UrbanUtilities

ENGINEERING DRAWING AND DOCUMENT MANAGEMENT REQUIREMENTS FOR CAPITAL PROJECT DELIVERY

PRO307

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Revision Table

Rev No.	Date	Status	Owner	Reviewer	Approver
5	22/10/2024	Issued for Use	Michael Buckley RPEQ 08464	Krupal Patel	Kate Lanskey

Revision History

Rev No.	Date	Change or Action	Author
0	Sept 2013	Original	Glen Southern
1	July 2019	Drawing Management Guidelines revised to align with the 'Redye' DMS.	Glen Southern
5	Oct 2024	Major Update	Michael Buckley

Endorsement

Committee	Date
Technical Standards Committee	19/12/2023

1. Purpose

This document sets out Urban Utilities standards, practices, and procedures required for the preparation, checking, certification, management of engineering drawings and documentation required for new and altered infrastructure. This is to ensure adequacy and consistency in creation and management of these drawings and documents.

2. Scope

This document applies to engineering drawings and documents produced by Urban Utilities engineering and drafting personnel, Authorised Partners, external third parties, consultants, or contractors engaged by Urban Utilities delivering designs for capital project delivery.

Network water supply and sewerage pipeline drawings are to be completed in accordance with the relevant SEQ code and the Urban Utilities drawing templates.

3. Definitions and acronyms

Term	Definition
ADAC	Asset Design As-Constructed
AIS	Asset Information Specification
Architectural drawing	Drawings developed for architectural purposes showing layout, materials, finishes etc. but not engineering design.
Asset Drawing Team	Urban Utilities team responsible for administration of asset drawings in Redeye Engineering Drawing Management System
Authorised Partners	Partners that have been authorised under the program management approach framework to provide services to or for Urban Utilities
BIM	Building Information Modelling
Bound CAD drawing	Native format CAD drawing sheet in which all loaded CAD drawing references are inserted directly and the CAD drawing sheet no longer relies on CAD drawing reference (Xref) files for completeness.
CAD	Computer Aided Design – software that can produce two dimensional drawings and three-dimensional models.
CDE	Common Data Environment / Document Management System
Concept drawings	Means drawings showing concept design prepared early in the design process. It does not include sketches.
Delivery Quality Assurance	Urban Utilities person or team responsible for project document control
.dwg	Native format for several CAD packages
ECI	Early Contractor Involvement. This occurs in Stage 4 of project delivery leading to the Risk Adjusted Maximum Price.
EPS	Engineering & Professional Services – a team within Integrated Solutions
Engineering drawings and documents	Engineering drawings and documentation show how infrastructure has been designed, constructed, and commissioned. Engineering documents include, and are not limited to, design reports, technical advisory,

Term	Definition
	investigation reports, hazardous area dossier, power system analysis reports, data sheets, equipment list, valve list, line list, equipment schedules, cable schedule, label schedules, ADAC XML survey information
GDA2020	Geocentric Datum of Australia 2020
IES	Integrated Engineering Services Partner
InEight	InEight (Teambinder) document management system used by Urban Utilities to manage project deliverables
Market Ready Design (MRD)	Design has been completed to the point that it can be issued to market for further development of design.
Network Assets	Includes Urban Utilities reticulation mains up to and including 300 millimetres (mm) nominal bore, Urban Utilities trunk mains and pumping stations.
OLE	"Object Linking and Embedding" is a Microsoft Windows feature that allows user to copy or move information from one application to another while retaining the ability to edit the information in the original application.
Part A Drawings	Drawings required prior to commissioning – refer FOR52
Part B Drawings	Drawings required prior to Handover/Project Completion – refer FOR52
.pdf	Portable Document Format – a standardised file format that was developed by Adobe that allows documents to be shared easily between operating system platforms without being able to be modified.
P&ID	Piping and Instrumentation Diagram
PFD	Process Flow Diagram
Pre-Construction design	Means Concept, For Tender, MRD designs
Project Documentation	Governing technical documents for the specific item(s) for the specific works included or referenced in the Contract or Water Approval
QDOX	Urban Utilities Record Management System, also known as Content Manager
RedEye DMS	Urban Utilities Drawing Management System is RedEye Apps cloud-based Document Management System.
RPEQ	Registered Professional Engineer Queensland
Smart P&ID	A P&ID which carries additional data attributes in the .dwg file itself.
Stage Gate	Check Point in the Urban Utilities Project Management Approach capital process
Treatment facility	Sewage treatment facility. Also referred to as a Resource Recovery Centre (RRC)
UU	Urban Utilities
Wet Signature	A wet signature is when you physically hand sign a piece of paper.
Xref	The common term for the CAD drawing reference file which is loaded into native CAD drawing sheets

4. Referenced Documents

4.1 Codes and Technical Standards

The documents listed in Table 4-1 are either referenced, or shall be read, in conjunction with this document.

Table 4-1 Referenced Technical Codes and Standards

Reference	Description
POL56	Urban Utilities Information Management Policy
FS74	Engineering Drawing Drafter FAQ Fact Sheet
FS120	Engineering Drawing Approver FAQ Factsheet
PRO395	Urban Utilities Addendum to SEQ WS&S D&C Code; Urban Utilities Information Requirements
TMS1647	Plant and Equipment Tag numbering - Technical Specification
TMS1654	Project and Technical Document Numbering and Naming Requirements
PRO687	Drawing Management System Workflows
PRO697	Drawing Number and Template Allocation
FOR1063	Project Drawing/ Document Number Request Form
FOR52	Operational Readiness Acceptance Form

4.1 Industry Standards

The requirements of industry standards listed in Table 4-2 are to be adopted. Drawings produced for or on behalf of Urban Utilities must reflect good drawing practices in accordance with the current issue of these standards.

Table 4.2 Industry Standards

Document Number	Title
AS 1100	Technical Drawing
AS 1102	Graphical Symbols for Electrotechnology Documentation
AS3000	Wiring Rules
AS 3702	Item Designation in Electrotechnology
AS 4383	Preparation of Documentation used in Electrotechnology

4.2 Applicable BIM Standards and Guidelines

The core external standards that are to be used for the BIM Implementation are listed in Table 4.3.

Table 4.3 BIM Standards

Document Number	Title
ISO19650	Building Information Modelling (BIM) Standards

5. Technical Requirement

5.1 Application of 2D and 3D Models

Typically for any significant installation at a treatment facility or any other facility that has significant change to complex and or critical mechanical and electrical equipment, a 3D model will be required in design and as-constructed form. The 3D modelling requirements and the software and standards to apply to the project will be negotiated and agreed to during the ECI phase of the project.

3D models may be exempted for simple facilities by agreement with Urban Utilities.

Note that Urban Utilities operational systems currently rely on 2D as built drawings in .PDF format. Therefore, 2D drawings will be extracted from the 3D model and the As-Constructed drawings issued in .DWG and .PDF format.

There will be situations where is not economical to model, and remodel - for example small diameter auxiliary piping and fittings. In this situation Urban Utilities will update the 2D As-Constructed Drawings. Notwithstanding this Urban Utilities values the Native 3D Models as providing a basis for future project improvements.

5.2 2D Drawing Platform

All new 2D CAD drawings prepared for Urban Utilities must be in AutoCAD® .dwg format unless written authorisation has been provided by Urban Utilities to use an alternative format prior to commencement of any drafting work.

If another drawing software package is to be used for the preparation of 2D drawings, the native CAD file along with an AutoCAD® dwg format conversion shall be provided.

5.3 3D Model Platform

The Delivery Partner/Contractor must inform Urban Utilities of their ability to adopt the model software platforms listed below and confirm any additional software intended for use. Software platforms and versions must be agreed with Urban Utilities prior to commencement of any drafting work.

Purpose	Software
Parent Common Data Environment (Collaborative CDE)	Autodesk Construction Cloud (ACC)
Host Civil, Revit and Plant3D (Collaboration CDE)	Autodesk Construction Cloud (ACC)
P&ID	Autodesk Plant 3D
Mechanical/Piping Model	Autodesk Plant 3D
Structure	Autodesk Revit
Electrical	Autodesk AutoCAD, Autodesk Revit
Civil	Autodesk Civil 3D
Federated Model/Design Reviews	Autodesk Navisworks

5.4 3D Model Output Requirements

The 3D Model shall be issued to Urban Utilities in Native format as final deliverable.

The 3D Model shall be provided in Navisworks .nwd format to support design reviews and information sharing.

Refer to PRO687 for Redeye DMS workflow procedures for uploading 3D Models to Urban Utilities Drawing Management System.

5.5 Project BIM Implementation

Urban Utilities has developed its Employers Information Requirements (EIR) as an element of its Project BIM Implementation. When EIR is referenced in Project Documentation this will be used to set out to the Delivery Partner/Contractor what models and data are required for delivery and their purpose. These requirements will in turn be implemented by the Delivery Partner/Contractor through a Digital Engineering Execution Plan (DEXP).

This DEXP will demonstrate the ability of Delivery Partner/Contractor to adopt the process of Digital Engineering based on the reference documents and standards listed in this document. This will facilitate efficient data sharing and exchange whilst working in a collaborative environment across multi-disciplinary teams.

5.6 Information Security

The Delivery Partner/Contractor must comply with Urban Utilities POL56 Information Management Policy for the management of Urban Utilities asset data.

5.7 Survey Information Requirements

Supplied survey information and drawing data shall be in accordance with the following references.

Attribute	Details	Values
Geodetic datum used	Mapping grid of Australia	GDA2020
Height reference	Australian height datum (AHD)	0.000 (m)
Grid datum	Australian geodetic datum (AGD)	Zone 56
	Local grid reference	
Project location	Enter the project location, identifiable by cardinal points	E 511500.000, N 6 964 750.000
Model rotation	In relation to the project north	0° 00’ 00”

5.8 Standard and Typical Drawings

Urban Utilities maintains a set of Standard and Typical drawings for commonly used infrastructure. Standard drawings inform the designer of engineering standards which are mandatory. Typical drawings inform an acceptable method, or the Urban Utilities preferred method, of complying with engineering standards.

The designer must carry out the necessary investigations to confirm that the project design drawings they develop based on Urban Utilities Standard and Typical Drawings are suitable for their project application and modify where required in consultation with Urban Utilities. The designer must take full RPEQ design responsibility for their project design.

5.9 Existing Drawings

It is the responsibility of the person who makes the decision to create a new drawing and the Project Manager to ensure that any identified existing drawings that overlap the new drawing are updated, superseded, or made obsolete.

Where there is a requirement to modify existing or legacy drawings that do not conform to the standards in the current version of PRO307 then the standards applicable at the time of drawing creation can be maintained unless extensive modifications to the content are required. Advice can be obtained from the Urban Utilities Engineering & Professional Services Team on what constitutes extensive drawing modifications, typically it will be where more than 50% of the drawing content is being modified or a conflict with symbology is introduced.

An existing CAD drawing set does not need to be updated to the current standard Urban Utilities title block where a small number of drawings from a larger drawing pack are being updated to maintain title block consistency.

For existing drawings requiring extensive modifications Urban Utilities requires the drawing to be migrated onto the current title block and current standard. If a drawing is migrated into the current standard, it is expected that a new drawing number will be assigned, and the legacy number superseded.

If an existing non-conforming drawing is being used as a base for a drawing with a new drawing number, then the new drawing must be updated to conform to the current revision of PRO307.

Existing drawings only available in PDF version that require substantial change must be recreated as AutoCAD .dwg format conforming to the current version of PRO307.

5.10 Drawing Management

Urban Utilises uses an engineering drawing management system, RedEye Apps for Infrastructure Delivery projects. Only Issued ‘FOR CONSTRUCTION’ and ‘AS-CONSTRUCTED’ drawings are uploaded to RedEye according to the requirements in the Project Documentation. This upload is managed in a RedEye workflow.

5.11 Drawing Number Management

Drawing Numbers can only be issued from RedEye DMS by Urban Utilities Asset Drawing Team. Refer to Section 7 of TMS1654 and to PRO697 regarding the process to allocate drawing numbers.

