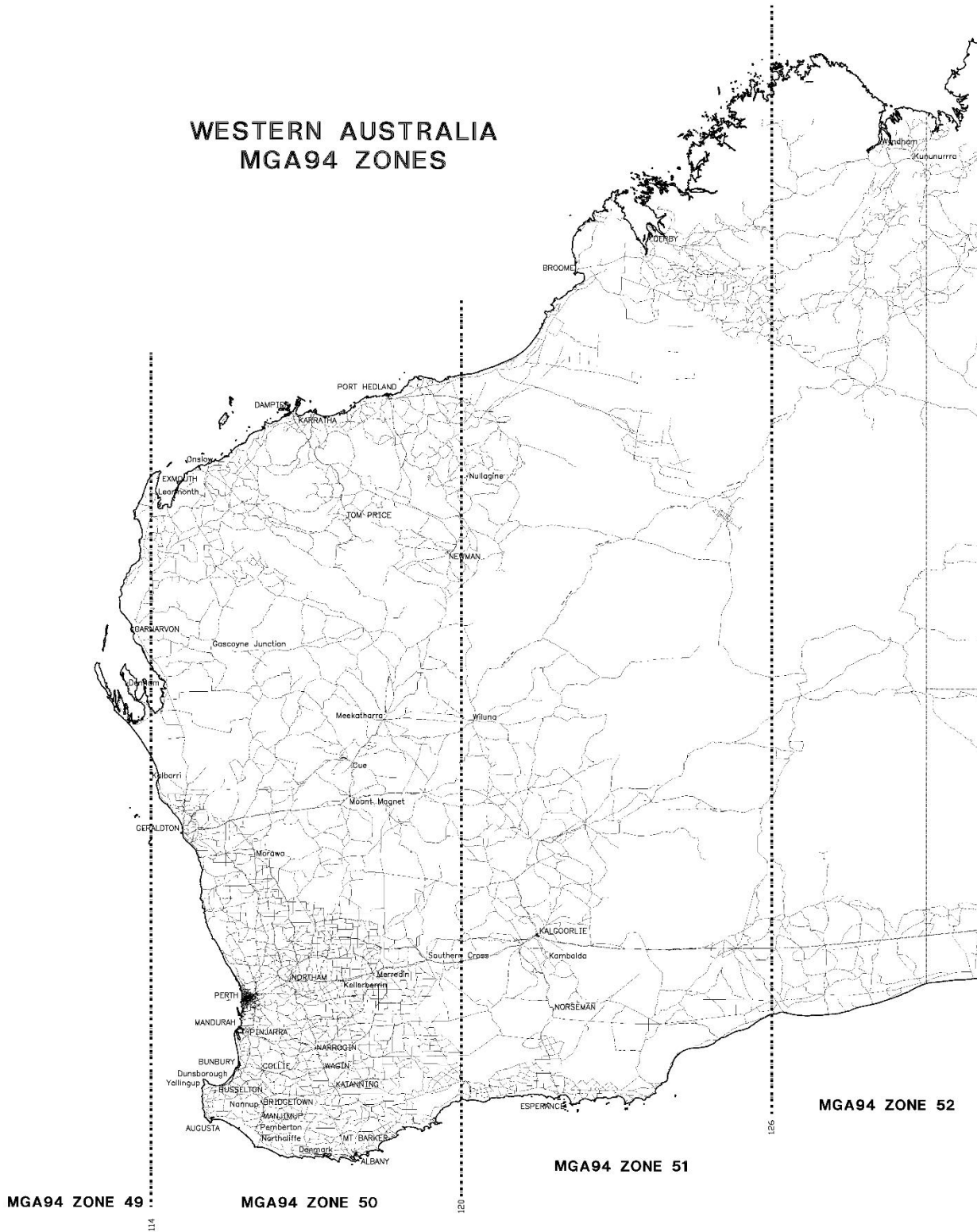
For REVISED drawings, the following Coordinate Systems listed below, will be accepted by the Water Corporation. See **Important Note** above

Description	Designation in Drawing Titleblock
No Coordinate System present within drawing	NONE
MGA94 [Zone 49 Extreme West]*	MGA94-49
MGA94 [Zone 50 West]*	MGA94-50
MGA94 [Zone 51 Centre]*	MGA94-51