5.12 Spare Drawing Management

During drawing number allocation the Delivery Partner/Contractor should arrange with Urban Utilities Delivery Quality Assurance Team to reserve numbers in Redeye for future use where appropriate to ensure drawing number continuity. SPARE drawings created within the set for future use must follow the same drawing process, up rev and upload as the rest of the set at the FOR CONSTRUCTION and AS CONSTRUCTED stages as normal. The word “SPARE” must be prominently shown on the drawing together with the Amendment table entry stating SPARE DRAWING. The Urban Utilities Project Manager is responsible to ensure the SPARE drawings are uploaded into RedEye at the project handover stage.

5.13 Unused Drawing Management

Unused drawing template(s) must be provided in the Drawing List with status as “No Longer Required” at handover stage to inform Asset Drawing team to remove them from RedEye.

5.14 Drawing Title Block Templates

When issuing a drawing number, the appropriate Drawing Title Block Templates should be selected based on the project stage of delivery.

There are four Drawing Title Block Templates to select from:

1. Concept Internal & External A1 Border
2. Design Internal A1 Border
3. Framework Partner A1 Border
4. Land & Easement Internal & External A1 Border

Please note the templates are not locked to each drawing number, i.e., you don’t have to upload the exact template that was downloaded for each drawing number. You can download the template from the first drawing number and copy it across your project, if the appropriate template is being used.

Drawings for all disciplines shall be produced to using the UU standard title blocks (A1 sheet size). The A1 sheet size shall be plotted at a scale of 1:1 for A1 and 1:2 for A3 dependent on project requirements. Note default sheet plot size is A3.

Survey Drawings for Easement, Land Acquisition Proposal, and Access Agreement Plans shall be produced to A3 sheet size. The A1 sheet size shall be plotted at a scale of 1:1 and 1:2 at A3.

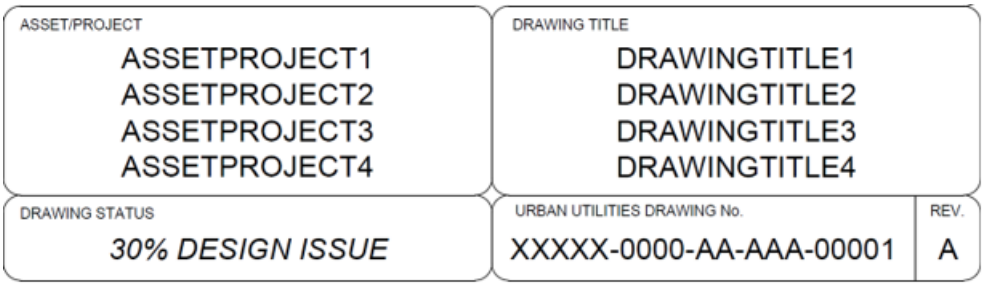
Drawing numbers and their associated templates can only be issued by Urban Utilities and cannot be self-generated.

Drawing Title Block templates will be available to download from the RedEye DMS in 'AutoCAD.dwg' format. The templates have the Urban Utilities approved plot styles, line types and title blocks. Urban Utilities may revise the RedEye version of this title block from time to time. The latest version of the drawing title block template will always be issued with any new drawing numbers.

New drawings shall use the latest Urban Utilities title block. Drawings using a new drawing Number shall use the latest title block.

Urban Utilities drawing title blocks cannot be exploded nor modified in any other manner than that detailed in this document.

All drawing title block fields must be completed prior to Formal Issuing of each drawing, as detailed in the extract below.



The Drawing Title fields are free fields to identify document contents, e.g., Reinforcement Details, Piping General Arrangement, Blower No. 1 Single Line Diagram.

Shortening of words within the Title Block shall only occur when there in insufficient space. Such as ST or RD, RES, MH, & etc.

Drawing Status is a dynamic block with varying options to choose for the status of the drawing. If a status is not available in a Title Block Template, (e.g., 'FOR CONSTRUCTION' is not available in the Concept Title Block Template) then it shall not be manually overridden.

Drawing revision is as per AS1100; new drawings shall be:

- PRE-CONSTRUCTION — Alphabetical revision (A to Z)
- FOR CONSTRUCTION — Numerical revision, starting at 0 (zero)
- AS-CONSTRUCTED (and beyond) — Next numerical revision.

5.15 Drawing Titles - Site Based Assets

The title block shall be completed as follows:

- ASSETPROJECT1 – UU Site Number and UU Site Name (PRO395 - Appendix B)
- ASSETPROJECT2 – UU Site Address (PRO395 – Appendix B)
- ASSETPROJECT3 – UU Sub Process Number and UU Process Name (PRO395 – Appendix C)
- ASSETPROJECT4 – UU Project Name.

- DRAWINGTITLE1 – Type of document, e.g. General Arrangement, Single Line Diagram, I/O List, or free text

- DRAWINGTITLE2 – Populate as per drawing text fields, e.g. Plan View, Site Cover Sheet. Show Equipment Description for plant and process drawing.
- DRAWINGTITLE 3 – Free text (Show Parent Equipment Tag for plant and process drawing)
- DRAWINGTITLE 4 – Free Text

Refer to Appendix A for examples of drawing titles for site based assets.

5.16 Drawing Titles - Network/Linear Based Assets

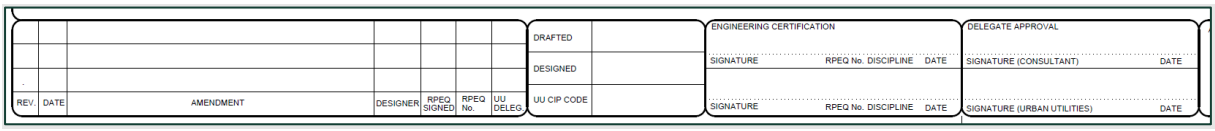
The title block shall be completed as follows:

- ASSET/PROJECT Section:
  - Used to describe the location of the asset. May include Asset Name and Operational ID/Line Number/Set Number, Street Name and Start & End Streets.
  - Contain the UU Project Name or nature of works being undertaken
- DRAWINGTITLE1 – Type of document, e.g., General Arrangement, Single Line Diagram, I/O List, or free text
- DRAWINGTITLE2 – Populate as per drawing text fields, e.g., Plan View, Site Cover Sheet
- DRAWINGTITLE3 – Free text
- DRAWINGTITLE4 – Free text

Refer to Appendix A for examples of drawing titles for network/lineal based assets.

5.17 Concept Internal and External Template

The Concept Internal & External Template is available for producing Stage Gate 2 Concept Drawings. The Template does not contain an As-Constructed section as these drawings shall never be used in a ‘FOR CONSTRUCTION’ scenario.



Revisions for this title block shall only ever be alpha characters.

The Delegate Approval Signature by Consultant is not necessary to be filled out for Urban Utilities Internal and IES produced drawings.

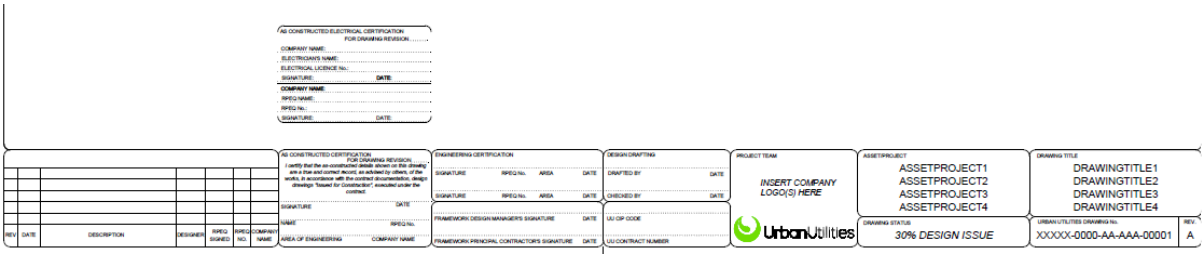
5.18 Design Internal Template

The **Design Internal Template** is used by Urban Utilities internal and IES produced drawings for Stage Gate 3 – Market Ready Design onwards.

If maintaining a drawing number from a Concept Template, the Alpha revision shall continue until ‘FOR CONSTRUCTION’ drawings are issued, which starts at zero “0”.

5.19 Framework Partner Template

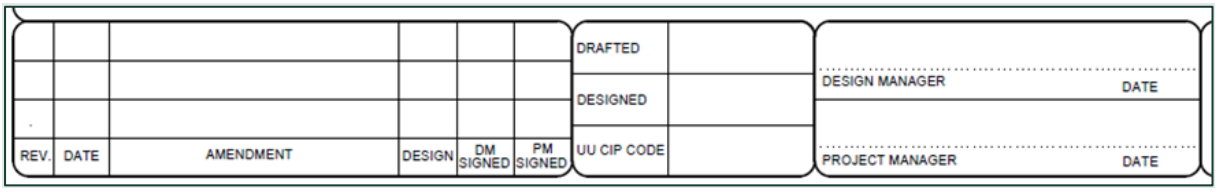
The **Framework Partner Template** is used by Capital Delivery Framework Partner produced drawings for 'Stage Gate 3 – Market Ready Design' onwards.



If maintaining a drawing number from a Concept Template, the Alpha revision shall continue until 'FOR CONSTRUCTION' drawings are issued, which starts at '0' (zero).

5.20 Land and Easement Internal and External Template

The Land and Easement Template can be used at any stage throughout the project lifecycle. The Template does not contain an As-Constructed section as these drawings will never become an 'AS-CONSTRUCTED' Drawing.



A Survey Plan lodged with the Titles Office will show the Parcel and/or Easement details, and construction access details are not required to be revised.

RPEQ certification of these plans is not required.

These drawings can only be transmitted via InEight (Teambinder) with one of these Status: FOR INFORMAITON or FOR REVIEW.

5.21 Drawing Title Block- Other Fields

The drawing title block must capture the following field entries where available for the project.

- UU CIP Code – this references the UU project number e.g. RTME002, SCAR007
- UU Contract No - unless provided by UU, enter N/A. e.g. IP012345

6. Drawings Presentation

6.1 Cover Page

Urban Utilities requires each package of work for water and wastewater reticulation network

to be accompanied by a cover page including locality plan and drawing index. A separate page including notes, abbreviations and legend shall be utilised throughout the drawing set. For situations of single drawings updates, this requirement may be relaxed.

6.2 Black and White, Or Colour

Where the drawing uses coloured line work, the colours selected shall be such that the line work depicted is clearly legible when the drawing is printed or copied on a monochrome (black and white) printer. If a drawing is to be presented in colour, lighter colours such as yellow and cyan should be avoided where possible.

6.3 Plotting

Details such as drawing sheet size, line thickness and text requirements are imposed to provide drawings suitable for scanning to Adobe Acrobat .pdf format files at A3 size and in Landscape orientation. These shall be created using Autodesk's internal DWG to PDF conversion and retain layer information on the pdf output.

All drawings shall be created at A1 full size. But printed at A3 size 1:2 scale.

Urban Utilities' default Plot Style is to plot colours (1-7) black per below lineweight table. All other colours (8-255) will plot their colour at the object lineweight.

Name	Color 1	Color 2	Color 3	Color 4	Color 5	Color 6	Color 7
Description	Description_1	Description_2	Description_3	Description_4	Description_5	Description_6	Description_7
Color	Black	Black	Black	Black	Black	Black	Black
Enable dithering	On	On	On	On	On	On	On
Convert to grayscale	Off	Off	Off	Off	Off	Off	Off
Use assigned pen #	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Virtual pen #	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Screening	100	100	100	100	100	100	100
Linetype	Use object linetype	Use object linetype	Use object linetype	Use object linetype	Use object linetype	Use object linetype	Use object linetype
Adaptive adjustment	On	On	On	On	On	On	On
Lineweight	0.5000 mm	0.2500 mm	0.2500 mm	0.1800 mm	0.7000 mm	0.1000 mm	0.2500 mm

If a plot style other than this is used, it must be sent to Urban Utilities for upload to their drawing management system RedEye so the correct render of the drawing can be displayed in the system. The new plot style must be submitted and uploaded prior to upload of drawings otherwise there will be an error message on affected drawings.