MGA94 [Zone 52 East]*	MGA94-52
AMG84 [Zone 52 East]	AMG84-52
AMG84 [Zone 49 Extreme West]	AMG84-49
AMG84 [Zone 50 West]	AMG84-50
AMG84 [Zone 51 Centre]	AMG84-51
ALB [Albany]	ALB
ALB94 [Albany 94]	ALB94
BRO [Broome]	BRO
BRO94 [Broome 94]	BRO94
BCG [Busselton]	BCG
BCG94 [Busselton 94]	BCG94
CARN [Carnarvon]	CARN
CARN94 [Carnarvon 94]	CARN94
CIG85 [Christmas Island 85]	CIG85
CIG94HI [Christmas Island 94 Hi]	CIG94HI
CIG94LO [Christmas Island 94 Lo]	CIG94LO
CKIG92 [Cocos (Keeling) Islands 92]	CKIG92
CKIG94 [Cocos (Keeling) Islands 94]	CKIG94
ESP [Esperance]	ESP
ESP94 [Esperance 94]	ESP94
EXM [Exmouth]	EXM
EXM94 [Exmouth 94]	EXM94
GCG [Geraldton]	GCG
GCG94 [Geraldton 94]	GCG94
GOLD [Goldfields]	GOLD
GOLD94 [Goldfields 94]	GOLD94
JCG [Jurien]	JCG
JCG94 [Jurien 94]	JCG94
KAR [Karratha]	KAR
KAR94 [Karratha 94]	KAR94
KUN [Kununurra]	KUN
KUN94 [Kununurra 94]	KUN94
LCG [Lancelin]	LCG
LCG94 [Lancelin 94]	LCG94
MRCG [Margaret River]	MRCG
MRCG94 [Margaret River 94]	MRCG94
PCG [Perth Coastal Grid]	PCG
PCG94 [Perth Coastal Grid 94]	PCG94
PHG [Port Hedland]	PHG
PHG94 [Port Hedland 94]	PHG94
GDA94	GDA94
Unknown	UNKNOWN
Local	LOCAL
See note contained within drawing	SEE NOTE

* See following page for location of MGA94 Zones within Western Australia.

WESTERN AUSTRALIA MGA94 ZONES



STANDARDS\ENGINEERING\DESIGN\STANDARDS\DS80 WCX CAD STANDARD_3_CURRENT\MGA ZONES 13.54 08/04/2005 cleavego\WS11251

9 'AS CONSTRUCTED' DRAWING REQUIREMENTS

Note: for As constructed requirements for Electrical and Control & Instrumentation drawings refer to the Electrical Design Standards

9.1 General Requirements

'As Constructed' information shall be progressively captured in step with construction work by an engineering surveyor who is certified in accordance with the requirements of the project specification. This information shall be progressively incorporated into 'As Constructed' drawings, prior to their submission for review and checking into the DMS.

As Constructed' drawing information shall show the true position of all structures and services relative to one another and to known cadastral boundaries, presented to a level of detail and drafting quality equal to that of corresponding issued-for-construction drawings. The status of each drawing used to construct an infrastructure asset shall be revised to 'As Constructed' irrespective of whether or not the asset configuration changed during construction (i.e. whether constructed as originally drawn or not).

If an existing Water Corporation Standard or Example drawing was used for a project, then the Standard or Example drawing shall be checked out of the DMS for copy and then all of the titleblock information shall be updated to represent the Project. A bold note shall also be included in the body of the drawing to identify the source Standard or Example drawing. eg. "This drawing has been derived from XY99-99-1A". It is most important to include the Revision letter of the Standard or Example drawing in the bold note. Once this drawing has been loaded into DMS, it too shall be revised to 'As Constructed' as detailed in this section.

Each 'As Constructed' drawing shall be dated and endorsed by the accountable project personnel, including the constructor, to certify the accuracy of 'As Constructed' information. No constructed asset shall be deemed to have reached practical completion in the absence of signed-off 'As Constructed' drawings that show 'As Constructed' information for all constructed components of that asset.

Equipment vendor's drawings shall be submitted for archival into the DMS and shall comply with the requirements of DS80 where possible. Where Equipment vendors are unable to comply with the requirements of DS80, the contractor may place Equipment vendor's drawing inside a DS80 compliant titleblock, for archival into the DMS. Vendor equipment drawings shall be provided in CAD format. Where compliance with the requirements outlined is not possible, the Contractor shall seek direction from the Superintendent.