6.4 Layer Management and Dim Style

Unless supplied otherwise on a project/program specific basis, Urban Utilities has no standard for layer name convention or dim style etc, however it is expected the layers and dimensions are consistent across all drawings in a project, and layer naming be self-explanatory.

Effective drawing layer management is an Urban Utilities requirement. Layer manager helps to control line colours, styles, visibility, and plotting:

- Objects shall not be drawn on 0 (zero) layer – except as necessary for blocks etc.
- No forced colour and line type changes are permitted.

In addition to the above, Electrical drawings shall be drawn to AS3000 standards.

Process drawings and symbols shall be drawn utilising ISA standards, reverting to ISO standards to fill in any gaps. Refer also to Section 13 for requirements for creation of Smart P&ID.

6.5 Lines and Line Style

When selecting a line thickness, it must be considered that the drawings will be reproduced at a smaller size such as A1 to A3, so the minimum line thickness is to be 0.10mm. The line thicknesses to be used are: 0.10mm, 0.18mm, 0.25 mm, 0.35 mm, 0.50 mm, 0.70 mm, 1.00 mm, 2.00 mm, 3.00 mm and so on.

Line styles to be used are set out in AS1100.101 Table 3.1, and any additional styles provided by Urban Utilities.

The embedded text in user defined lines is to be Arial Font and have a minimum height of 2.5 mm.

6.6 Text

AS1100.101 Table 4.1 details the recommended text heights.

Text font should be to AS1100.101, AutoCAD AERIAL. All text is to be in upper case including all annotation, notes, and titles, except where naming convention requires otherwise, i.e. mm, kPa.

Text shall not be overwritten with lines or other drawing entities.

6.7 Dimensions and Coordinates

Do not override the CAD system generated dimensions and coordinates, drawings shall be drawn exact.

6.8 Scales

As the drawings may be reproduced at half scale, it is necessary to choose a scale that when doubled in size is still a common scale available. The scales on A1 or A3 sheets shall be: 1:1, 1:2, 1:5, 1:10, 1:20, 1:25, 1:50, 1:100, 1:250, 1:500, 1:1000, 1:2500, 1:5000, 1:10000.

All drawings must have a scale bar showing the predominate scale.

Process drawings shall be drawn at 1:1 scale. Electrical drawings that are not General Arrangement style (e.g., single line diagrams, schematics, termination drawings, loop diagrams, cable block diagrams) runs must be drawn at 1:1 scale.

Drawing of all data in model space shall be at 1:1 scale.

6.9 Sections and Details

Section and Detail indicators shall be to AS1100.101, Figure 7.3 Sheets 1 and 2, except that Section indicators are to be annotated with an Alpha character for the section, and the last three digits of the drawing number on which the section appears.

Detail indicators are to be annotated with a Numeric character for the detail, and the last three digits of the drawing number on which the detail appears.

If the indicator and the section are on the one drawing, then the drawing digits shall be substituted with a dash. Figures 1 and 2 show typical annotations.

If a section is created referencing an existing drawing without a standard drawing number, the full drawing number should be referenced for clarity.

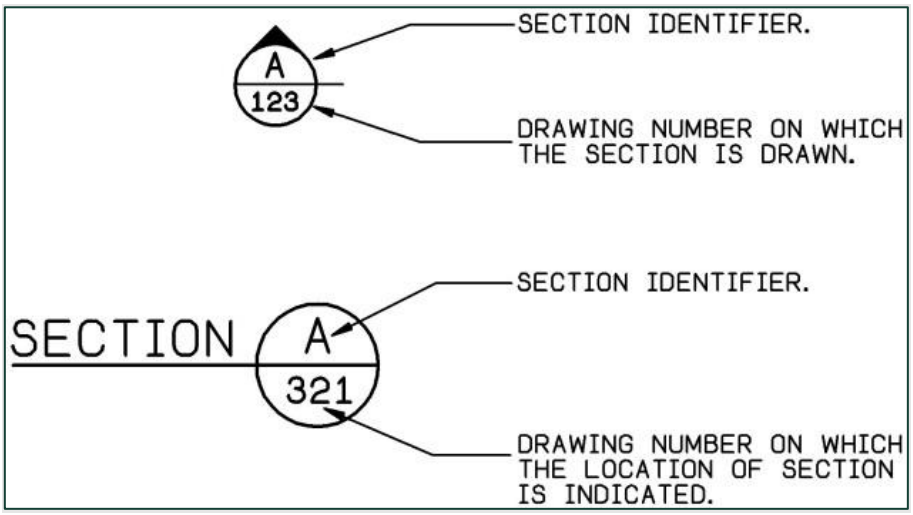


Figure 1

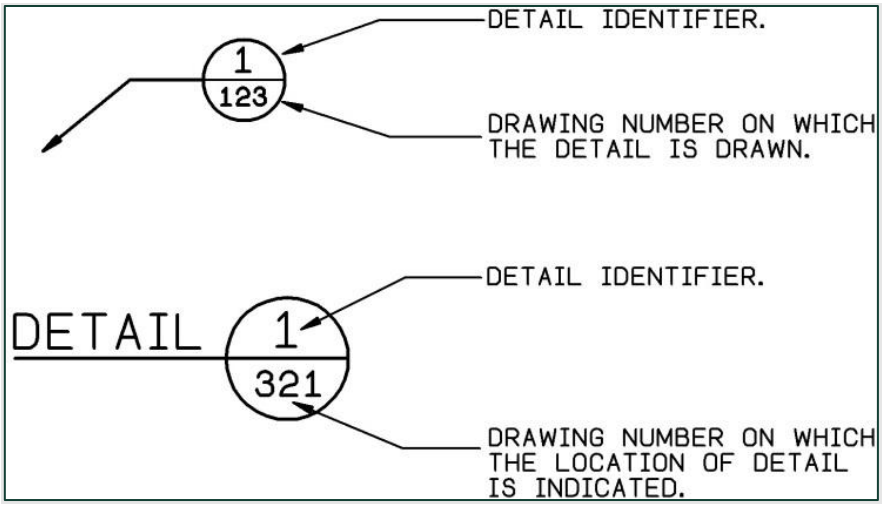


Figure 2

6.10 New and Existing Works

New and existing works are to be distinguished using either line thickening and/or shading. Figures 3 and 4 shown below illustrate these alternatives.

Colour may be applied to drawings, rather than being restricted by black and white. This will assist in identifying new / proposed works against busy existing workings and open the realm of layering on a drawing. Refer 6.1 COVER PAGE for Legend requirements.

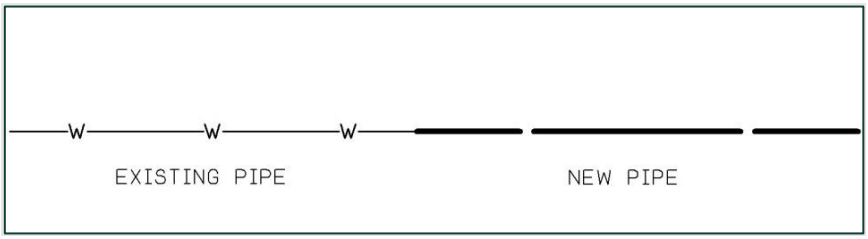


Figure 3

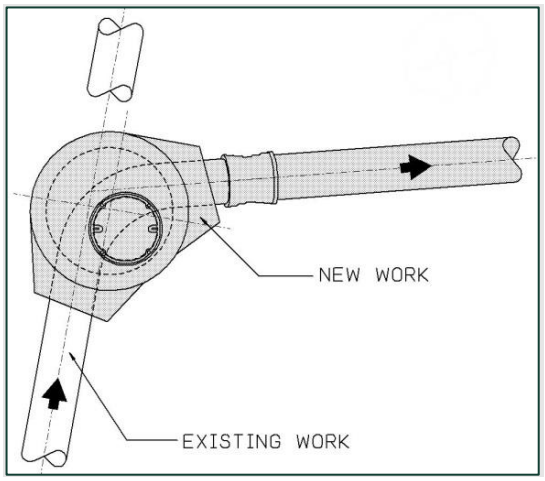


Figure 4

6.11 Pipe Detailing

All new pipes are to be clearly marked with the diameter of the pipe, material, and class. The following is an example of a 100mm diameter Ductile Iron pipe (e.g., DN100 DICL PN16).

All existing pipes shall be clearly marked with the diameter and material as a minimum.

All pipes shall be noted on drawings to include relevant information on pipe material, outside diameter, wall thickness, internal lining thickness, internal diameter, pressure rating or class and external coating.

Arrows shall be shown to indicate all pipe flow directions for sewers.

6.12 Hard Copies

Urban Utilities do not require hard copies for any submission.

7. Drawing Issue

All drawings at all phases of Concept, Design and Implementation must have a Drawing Number, Drawing Status and Revision included on the drawing.

Drawings can either be Formally Issued or Informally Issued. A drawing is classified as Formal when it carries all the necessary engineering and authorisation signatures. A drawing is classified as informal when it does not carry all the engineering and authorisation signatures.

The below table indicates if the status is required to be Formally or Informally Issued.

STATUS	Formally Issued	Informally Issued
SKETCH	No	Yes
CONCEPT (Stage Gate 2)	No	Yes
FOR INFORMATION	No	Yes
MARKET READY DESIGN (Stage Gate 3)	No	Yes
30% DESIGN	No	Yes
80% DESIGN	No	Yes
FOR CONSTRUCTION (Stage Gate 5)	Yes	No
AS-CONSTRUCTED (Stage Gate 5)	Yes	No
SUPERSEDED	Yes	No
OBSOLETE	Yes	No
DECOMMISSIONED	Yes	No

7.1 Informally Issued Drawings

Drawings that are Informally Issued must not be submitted to RedEye DMS.

Informally issued sketches and drawings transmitted to InEight (Teambinder) must be in PDF format and will be treated as “FOR INFORMATION” in the project records.

PRE-CONSTRUCTION” (Concept, MRD) drawings appropriately signed and accepted by Urban Utilities, that are required to be issued, shall have the Amendment Status updated from the preliminary amendment letter to the next alphabetical revision, i.e. A,B,C... The reason for the issue is as per Section 7, which utilises the 5mm high text dynamic block, in the title block’s DRAWING STATUS area.

The reason for issue may include 30% - 80% MARKET READY DESIGN.

Pre-construction drawings are managed as project files in the UU InEight (Teambinder) and QDox.

7.2 Formally Issued Drawings

Drawings that are formally Issued are submitted to RedEye DMS.

7.3 Issued For Construction

ISSUED FOR CONSTRUCTION (IFC) drawings that are required to be issued shall have the Revision updated to numeric revision, ie: 0, 1, 2.

All Amendment History is to be deleted and reflect the current FOR CONSTRUCTION description. When the drawing is completed, checked and is ready for issue, then it must be signed.

Any additional “FOR CONSTRUCTION” drawing revisions shall be as per Section 7.11 Amended Drawings.

For the initial ‘FOR CONSTRUCTION’ drawing revision, all fields including Design Drafting, Engineering Certification and Amendments sections shall be cleared, and then the ‘FOR CONSTRUCTION’ drawing revision details shall be completed for all sections, excepting the ‘AS CONSTRUCTED CERTIFICTION’ section. For any subsequent ‘FOR CONSTRUCTION’ revision, the Engineering Certification sections shall be updated to reflect the latest revision.

7.4 As Constructed Issue

AS-CONSTRUCTED’ issue is to be updated with the next Revision number and the Amendment tabulation field is to be updated to read ‘AS CONSTRUCTED’. However this does not apply and there is no requirement to up Rev the AS-CONSTRUCTED status if an amendment is only in the title block. ie: CIP code adjustment or asset project details.

All previous revision clouds must be removed from AS-CONSTRUCTED drawings. Any subsequent revisions to ‘AS-CONSTRUCTED’ drawings shall be as per Section 7.11 Amended Drawings.