9.2 Format of 'As Constructed' Drawings

The format of each 'As Constructed' drawing submitted for checking and archival into the DMS shall be as follows:

- (a) WCX CAD Standard DS80 compliant AutoCAD or MicroStation CAD drawing file and PDF following the Drawing submission instructions.
- (b) Drawings shall be clearly marked As Constructed and contain a box for the accountable project personnel to sign.

9.3 Required 'As Constructed' Information Detail

As a minimum, 'As Constructed' drawings shall include the information indicated below and each point shall be fixed by MGA94 coordinates and if possible, at least two dimensions to cadastral boundaries.

To account for deflections and horizontal curves Water Corporation require sufficient measured points so that the centreline of the new linear asset is always within 250mm of a straight line drawn between any two consecutive measured points.

9.3.1 Wastewater Pumping Station &/or Pressure Main

- (a) The site plan drawing shall show:-
- The position of the pumping station, valve pits and electrical cubicle.
 - The position of the inlet access chamber and inlet pipe or pipes with invert levels, pipe materials, class and diameter of pipes.
 - The position of the overflow facilities with pipe invert levels, grades, pipe materials, class and diameter.
 - The position of power poles, cables, water service, fences, gates and pressure main.
 - Details of paving and drainage.
 - Site levels.
- (b) The general arrangement drawing shall show:-
- Details of pumpsets with make and model number and impeller diameter.
 - Pump control levels in the wet well.
 - Details of discharge pipework with sluice valves, reflux valves and mobile pump branch.
 - Level of pump well floor and top slab.
 - Status of redundant (not in use) pipework i.e. removed or left in place
 - Any disconnections, cutting and capping and the like must be specifically stated on the 'As Constructed' drawing
- (c) The Pressure Main drawing shall show:-
- Horizontal alignments and running chainage
 - Invert levels at bends, changes of grade and point of discharge
 - The 'As Constructed' information shall contain a description and surveyed MGA94 coordinates for every bend, valve, connection, scour, manhole and all other fittings or attachments.
 - Pipe material with position of any change in material.
 - Pipe classification, inside diameter, outside diameter and thickness.
 - Position of scour valves, air valves and bends
 - Status of redundant (not in use) PM i.e. removed or left in place
 - Any disconnections, cutting and capping and the like must be specifically stated on the 'As Constructed' drawing

9.3.2 Wastewater Main Sewers

- (a) The location of Main Sewers shall be fixed by dimensions to the intersection points of sewer centre lines in Access Chambers, Maintenance Shafts and Deleted Access Chambers, ends of IO sewers, centres of inspection shafts on IS sewers.
- (b) The following 'As Constructed' information shall be included in all Main Sewer drawings:-
- Diameter of pipe.
 - Pipe material.
 - Type of pipe joint.
 - Grade of sewer, calculated by dividing the horizontal distance between the points at which levels are taken by the differences in the sewer inlet levels at the internal faces of the Access Chamber walls, the centre of the Maintenance Shafts or Deleted Access Chambers or end of sewer or centre of IS shaft.
 - Length of sewer measured between the centre of Access Chambers, Maintenance Shafts and Deleted Access Chambers.
 - Length of IO sewer measured from the centre of Access Chambers and or Maintenance Shafts to the capped end of the sewer.
 - Length of IS sewer measured from the intersection of sewer centrelines to the centre of the vertical inspection shaft.
 - Concrete encasement and steel sleeves with measurement fixing their locations to the downstream Access Point.

- Invert levels at the internal faces of Access Chamber walls, centres of Maintenance Shafts and Deleted Access Chambers and ends of sewers and at the inspection shaft on IS sewers.
- The cover surface level of the Access Chambers and Maintenance Shafts shall be taken on the top edge of the cover frame above the downstream sewer.
- Status of redundant (not in use) Main Sewer i.e. removed or left in place.
- Any disconnections, cutting and capping and the like must be specifically stated on the 'As Constructed' drawing
- The 'As Constructed' information shall contain a description and surveyed MGA94 coordinates for every bend, valve, connection, scour, manhole and all other fittings or attachments.

9.3.3 Water Supply Distribution Pipelines

- On the first drawing of the Planset, the 'As Constructed' information showing the actual total lengths laid of each type and size of pipe; and the date(s) of the successful pressure test(s).
- Pipe type, joint type and pressure rating. Pipe level and ground levels
- Running horizontal distances shall be shown for all valves, fittings, change of pipe size, change of direction, connections etc.
- At every pipeline horizontal distance shown, where possible, the horizontal distance of the nearest building line or lot boundary normal to the alignment of the main shall be shown. The offset of the main shall also be shown.
- The start of each running horizontal distance line shall be from an existing fitting or main. This fitting or main shall be described (eg. "EXIST. 500 x 400 Tee") and marked as "START 00m". "START 00m" shall have a measurement relating its position to the nearest lot boundary or building line, normal to the alignment of the main.
- All valves, fittings, connections, air valves, scours etc. shall have size and horizontal distance indicated (eg. 300 SV, 10.2m).
- All bends shall be indicated by angle and horizontal distance (eg. 45° BEND, 35.7m).
- All blank ends shall be indicated (eg. END, B/END, 532.7m).
- The 'As Constructed' information shall contain a description and surveyed MGA94 coordinates for every bend, valve, connection, scour, manhole and all other fittings or attachments.
- Status of redundant (not in use) WS Main i.e. removed or left in place.
- Any disconnections, cutting and capping and the like must be specifically stated on the 'As Constructed' drawing

9.3.4 Water Supply Distribution Tanks

- Positions of the tank and overflow/drainage sump.
- Site levels
- Details of hardstand, paving and drainage including levels
- Details of under drainage including levels
- Positions and details of fences, gates, power poles and other services including cables and conduits.
- Positions of pipe fittings, valves, valve pits, overflow/drainage chambers, pits, sampling points, flow meter, pitometer points, electrical cubicles
- Orientations of tank pipework inlet, outlet, overflow, scour and interconnecting pipes.
- Orientations of roof and wall hatches, ladders/stairways and roof ridges.
- Invert levels of pipework at bends, fittings and change of grade.
- Lengths of pipework or running horizontal distances.
- Details of pipework - Diameter, material, class, and joint type.
- Status of redundant (not in use) pipework i.e. removed or left in place.
- Any disconnections, cutting and capping and the like must be specifically stated on the 'As Constructed' drawing
- Details of valves - Diameter, class, manufacturer and model.
- Foundation details - Pad thickness, material and compaction

- Concrete details - Grade, admixtures used and cover to reinforcement
- Reinforcement details -Type and diameter or fabric number
- Lifting system details - Manufacturer and part numbers.
- Pipe penetration details - Floor, wall and roof
- Pipe concrete encasement details
- Tank floor slopes
- Ladder/stairway details including fixing details
- Details of structural steelwork including fixing details
- Steel roof sheeting details - BMT, coating, colour code, manufacturer, warranty reference (ref no. and date) and expiry date of warranty.
- Details of steel plate for steel tank - Thickness and grade of steel. On steel shell drawing include the note “No welding on tank to be undertaken without consulting Mechanical & Electrical Services Branch.”
- Details of paint applied to metal interfaces - Manufacturer and type
- Details of painting system for steel tanks - Manufacturer, type, coat thickness, and colour code
- Details of protection to structural steel work - Material and type and thickness of coating
- Details of internal liners for steel tanks - Manufacturer, material, thickness and warranty
- Instrumentation details - Location, manufacturer and part numbers.
- Cathodic protection details - Manufacturer and part numbers.
- Isolating flange details - Location

9.3.5 Dams and Dam Safety

- All the requirements detailed in project specifications and relevant Water Corporation Design Standards applicable to those assets constructed.

9.3.6 Urban Main Drain & Country Drains

- Corrected distances along the route of the drain.
- Invert levels at access chambers and structures.
- Levels for top of access chambers and top of structures.
- The position of access chambers and structures by cadastral ties (or by MGA94 coordinates where cadastral ties are not possible).
- Finished contours for compensating basins and open drains.
- The actual storage capacity, to the design TWL, of compensating basins noted in the design data on the drawing.
- Bedding information of piped drains and culverts.
- Junction locations.
- The extents of remnant vegetation and planted vegetation.
- Variations from design.
- All other relevant ‘As Constructed’ information
- The ‘As Constructed’ information shall contain a description and surveyed MGA94 coordinates for every bend, valve, connection, scour, manhole and all other fittings or attachments.