For the ‘AS CONSTRUCTED’ drawing revision, the Amendment tabulation field shall retain the FOR CONSTRUCTION history. The ‘AS CONSTRUCTED CERTIFICATION’ details MUST be filled in, in addition to the Amendments tabulation fields as described in section 7.11.

7.5 Land and Easement Drawings

LAND AND EASEMENT Drawings are the exception to the rule, these drawings are only to be transmitted via InEight Teambinder with the status FOR INFORMATION. They will only ever be issued with Alpha character Revisions. The First Formal Issue shall have the Amendment table cleared.

7.6 Superseded Drawing

SUPERSEDED drawings are where the contents of the drawing has been changed by either adding or removing asset as part of some improvement or project upgrade.

Refer to section 5.9 for where drawings are modified >50%. In this circumstance, new drawing may have to be issued and the old drawing is required to include the new drawing reference number. Refer to Section 11 for how to apply SUPERSEDED to existing ‘AS-CONSTRUCTED’ Drawings

7.7 Decommissioned Drawing

DECOMISSIONED drawings are only required to be produced for Active Assets and Trunk Linear assets.

DECOMMISSIONED drawings show assets that have been decommissioned and are remaining in place, whether they may be brought back into service. This relates to asset that has been removed from service and has been physically disconnected/ blanked off from a process or the network; but structure/ equipment is still on ground/ in ground. Drawings should reflect the methodology for how the decommissioning is to be implemented.

Partly decommission asset, where only part of a drawing shows Decommissioned Assets, then these items shall be greyed and the line type change to hidden dashed and existing drawing is required to be updated.

Fully decommissioned site, drawings shall only be issued as Decommissioned where the entire drawing contents is being decommissioned and removed entirely from site.

If relevant, the drawing number of the Drawing set that instigated the decommissioning can be stamped on the drawing under the DECOMMISSIONED stamp.

7.8 Obsolete Drawing

OBSOLETE drawings refer to assets that have been retired from service or replaced as part of end of life or replaced by a new or different process or equipment due to an upgrade to the asset.

These drawing shall be updated with OBSOLETE status shown on the drawing in RedEye by Urban Utilities.

Obsolete drawing where assets are removed. Refer to section 11 for how to apply Obsoleting to existing AS CONSTRUCTED drawings and to Legacy As-Constructed Drawings.

7.9 Transmittal Document

All issued drawings must be released under the cover of a transmittal document regardless of whether the recipient is internal or external.

7.10 Vendor/Shop Drawings

These may be unmodified manufacturer equipment drawings and / or modified manufacturer equipment drawings.

- Unmodified Vendor/Shop drawings cover off the shelf parts, components, prefabricated standard equipment, etc. These drawings will be dealt with as vendor documents transmitted to InEight Teambinder/Qdox and are not required to be on an Urban Utilities drawing template. These drawings will have vendor title block, vendor manufacturing standard and partner signoff requirement.
- Modified Vendor/Shop drawings cover bespoke manufactured equipment. These drawings will be dealt with as engineering drawings to be managed in RedEye DMS. Modified / Manufactured bespoke items are governed by Manufacturing Standards,

hence requirement for numbering block but not RPEQ / Engineering Sign Off block. There is a Partner signoff requirement that the modified Vendor/Shop drawings follow the Manufacturing Standards and are accurate.

7.11 Amended Drawings

If a drawing requires amending after the original issue '0', then the drawing revision is to be updated with the next number e.g. '1', '2', etc. In addition, the amendment tabulation (extract below) on the drawing is to be populated and include a brief description of the amendment.

REV	DATE	DESCRIPTION	DESIGNER	RPEQ SIGNED	RPEQ NO.	COMPANY NAME

The drawing must receive the necessary engineering and authorisation signatures, evidenced by initials of the drafter, checker plus the signature and details of the certifying RPEQ as well as the dates.

The amended portion of the drawing is to be surrounded with a cloud and an amendment marker attached. The cloud is to be formed with a 0.25 thick line and the marker is to be a 3.5 high letter surrounded with a triangle. If there is more than one area of the drawing amended, then a cloud and the same numbered marker is to be placed over each section. Figure 6 below illustrates this.

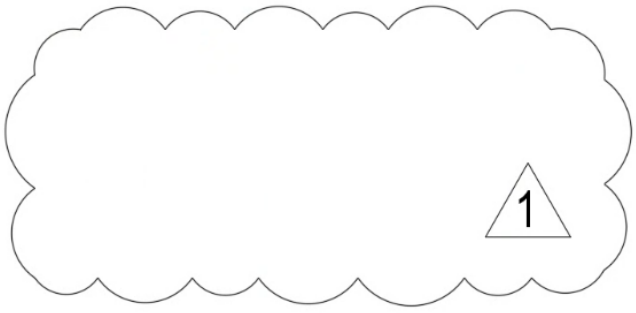


Figure 6

If subsequent amendments are made to the drawing, the previous amendment cloud is to be removed from its existing location, a new cloud placed around the new amendment and a new marker triangle added. The marker triangle located near the previous amendment is to remain on the drawing and greyed out to help maintain drawing clarity.

Unnecessary revision clouds and triangles should be removed from a drawing at Issue 'FOR CONSTRUCTION' stage but cover all changes requiring Engineering Certification and Authorising.

8. Checking, Certification, Authorising

8.1 Checking

Drawings completed by the drafter are to be checked by another discipline qualified person for correctness and compliance to standards including the requirements in PRO307.

The drafter and checker insert their details and the date in the designated spaces on the CAD title block, and are not required to sign the PDF copy of drawings.

8.2 Engineering Certification

The Professional Engineers Act 2002 (Qld) (the PE Act) requires that individuals who carry out professional engineering services must either be a Registered Professional Engineer Queensland (RPEQ) or be directly supervised by an RPEQ.

Urban Utilities requires that all engineering drawings and documents formally issued by Authorised Partners, external third parties, consultants or contractors must be certified by the RPEQ who is registered under the applicable area of engineering according to the PE Act.

Note that the work of architects is not a Professional Engineering Service and therefore architectural drawings should not need RPEQ Certification. Engineering design drawings that are referenced by architectural drawings will need to be certified by an RPEQ.

The RPEQ will certify that the content of the engineering drawings and documents is correct, meeting the applicable standards and takes responsibility for the professional engineering service in terms of compliance with the PE Act.

Any changes made to the RPEQ certified drawings and documents that involve a professional engineering service will require re-certification by the RPEQ.

The RPEQ certification in the Engineering Certification panel on the title block of each drawing must include the RPEQ's signature, name, registration number, area of engineering and the date.

8.3 Authorising of Drawings

The engineering drawing or document must be authorised by the Delivery Partner/Contractor for formal issue to Urban Utilities.

The authoriser accepts overall responsibility for ensuring that the drawings have followed the process of being appropriately checked and certified, that the drawing content accurately reflects the design, and that the drawing is displaying correctly.

The signature evidencing the drawing authorisation together with date shall be shown in the Frameworks panel on the title block for all drawings formally issued.

8.4 Survey Drawing/Document Certification

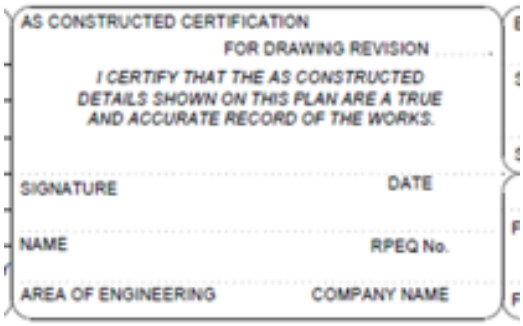
Surveying information must be certified for accuracy by a Registered Surveyor (QLD) either by individual certification on each formal survey drawing or survey report (e.g. ADAC Report) or by a covering letter detailing the documents covered by the certification. Certification shall include the name, signature, and registration number of the certifying surveyor as well as the date.

Regarding survey drawing or document for real property boundaries a cadastral certification by a Registered Cadastral Surveyor (QLD) is required.

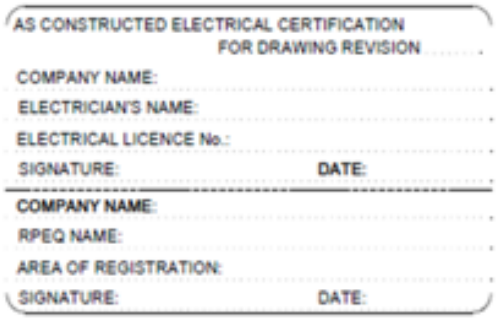
8.5 Certification of As-Constructed Drawings

“AS CONSTRUCTED” drawings are to be produced for all projects and must accurately reflect all the works built.

For **civil & mechanical works** the As Constructed drawing revision must be certified to be a true and accurate record through their signature, name, number and date in the AS CONSTRUCTED CERTIFICATION FOR DRAWING REVISION panel. Refer to extract below.



For **electrical and control works** the As Constructed drawing revision must be certified as a true and accurate record through their signature, name, number and date in the AS CONSTRUCTED ELECTRICAL CERTIFICATION FOR DRAWING REVISION panel; and signed by the licenced electrician, including signature, name, contractor licence number and date.



The FRAMEWORKS panel must be signed by the authorised representative prior to issue to Urban Utilities.

Note regarding responsibilities for Electrical RPEQ sign off for changes from FOR CONSTRUCTION to AS CONSTRUCTED. The bottom section of the AS CONSTRUCTED ELECTRICAL CERTIFICATION FOR DRAWING REVISION panel must be certified by the Electrical RPEQ engineer for As Constructed status. This requirement is solely to certify the drawing only is as per the approved RPEQ design with all red line mark ups added.
There is no responsibility for certification of any site installation works from the Electrical RPEQ. The site certification is covered in whole by the electrical contractor, who shall sign off in upper section of the AS CONSTRUCTED ELECTRICAL CERTIFICATION FOR DRAWING REVISION panel.

8.6 Signature Requirements

Electronic Signatures and Digital Signatures are accepted by Urban Utilities (where accompanied by a signature image) on all documents not requiring a witness or countersign.

For engineering drawings and documents signatures and (where applicable) their registration number, must be either:

- Wet signatures (i.e. physically hand signed) on printed drawings and the signed drawings scanned to pdf), or
- Digital signature – use of Digital Certificate (Digital ID) attached to the PDF document to record unique information of the signatory and to secure the document against further changes, or
- Electronic Signature - hand signature image inserted into a document or signed on screen with finger or stylus.

The signatory's name in the name field, initial or full name in the signature field, date of signing and (where applicable) their RPEQ number is to be added to the title block on the CAD file.

Sign and date the pdf copy of each drawing using one of the above methods.

8.7 Issue and Upload Requirements

FOR CONSTRUCTION and AS CONSTRUCTED Drawings as applicable must be submitted to Urban Utilities RedEye DMS in accordance with PRO687 Drawing Management System Workflows - and any specific project requirements set out in Project Documentation.

Dependant on project setup, the AutoCAD .dwg and PDF issued files may be uploaded directly to RedEye DMS by the issuing party (e.g. by Authorised Partner or Consultant), by Urban Utilities CRD Quality Assurance or other Urban Utilities Authorised Person.

Wet signed hard copies are to be retained by the contractor and are not transmitted to Urban Utilities.

8.8 Upload of Drawings

Delivery Partners are required to verify their FOR CONSTRUCTION and AS CONSTRUCTED drawings are clean (per section 9.2) and error free at upload to Redeye DMS using the process laid out in PRO687 to complete the Workflow. This is to confirm that signature requirements as set out in PRO307 are met and to confirm that the drawing content in the PDF and CAD versions match.

8.9 Approval of Drawings

Drawings are approved by Urban Utilities through the FOR52 signoff for Part A drawings submitted prior to Commissioning; and FOR52 signoff of Part B drawings submitted for deliverables handover.

9. Electronic drawing file management

9.1 CAD Drawing File Naming

The file name of the electronic drawing file shall be in format “Document/Drawing Number_Rev". Example BCNES-0056-CV-DRG-00001_00; or “Document/Drawing Number_Rev.ArtefactID". Example BCNES-0056-CV-DRG-00001_00.4134997. The ".ArtefactID" is OPTIONAL only if users check in drawings in bulk. The file name is to be recorded on the title block of each drawing.

Generally, there should be a separate file for each individual drawing. Only the Asset Drawing team in Urban Utilities may approve the upload of multi file format (several drawings combined under the one file name).

9.2 Clean Drawings

External reference drawings may be used during the production of a single drawing only.

On completion of the drawing and prior to submission to Urban Utilities for archiving, all drawing files must be cleaned up with all non-used information removed. Details used in the development of the drawing, but which are not part of the final design view must be removed.

In addition, the files must have all XRef’s bound. All unused XRef’s must be totally removed from the drawing.

Common issues with embedding, inserting, or importing OLE format image files into CAD drawings can transfer to RedEye DMS when the .dwg file is uploaded meaning the file does not render properly, the image may not display, or aerial photos may not scale and geolocate accurately. This is a known issue and Urban Utilities await RedEye to develop the technical solution. For more information check the FS74 – Engineering Drawing Drafter FAQ FactSheet.

Therefore Images (such as photos, logo) are required to be embedded in the .dwg file as JPEG or BMP image files.

Drawings that are produced from 3D object data (Civil 3D alignments, surface etc) need to be embedded in the drawing as linework.

9.3 Uploading of AutoCad Drawings

All AutoCAD .dwg files that are to be uploaded to RedEye must be single entity files. They must not have any external references files. They all must be inserted into the file so if opened it looks like the PDF rendered drawing and has the ability to be plotted again to look like that drawing.

Each file must only contain a single drawing on a single layout. The exception being electrical drawings.

The bound type needs to be 'INSERT', as this will not modify the layer naming of the file to be bound. All drawings must be able to standalone and be able to be moved or copied to other directories or emailed without loss of data.

10. Auditing

In relation to its Infrastructure Delivery Program, Urban Utilities may inspect any drawing, drawing process or procedure at any time to gain assurance that the Partner or Contractor's drawing management, including Subcontractor drawing management, are in compliance with PRO307 and the project requirements.

This includes auditing of drawings submitted prior to Commissioning for Part A drawings; and prior to Deliverables Handover and FOR52 signoff for Part B Drawings.

Where non-conformance is identified through auditing then the organisation that created the drawing must initiate nonconformance corrective action in line with the applicable design management plan, quality plan and/or project requirements.

11. Management of Existing drawings

11.1 Modifying Existing Drawings

At times, existing drawings will require modifications to reflect the current asset's data. When modifying existing drawing numbers, the drafter shall maintain the existing drawing number, and the revision shall reflect the next character in the sequence, i.e. D, E, F, etc, OR 12, 13, 14, etc.

When updating existing drawing(s) and there is a new Urban Utilities title block then the existing drawing(s) should be migrated across to that new title block accordance to the guidance outlined in section 5.9.

The fields in the new title block are to be updated to reflect the existing. Any unknown non-matching fields are to be confirmed with the Project Manager.

As per Section 7.11 Amended Drawings, revision clouds and triangles shall reflect the new additions. Any existing triangles are to be greyed out. Regardless of the existing drawing is 'AS-CONSTRUCTED' revision triangles are still required..

11.2 Superseded and Obsoleted Drawings

SUPERSEDED drawings: are where the contents are no longer valid. If SUPERSEDED, the drawing must be updated with a SUPERSEDED stamp. Where the 'AS-CONSTRUCTED' drawing is being superseded, the Amendments Description shall identify DRAWING SUPERSEDED BY XXXXXXXXXX (new drawing number), dated, and digitally initialled by the DESIGNER in AutoCAD only.

Where the complete set of drawings is superseded, the words should specify the new drawing number range e.g., SPxxx-xxxx-EE-DRG-00001 to SPxxx-xxxx-EE-DRG-00025. SUPERSEDED drawing number can be bought back to life at any time, but they must retain the same drawing title.

Delivery Partners or contractors must transmit SUPERSEDED drawings to Urban Utilities CRD Quality Assurance for record.

OBSOLETED drawings: Sometimes an existing drawing is no longer required, due to infrastructure being removed/demolished. When this occurs, Delivery Partners are not required to stamp the words "OBSOLETE" on each drawing sheet.

Delivery Partners must transmit OBSOLETE drawings numbers to Urban Utilities CRD Quality Assurance and request Asset Drawing team, by adding into drawing list, to assign workflow to OBSOLETE drawings. Delivery Partners must provide Asset Drawing team the list of obsoleted drawings, and project number to add in the comment field to ensure the accuracy of the drawings.

11.3 Demolition Plan Drawings

Demolition drawings maybe required as part of deliverables to enable the demolition to IFC for any temporary work.

Demolition Drawings are treated as documents, Delivery Partners must transmit Demolition Plan/ drawing to Urban Utilities Delivery Quality Assurance Team.

Demolition drawings are not required to be uploaded to be in RedEye and to be provided to Urban Utilities with OBSOLETED status via InEight for archiving purpose at PART B.

Only drawings of rehabilitation work shall be uploaded into RedEye.

11.4 Temporary Drawings

Temporary drawings are treated as documents and Delivery Partners must transmit Demolition Plan drawings to Urban Utilities CRD Quality Assurance team.

Temporary drawings maybe required as part of deliverables to enable the demolition to IFC for any temporary work.

Temporary drawings are not required to be uploaded to be in RedEye and to be provided to Urban Utilities with OBSOLETED status via InEight for archiving purpose at PART B.

12. Updating of legacy as-constructed drawings

'LEGACY AS-CONSTRUCTED' Drawings are classed as drawing that were not produced with Computer Aided Drafting. Additionally, on a case-by-case basis, if an electronic CAD File does not exist for a particular 'AS-CONSTRUCTED' drawing, it may be assessed into this drawing Category at the discretion of Urban Utilities. The following outlines how these are to be treated in various scenarios when updates are required.

Only Trunk Linear (passive) and Site (Active) assets require updating of 'LEGACY AS-CONSTRUCTED' DRAWINGS.

In general LEGACY 'AS-CONSTRUCTED' Drawings will be permitted to be updated by Red Pen Mark-up of the existing drawing. This is permitted where the engineering certification significance is minor or inconsequential to the existing and new as constructed certification (i.e., the Markup does not affect the engineering intent, safety, or functionality).

If the change to the 'LEGACY AS-CONSTRUCTED' Drawing does not fit into one of the below categories of change, then it must be redrawn on the latest title block and follow the other parts of this document.

If there are already a number of Red Pen Mark Ups on the ''LEGACY AS-CONSTRUCTED Drawing, Urban Utilities at its discretion may require it to be Re-drafted rather than further Red Pen Mark-ups being added. This will require it to be completely re-drafted on the latest Title Block, with the existing drawing to be superseded.

12.1 Minor Legacy As-Constructed Markup

Minor Red Pen Mark-ups of LEGACY AS-CONSTRUCTED Drawings will be permitted at the discretion of Urban Utilities. This method is permitted where the engineering certification significance is minor or inconsequential to the existing and new As-Constructed certification. As-Constructed RPEQ Certification of the change is required via a covering letter where there is design amendment that affects the engineering intent, safety, or functionality.

12.2 Production of Legacy As-Constructed Drawings

There are 2 acceptable methods for production of Legacy "AS-CONSTRUCTED" drawings as follows:

Method 1

This method involves marking up the existing drawing by clearly defining the altered work. Three examples are given below. The "AS-CONSTRUCTED" work is to be shown in the colour red with the incorrect entity crossed out. For this method, all non "AS-CONSTRUCTED" data will need to be shown in black / grey scale. A contrasting text font shall be used. These drawings may be marked up by hand on a hard copy drawing or a colour print of an altered PDF drawing produced, together with signatures for quality checks and applicable engineering certifications and scanned to PDF.

Samples are shown below in Figures 7, 8 and 9.

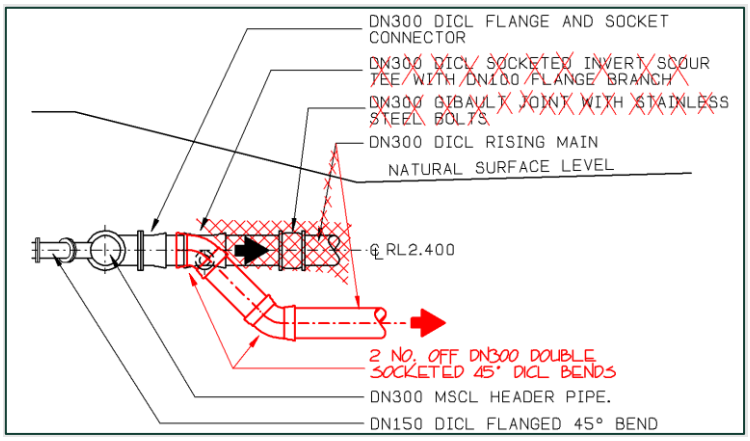


Figure 7 Sample of Red Pen Mark-Up of LEGACY AS CONSTRUCTED Altered Works

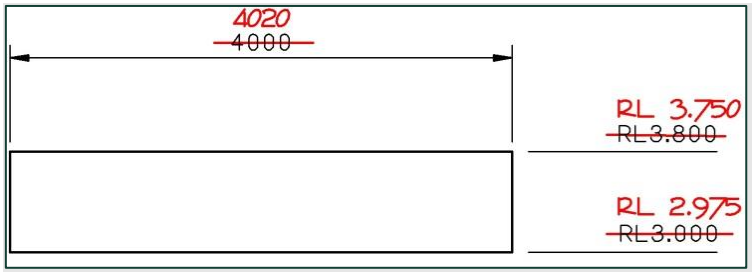


Figure 8 Sample of Red Pen Mark-Up of LEGACY AS-CONSTRUCTED Altered Dimensions and Levels

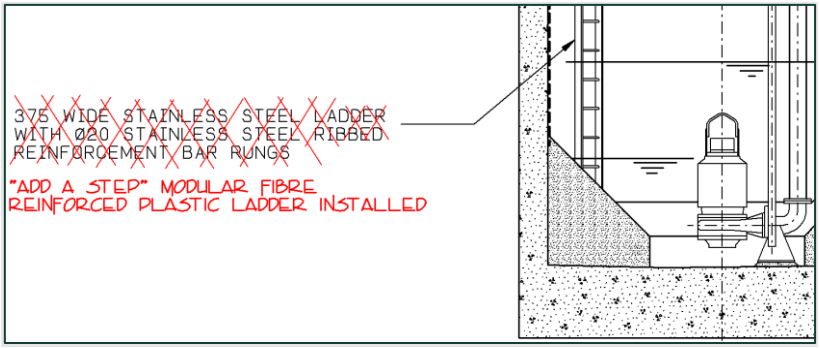


Figure 9 Sample of Red Pen Mark-Up of LEGACY AS-CONSTRUCTED Substituted Works

Where possible to be facilitated by an existing amendment table and revision, the Red Pen Mark-up of the 'LEGACY AS-CONSTRUCTED' are to be updated with the next Amendment number/letter. The Design Panel in the title block is not to be changed, it remains the same along with the As-Constructed Panel.

Revision clouds and triangles are to be used as appropriate to maintain visual amenity and take into consideration the possibility of future Red Pen Mark-ups.

Method 2

This method involves redrawing as an electronic CAD drawing to reflect the final work in accordance with this procedure. The drawing is to have all works not built removed from the drawing and where the structure varied in size and height from the design, the drawing is to

be modified to show the revised size and shape. The drawing must be altered and not just the dimension or annotation changed.

If substitute materials such as a different pipe joint type are used, then the drawing is to show the correct materials and in the example of the pipe joint the new pipe joint is to be drawn. This drawing must be able to be scaled and accurately reflect the work as it was constructed.

As the whole of the drawing is ‘AS-CONSTRUCTED’, no red mark-up will appear.