9.3.7 Water Supply Reticulation

Requirements as detailed in Design Standard DS 63 and the Developers Manual.

9.3.8 Non Drinking Water Reticulation

Requirements as detailed in Design Standard DS 63-01 and the Developers Manual.

9.3.9 Wastewater Reticulation

Requirements as detailed in Design Standard DS 50 – Design and Construction Requirements for Gravity Sewers DN150 to DN600 and the Developers Manual.

9.3.10 Water and Water Resource Recovery Facility or Wastewater Treatment Plants

All the requirements detailed in project specifications and relevant Water Corporation Design Standards applicable to those assets constructed.

10 Water Conveyance Equipment Identification Numbers

The boundary between a Water Treatment Plant and its water conveyance system needs to be explicitly agreed on a project-by-project basis. The initial guiding principles are:

- Equipment operated through the treatment plant control system should be numbered according to the convention for water treatment plants; and
- Equipment operated through the conveyance SCADA system or under the manual control of the conveyance system operators should be numbered according to the convention for water conveyance systems.
- The term “water conveyance system” means and includes:
 - Raw water collection systems (bringing water to a water treatment plant).
 - Trunk and distribution systems (taking water from a water treatment plant or other sources of potable water and delivering water to the reticulation network); and
 - Control infrastructure at the interface between the distribution system and the reticulation network.

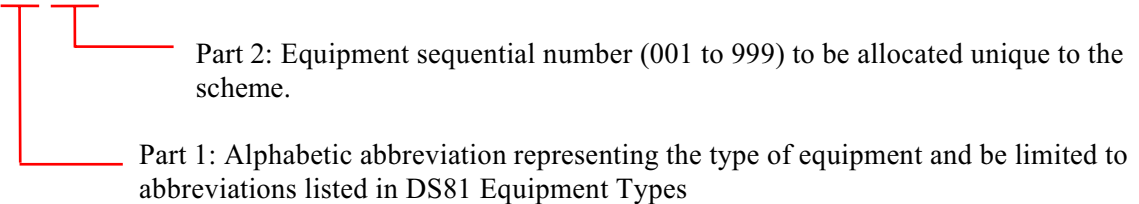
10.1.1 General

The Designer/Design Manager shall identify which items require numbers. All reasonable attempts to allocate numbers to in-line valves and in-line instruments that are in close proximity for ease of identification by people scanning drawings or actual tags on equipment in the field.

For general equipment within the water conveyance system the following numbering convention shall be applied.

The label shall be an alphanumeric string comprising two parts.

PU999

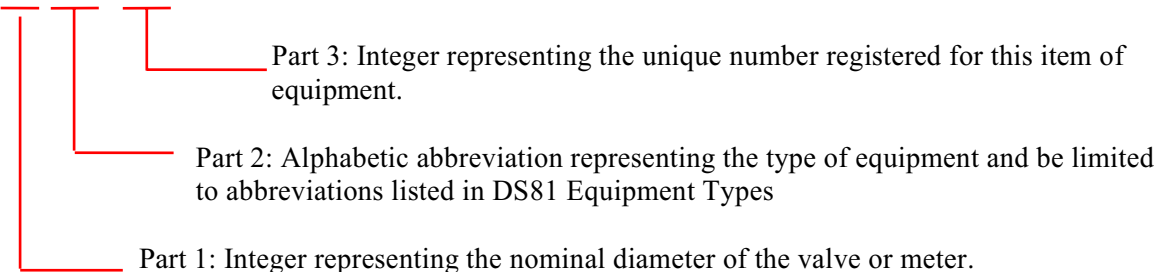


10.1.2 Valves and Flow Meters

For valves and flow meters within the water conveyance system equipment the following numbering convention shall be applied.

The label shall be an alphanumeric string comprising three parts for all in-line valves and in-line instruments:

900SV2375



Examples of valid equipment labels for in-line valves and in-line instruments are:

900SV2375	900mm Sluice Valve # 2375
800EBV4031	800mm Electrically Actuated Butterfly Valve # 4031
1000RV2400	1000mm Reflux Valve # 2400
900MFE3718	900mm Magnetic Flow Meter # 3718

END OF DOCUMENT