12.3 Signing and Amending Legacy Drawings

‘AS-CONSTRUCTED’ legacy drawings are to be updated with a new Amendment number, and the Amendment tabulation is to be updated to read “AS-CONSTRUCTED”. The authoriser’s initials should be of the person who checked the drawing is correct.

In addition, the ‘AS-CONSTRUCTED DETAILS’ panel in the title block is to be completed. In all civil, electrical, and mechanical works where the amendment involves a change to the engineering intent, safety, or functionality then the drawing MUST be signed off by a RPEQ.

All revision clouds and triangles for the first ‘AS-CONSTRUCTED’ revision is to be deleted from the drawing. Any subsequent revisions to ‘AS-CONSTRUCTED’ drawings need to follow Section 7.11 Amended Drawings.

13. Piping & Instrumentation Diagram Guidelines

13.1 Scope

The section provides guidance on the requirements and specifications for creating and managing Piping and Instrumentation Diagrams (P&ID) and Process Flow Diagrams (PFD) for existing and / or future assets installed at Urban Utilities sites in both traditional format and in smart/intelligent formats.

This section is relevant to treatment plant facilities, pumping stations, chemical dosing units and for representing complex network lineal assets.

13.2 P&ID Requirements

A P&ID is a schematic diagram describing the piping and process equipment together with the instrumentation and control devices in their sequential arrangement in the process flow paths.

The P&ID must be prepared at the design stage for all piping systems that include operable equipment, valves or instrumentation and include the following information as applicable:

- Indicate all mechanical equipment with identification labels.
- Indicate piping materials, pipe class, line sizes, increasers and reducers.
- Indicate all valves, valve types, manual and actuated, with identification labels,
- Indicate all fittings and pipe connections, inclusive of drains, vents, sample points, expansion joints, special fittings etc.
- Indicate tie-in points.
- Indicate flow direction.
- Indicate any process requirements for pipe slope.
- Indicate maintainability requirements (isolations, dismantling joints, removable spools, blind flanges etc.)
- Indicate instruments with identification labels.
- Indicate control loops and interlocks.

Where this level of information is impractical or unreasonable then the designer should request a deviation from technical standards as per PRO752.

13.3 Process Flow Diagram Requirements

The PFD will define the major items of plant and the connections between them, including the following:

- Process streams and names
- Major equipment items
- Connections with other systems
- Operational data (temperature, pressure, flow rate, etc.) for each flow stream such as in mass flow balance.

The PFD generally should not show details such as pipe classes, minor lines, instrumentation details.

13.4 Reference Documents

In addition to the Reference Documents listed in Section 4, the documents listed in Table 13-1 and Table 13-2 are either referenced or shall be read in conjunction with this section of the Specification for requirements relating to P&IDs.

Table 13-1 Referenced Technical Standards

Reference	Description
PID-QP-TYP-00001	P&ID Project Template including Title Sheet - Title block (zip file)
PID-QP-TYP-00002	P&ID Legend Sheet - Sheet 1 of 4 – General Symbols
PID-QP-TYP-00003	P&ID Legend Sheet - Sheet 2 of 4 – Equipment Symbols
PID-QP-TYP-00004	P&ID Legend Sheet - Sheet 3 of 4 – Pipeline Types
PID-QP-TYP-00005	P&ID Legend Sheet - Sheet 4 of 4 – Item Types

Note: PID-QP-TYP-00001 zip file contains all smart PID project template and tool palette files including PID title block. Should a project be delivered without smart PID, the title block should still be derived from this zip file within .....\UU P3D Template\Related Files

Copies of these drawings are in the Appendix.

Table 13-2 Referenced Industry Standards for P&ID

Reference	Description
ANSI/ISA 5.1-2009	Instrument Symbols and Identification
AS 1101	Graphical Symbols (numerous Parts are listed as obsolete and are to be used for historical reference only)
ISO 3511-3	Process Measurement Control Functions and Instrumentation; Symbolic Representation
ISO 3511-4	Industrial Process Measurement Control Functions and Instrumentation; Symbolic Representation

13.5 General Requirements

Urban Utilities require Smart P&IDs to be prepared and submitted in Autodesk® Plant 3D using Urban Utilities custom P&ID template.

The Urban Utilities P&ID template including Tool palettes and supporting files can be found in Redeye DMS under PID-QP-TYP-00001.

13.6 Uploading of Smart P&ID in Autodesk Plant 3D

Where identified on the DRL Urban Utilities requires smart P&IDs created using AutoCAD Plant 3D to be uploaded to the Urban Utilities Redeye DMS as native files. Data integrity of all smart P&IDs must be checked and confirmed by the P&ID author prior to uploading. All P&ID tagging, attributes and data must be connected to the drawing annotations and database. Any

updates to the P&ID drawings shall update the database and any data changes from the database shall be reflected in the P&ID annotations.

Refer to PRO687 for Redeye DMS workflow procedures.

13.7 Precedence

Where symbols or codes differ across the relevant standards the following order of precedence shall apply, in descending order:

1. UU Standard PRO395 (Appendix D) and TMS 1647
2. UU Standard Drawings PID-QP-TYP-00002, 00003, 00004 and 00005
3. ANSI/ISA-5.1-2009
4. ISO Standard 3511
5. Australian Standard 1101 (as current and applicable)
6. Custom symbol or code

13.8 Symbols, Codes, and Line Types

Symbols and representations used on P&IDs shall be as per standards listed in Section 13.4. Non-standard symbols to be created using “convert to PID object” and not added through the project properties.

13.9 Piping Designation

Piping designation shall be in accordance with Process Line Tags and Annotation on PID-QP-TYP-0002 and TMS 1647

In all cases where codes are used that are not shown within these documents they shall be defined on the drawing where they are used and/or in a master legend for the set of drawings.

Pipes shall be tagged when there is a change in pipe material or pipe specification only.

13.10 Piping and Connection Symbols (Line Type)

Various line types are used to identify how instruments connect to each other in each process, as well as the type of signal that is used (e.g., electrical, pneumatic etc.). Refer to PID-QP-TYP-00002 template for linetypes and colour requirements.

13.11 Pipe Material Codes

Material codes shall be used for pipeline tagging to identify chosen build material. Pipe tagging shall be used on primary, minor and secondary process lines, and pneumatic and hydraulic lines. Refer to PID-QP-TYP-00004 and TMS1647

13.12 Fluid Abbreviation

Fluid abbreviations shall be used for pipeline tagging to identify the fluid in the line. Fluid abbreviations shall be used on primary, minor and secondary process lines and pneumatic and hydraulic lines, Ref to PID-QP-TYP-00004 and TMS1647

13.13 Equipment Designation

Equipment titles shall be functionally descriptive in terms of process and generic in terms of equipment type. Refer to Legend Sheet PID-QP-TYP-00005

Equipment shall be designated and numbered with respect to location as appropriate. Any new equipment added to a particular location shall be incremented numerically from the existing equipment in that location.

13.14 Equipment Designation Code

The equipment numbering/naming system shall be in accordance with PRO395 App D & TMS1647.

In all cases where codes are used that are not listed in PRO395 and TMS1647 they shall be defined on the drawing where they are used and/or in a master legend for the set of drawings.

The equipment designation shall be shown inside or adjacent to the equipment symbol and/or representation on the P&ID.

13.15 Instrumentation

Instrumentation names shall be as per ISA5.1 and TEM118 and symbols shall be as per PID-QP-TYP-00005 4 and, where not shown apply ISA.

Instruments may be designated and numbered with respect to location as appropriate. Any new instruments added to a particular location shall be incremented numerically from the existing instruments in that location.

Instrument identification shall be as shown in P&ID template PID-QP-TYP-00005.

Control loops are sequential within the parameter measured (T, P, F…) i.e., TT001, then next loop will be TT002 however a PT will start from the last loop within the pressure instruments PT001.

13.16 Instrument Identification Prefix

The first letter is used to designate the measured variable. The succeeding letter(s) are used to designate the function of the component, or to modify the meaning of the first letter. Refer to P&ID template PID-QP-TYP-00002.

13.17 Process Area

Process Area identifier codes shall be used to identify the process used for a particular P&ID, location, or project. The Process Area identifier code shall be attached to each instrument. Process areas are defined in PRO395 Appendix C.

13.18 Off Page Connectors

Off Page Connectors (OPC) will be used to maintain continuity of lines that span various drawings. The **DWG Number** shows which drawing the line continues to, and the **Connection Number** shows which line the pipe continues to on the receiving drawing. The **Connecting**

Origin/Destination describes where the pipe came from or connects to. Refer to PID-QP-TYP-00002.

13.19 Existing Numbering and Tagging Conventions

There may be occasions where new capital plant needs to be retrofitted and/or interfaced with existing operational plant. It is possible that existing numbering and tagging conventions exist for specific sites. At the commencement of design works, designers shall engage with plant operators and/or the Urban Utilities representative to establish if a site has an existing (and established) numbering and tagging convention. This rule only applies to work associated with a site and/or plant that has an established convention and where introduction of a new convention would lead to operator and maintenance staff confusion and error.

13.20 Drawing Titles and Numbering

Drawing numbers shall be expressed in accordance with TMS1654.

Each drawing shall be titled with an appropriate description of the P&ID, refer section 5.14.

Each project shall start with a P&ID Drawing Index consisting of the project name/title located in the top centre of the drawing. A table shall be included, sequentially listing all the drawing numbers and description (drawing titles) for the project.

APPENDIX A – EXAMPLES OF DRAWING TITLES

1. Site Based Assets

In reference to section 5.10.1 and as a guide for the designer, following are examples of drawing titles for Resource Recovery Centre sites: Process, Civil, Mechanical and Structural drawings

ASSET/PROJECT	DRAWING TITLE
Example 1: New Drawing No.: ST018-0400-QP-DRG-00001	
ST018 LUGGAGE POINT STP 200 MAIN BEACH RD., PINKENBA 0400 SLUDGE TREATMENT PROJECT TITLE	ST018 P&ID LEGEND FERROUS CHLORIDE DOSING FACILITY 0471 DIGESTER SLUDGE STORAGE
Example 2: New Drawing No.: ST018 -0800-CV-DRG-00001	
ST018 LUGGAGE POINT STP 200 MAIN BEACH RD., PINKENBA 0800 ODOUR MANAGEMENT PROJECT TITLE	ST018 CIVIL DRAWING STORAGE AND DOSING AREA GENERAL ARRANGEMENT FERROUS CHLORIDE DOSING FACILITY 0850 ODOUR CONTROL
Example 3 New Drawing No.: ST022-0400-ME-DRG-00001	
ST022 OXLEY STP 240 DONALDSON RD ROCKLEA 0400 SLUDGE TREATMENT PROJECT TITLE	ST022 MECHANICAL DRAWING GENERAL ARRANGEMENT PLAN AND ELEVATIONS BLOWER PIPEWORK 0440 ANAEROBIC DIGESTION GENERAL
Example 4 New Drawing No.: ST022-0400-EE-DRG-00002	
ST022 OXLEY STP 240 DONALDSON RD ROCKLEA 0400 SLUDGE TREATMENT PROJECT TITLE	ST022 ELECTRICAL DRAWING DIGESTER BIOGAS BLOWERS BYPASS HAZARDOUS AREA ZONAL DRAWING 0440 ANAEROBIC DIGESTION GENERAL
Example 5 New Drawing No.: ST059-0700-CV-DRG-00001	

ASSET/PROJECT	DRAWING TITLE
ST059 KALBAR STP 29 HEIT RD KALBAR 0700 OUTFALL CHEMICAL DELIVERY STOAGE PROJECT TITLE	ST059 CIVIL DRAWING CONSTRUCTION NOTES SODIUM HYPOCHLORITE LOCAL CONTROL STATION 0750-LCS-0001
Example 6 New Drawing No.: ST063-0400-SS-DRG-00001	
ST063 LOWOOD STP FOREST HILL FERNVALE RD, VERNOR 0400 SLUDGE TREATMENT LOWOOD/ FERNVAL SEWERAGE SCHEME UPGRADE PROJECT	ST063 STRUCTURAL DRAWING SLUDGE DEWATERING BUILDING STRUCTURAL DETAIL STAIRS 0440 ANAEROBIC DIGESTION GENERAL
Example 7 New Drawing No.: ST063-0700-CV-DRG-00001	
ST063 LOWOOD STP FOREST HILL FERNVALE RD, VERNOR 0700 OUTFALL LOWOOD/ FERNVAL SEWERAGE SCHEME UPGRADE PROJECT	ST063 CIVIL DRAWING OUTFALL DISCHARGE STRUCTURE GENERAL ARRANGEMENT 0780 OUTFALL
Example 8 New Drawing No.: ST063-0500-CV-DRG-00001	
ST063 LOWOOD STP FOREST HILL FERNVALE RD, VERNOR 0500 BIOLOGICAL TREATMENT LOWOOD/ FERNVAL SEWERAGE SCHEME UPGRADE PROJECT	ST063 CIVIL DRAWING MAJOR PROCESS PIPEWORK 0520 AERATION BLOWERS
Example 9 New Drawing No.: ST063-1100-CV-DRG-00001	
ST063 LOWOOD STP FOREST HILL FERNVALE RD, VERNOR 1100 GENERAL LOWOOD/ FERNVAL SEWERAGE SCHEME UPGRADE PROJECT	ST063 CIVIL DRAWING ROAD WORK SECTION 1110 ROADS

ASSET/PROJECT	DRAWING TITLE
Example 10 New Drawing No.: ST063-0200-ME-DRG-00001	
ST063 LOWOOD STP FOREST HILL FERNVALE RD, VERNOR 0200 PRE TREATMENT LOWOOD/FERNVAL SEWERAGE SCHEME UPGRADE PROJECT	ST063 MECHANICAL DRAWING GRIT DREDGER CLAM DOOR ASSEMBLY 0230 GRIT DREDGER ST063-0230-SCP-0001

These examples apply for Resource Recovery Centre sites: Electrical Drawings.

ASSET/PROJECT	DRAWING TITLE
Example 1	
SP010 EAGLE FARM CPS 5 BUNYA STREET EAGLE FARM 1000 SITE PROCESS OR ELECTRICAL OWER DISTRIBUTION PLC REPLACEMENT PROGRAM	TERMINATION DIAGRAM ANALOG INPUTS SP010-1090-PLC-0001
Example 2	
ST032 GIBSON ISLAND STP 188 PARINGA ROAD, MURRARRIE 1000 SITE PROCESS CONTROL OR ELECTRICAL POWER DISTRIBUTION MAIN PUMP SWITCHBOARD AND MOTOR REPLACEMENT	SINGLE LINE DIAGRAM INLET PUMPS MAIN SWITCHBOARD RAW SEWAGE PUMP 1 SP230-1040-SWB-0001
Example 3	
ST032 GIBSON ISLAND STP 188 PARINGA ROAD, MURRARRIE 1000 SITE PROCESS CONTROL OR ELECTRICAL POWER DISTRIBUTION MAIN PUMP SWITCHBOARD AND MOTOR REPLACEMENT	SCHEMATIC DIAGRAM INLET PUMPS MAIN SWITCHBOARD RAW SEWAGE PUMP 1 SP230-1040-SWB-0001
Example 4 (SPECIFIC FORMATS FOR NETWORK PUMP STATION ASSETS)	
SP999 SAMPLE ROAD, GREEN SQUARE SEWAGE PUMP STATION 1000 SITE PROCESS CONTROL OR ELECTRICAL POWER DISTRIBUTION	PUMP STATION SWITCHBOARD SP999-1040-SWB-0001 SCHEMATIC DIAGRAM SUBMERSIBLE PUMP No2

ASSET/PROJECT	DRAWING TITLE
Example 5	
ST018 LUGGAGE POINT STP 200 MAIN BEACH ROAD PINKENBA 0800 ODOUR MANAGEMENT AIR TREATMENT FACILITY UPGRADE	PROCESS & INSTRUMENTATION DIAGRAM (P&I) EXTRACTION FANS ST018-0840-FAN-0001
Example 6	
ST018 LUGGAGE POINT STP 200 MAIN BEACH ROAD PINKENBA 0 200 PRE TREATMENT CHANNEL REHABILITATION PROJECTST018	GENERAL ARRANGEMENT PLAN AND ELEVATIONS GIRT SCREEN ST018-0230-SCR-0001
Example 7	
ST032 GIBSON ISLAND STP 188 PARINGA ROAD, MURRARRIE 1000 SITE PROCESS CONTROL OR ELECTRICAL POWER DISTRIBUTION ELECTRICAL POWER DISTRIBUTION	ELECTRICAL LAYOUT DRAWING HV CABLE ROUTES SITE WIDE-KEY PLAN
Example 8	
ST032 GIBSON ISLAND STP 188 PARINGA ROAD, MURRARRIE 1000 SITE PROCESS CONTROL OR ELECTRICAL POWER DISTRIBUTION	CONTROL SYSTEM NETWORK ARCHITECTURE DIAGRAM SCREENS AREA / INLET PUMP STATION

These examples apply for SP, WP, WB and RP sites

ASSET/PROJECT	DRAWING TITLE
Example 1: New Drawing No.: WP111-0100-CV-DRG-00001	
WP111 MT JULLEAT STREET REDBANK PLAINS 0100 PUMPING, CIVIL WATER PUMP STATION UPGRADE	WP111 CIVIL DRAWING WATER PUMP STATION SITE WATER TRUNK RISING MAIN PLAN AND LONGITUDUAL SECTION
Example 2:	

ASSET/PROJECT	DRAWING TITLE
New Drawing No.: WP111-0100-SS-DRG-00001	
WP111 MT JULLEAT STREET REDBANK PLAINS 0100 PUMPING, STRUCTURAL WATER PUMP STATION UPGRADE	WP111 STRUCTURAL DRAWING WATER PUMP STATION SITE FLOW METER AND PUMP OUT CHAMBER REINFORCING PLAN & SECTION
Example 3 New Drawing No.: WP111-0100-QP-DRG-00001	
WP111 MT JULLEAT STREET REDBANK PLAINS 0100 PUMPING, P&ID WATER PUMP STATION UPGRADE	WP111 P&ID DRAWING WATER PUMP STATION SITE P&ID LEGEND SHEET 1 OF 2

These examples apply for single and multiples Water Reservoir sites. There may be several assets at the same site, i.e. the reservoir site may also have multiple reservoirs and a chemical dosing facility.

ASSET/PROJECT	DRAWING TITLE
Example 1: New Drawing No.: WR005-0021-CV-DRG-00001	
WR005-0021 TARRAGINDI RESERVOIR (R005) 159 TARRAGINDI RD, TARRAGINDI 0021 STORAGE 1, CIVIL ROOF REPLACEMENT AND DISINFECTION UPGRADE	WR005-0021 CIVIL DRAWING RESERVOIR NO.1 PAVEMENT PLAN AND MIXER DETAILS
Example 2: New Drawing No.: WR077-0022-SS-DRG-00001	
WR077-0022 KARRAGAROO HILL RESERVOIR (R085) WHITEHEAD ST, EASTERN HEIGHTS 0022 STORAGE 2, STRUCTURAL ROOF REPLACEMENT AND PIPE WORKS UPGRADE	WR077-0022 STRUCTURAL DRAWING RESERVOIR NO.2 ACCESS PLATFORM AND HANDRAIL PLANS
Example 3: New Drawing No.: WR023-0000-QP-DRG-00001	
WR023 OUTLOOK DR RESERVOIR (R023) 130 MOUNT GRAVAT OUTLOOK DRIVE 0000 GENERAL SITE LAYOUT, P&ID CHLORAMINATION FACILITY	WR023 P&ID DRAWING OUTLOOK DR RESERVOIR GENERAL SITE LAYOUT

2. Network/Linear Based Assets

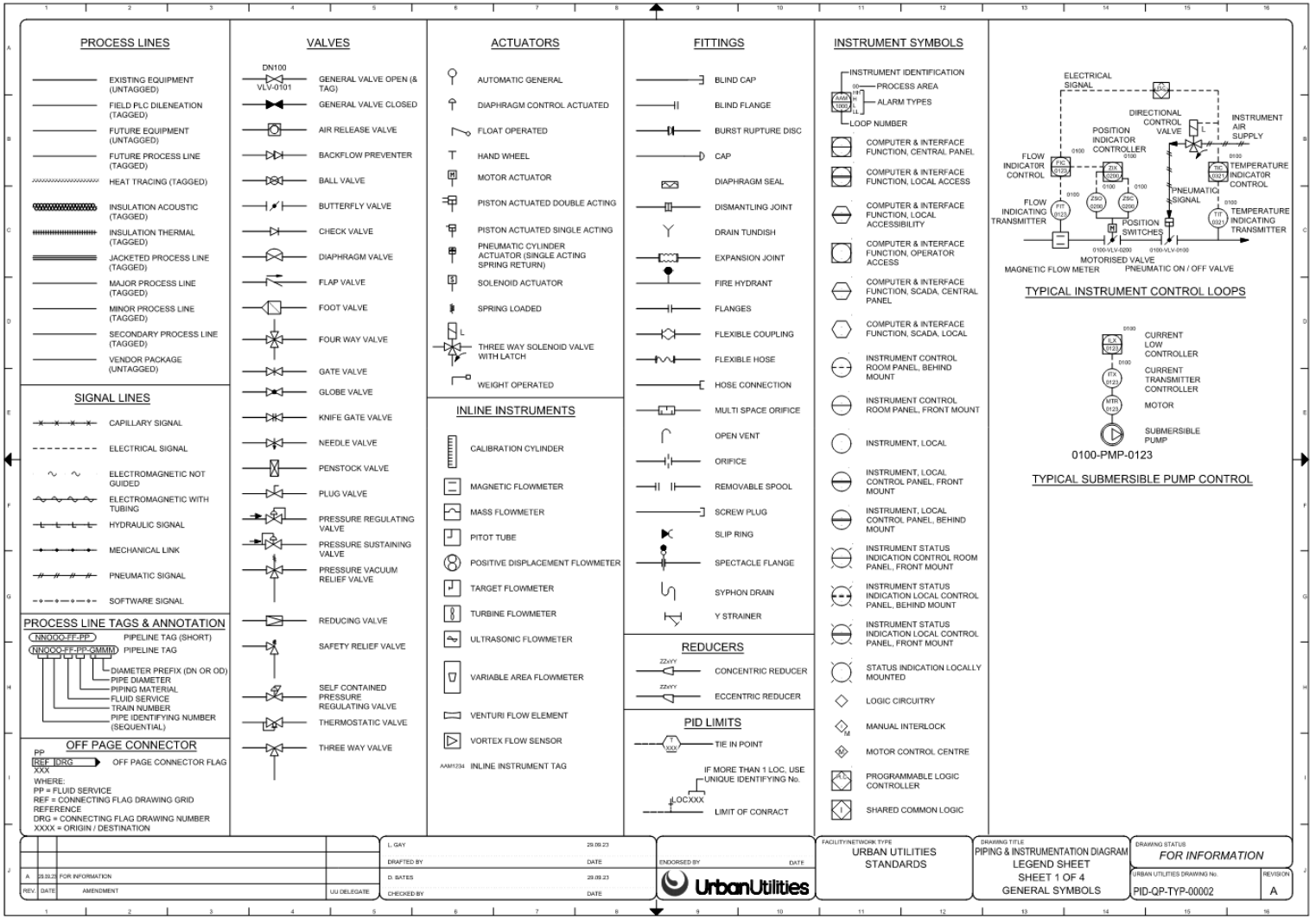
ASSET/PROJECT	DRAWING TITLE
Example 1	
NORMAN CREEK INTERCEPTOR SEWER SECTION 6 HAMILTON SIPHON BULIMBA TO HAMILTON SIPHON REHABILITATION	BULIMBA SHAFT VENT PIPE PLAN, DROP MH AND INLET MH SECTION
Example 2	
S977 CAMIRA RESERVIOR TO MICA STREET ISHMALE ROAD NEAR KIMMINS STREET AIR VAVLE REPLACEMENT TAV445925	AIR VALVE PIT STEEL REINFORCEMENT DETAILS PLAN AND SECTIONS
Example 3	
CEMETERY ROAD AND BRIGGS ROAD IPSWICH WATER MAIN RENEWALS	SITE PLAN 3 AND SITE PLAN 4

APPENDIX B – P&ID Typical Drawings and Legends

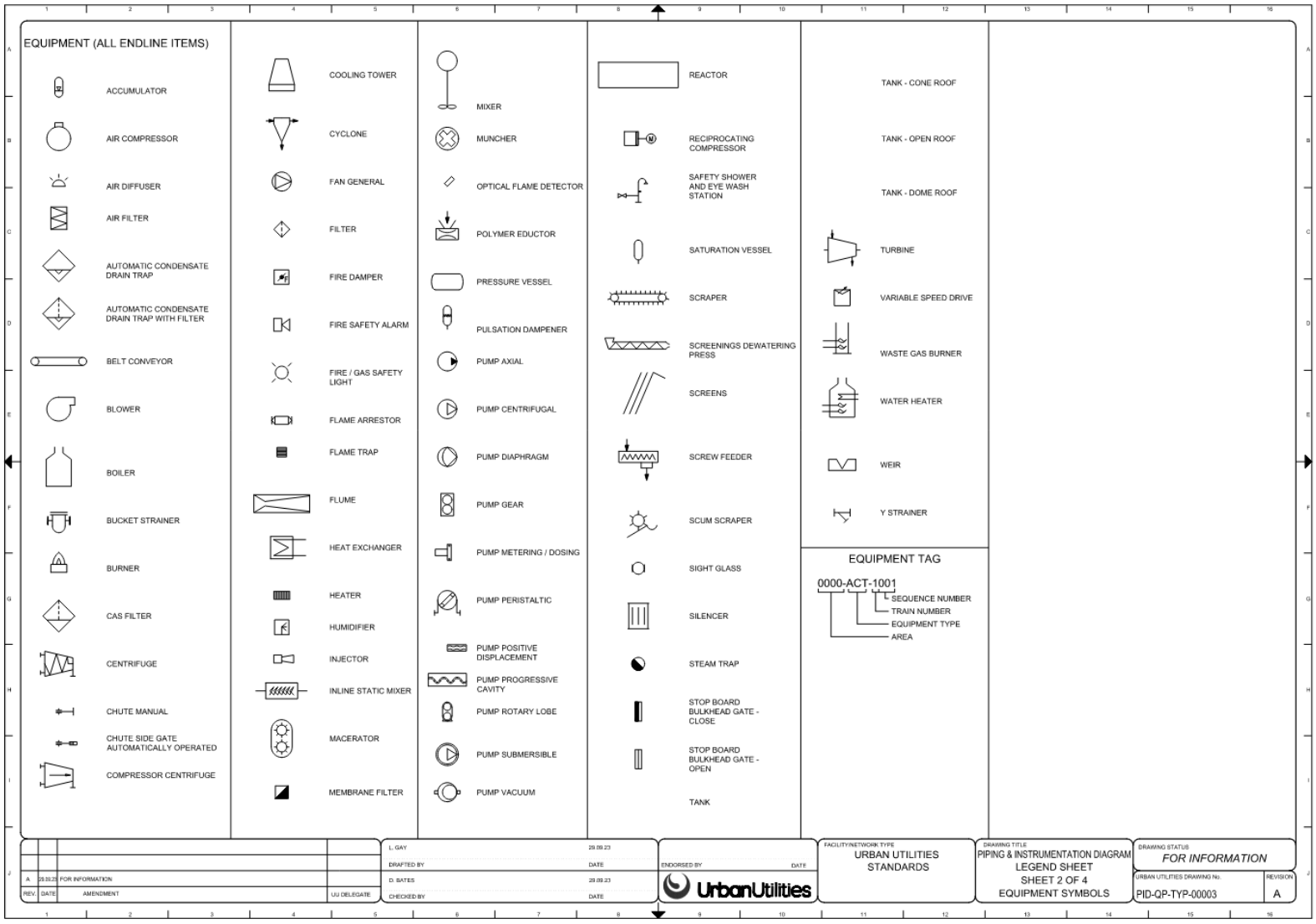
Note: P&ID template drawings and legends included in this appendix were those current at the time of issue of this Procedure and are subject to change without notice. The current revision of these drawings at any point in time is available from the Urban Utilities Redeye P&ID template folder.

The Urban Utilities P&ID template including tool palettes and supporting files can be found in Redeye DMS under PID-QP-TYP-00001

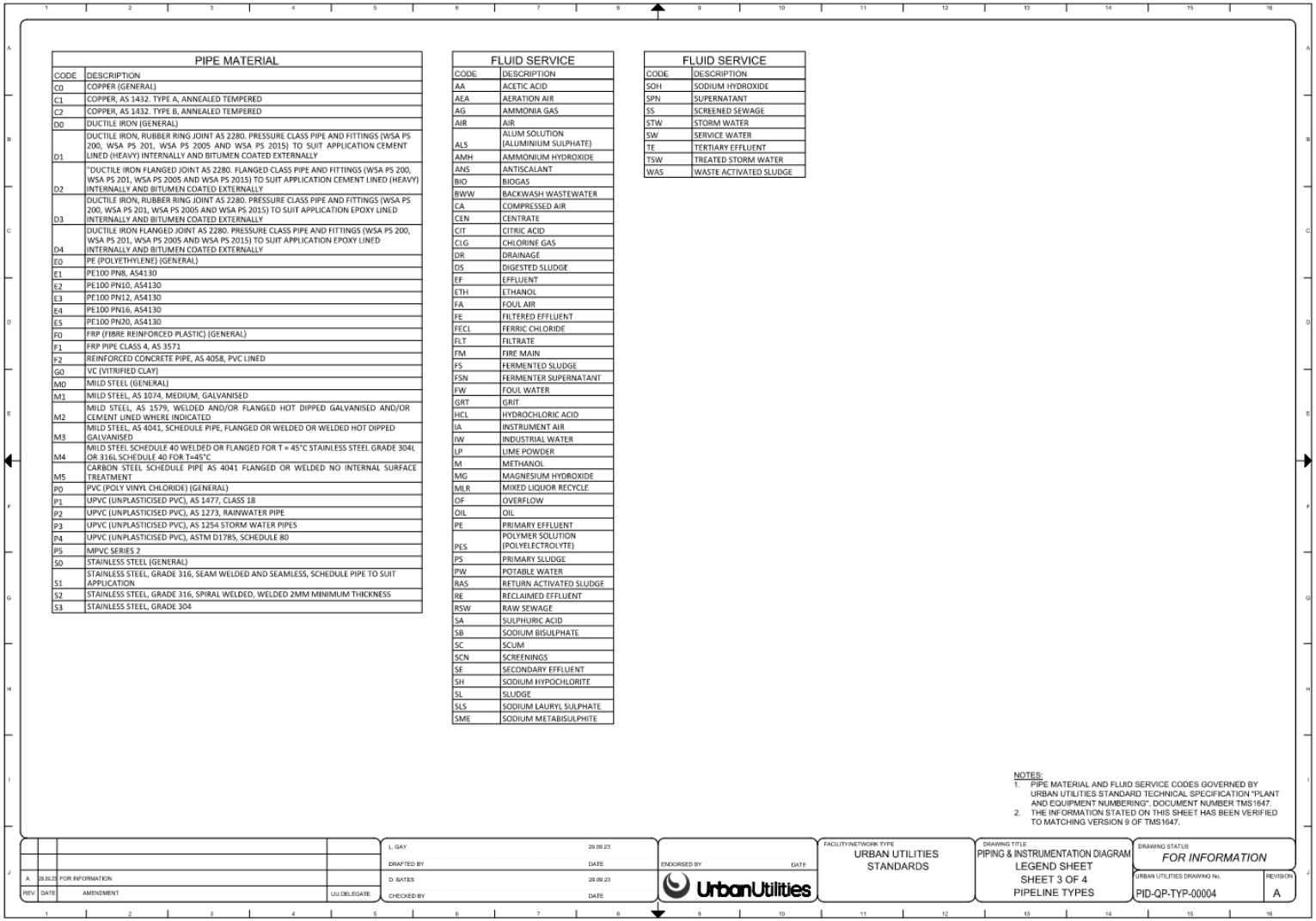
A1 PID-QP-TYP-00002



A2 PID-QP-TYP-00003



A3 PID-QP-TYP-00004



PIPE MATERIAL	
CODE	DESCRIPTION
C0	COPPER (GENERAL)
C1	COPPER, AS 1432, TYPE A, ANNEALED TEMPERED
C2	COPPER, AS 1432, TYPE B, ANNEALED TEMPERED
D0	DUCTILE IRON (GENERAL)
D1	DUCTILE IRON, RUBBER RING JOINT AS 2280, PRESSURE CLASS PIPE AND FITTINGS (WSA PS 200, WSA PS 201, WSA PS 2005 AND WSA PS 2015) TO SUIT APPLICATION CEMENT LINED (HEAVY) INTERNALLY AND BITUMEN COATED EXTERNALLY
D2	"DUCTILE IRON FLANGED JOINT AS 2280. FLANGED CLASS PIPE AND FITTINGS (WSA PS 200, WSA PS 201, WSA PS 2005 AND WSA PS 2015) TO SUIT APPLICATION CEMENT LINED (HEAVY) INTERNALLY AND BITUMEN COATED EXTERNALLY
D3	DUCTILE IRON, RUBBER RING JOINT AS 2280. PRESSURE CLASS PIPE AND FITTINGS (WSA PS 200, WSA PS 201, WSA PS 2005 AND WSA PS 2015) TO SUIT APPLICATION EPOXY LINED INTERNALLY AND BITUMEN COATED EXTERNALLY
D4	DUCTILE IRON FLANGED JOINT AS 2280. PRESSURE CLASS PIPE AND FITTINGS (WSA PS 200, WSA PS 201, WSA PS 2005 AND WSA PS 2015) TO SUIT APPLICATION EPOXY LINED INTERNALLY AND BITUMEN COATED EXTERNALLY
E0	PE (POLYETHYLENE) (GENERAL)
E1	PE100 PN8, AS4130
E2	PE100 PN10, AS4130
E3	PE100 PN12, AS4130
E4	PE100 PN16, AS4130
E5	PE100 PN20, AS4130
F0	FRP (FIBRE REINFORCED PLASTIC) (GENERAL)
F1	FRP PIPE CLASS 4, AS 3571
F2	REINFORCED CONCRETE PIPE, AS 4058, PVC LINED
G0	VC (VITRIFIED CLAY)
M0	MILD STEEL (GENERAL)
M1	MILD STEEL, AS 1074, MEDIUM, GALVANISED
M2	MILD STEEL, AS 1579, WELDED AND/OR FLANGED HOT DIPPED GALVANISED AND/OR CEMENT LINED WHERE INDICATED
M3	MILD STEEL, AS 4041, SCHEDULE PIPE, FLANGED OR WELDED OR WELDED HOT DIPPED GALVANISED
M4	MILD STEEL SCHEDULE 40 WELDED OR FLANGED FOR T = 45°C STAINLESS STEEL GRADE 304L OR 316L SCHEDULE 40 FOR T=45°C
M5	CARBON STEEL SCHEDULE PIPE AS 4041 FLANGED OR WELDED NO INTERNAL SURFACE TREATMENT
P0	PVC (POLY VINYL CHLORIDE) (GENERAL)
P1	UPVC (UNPLASTICISED PVC), AS 1477, CLASS 18
P2	UPVC (UNPLASTICISED PVC), AS 1273, RAINWATER PIPE
P3	UPVC (UNPLASTICISED PVC), AS 1254 STORM WATER PIPES
P4	UPVC (UNPLASTICISED PVC), ASTM D1785, SCHEDULE 80
P5	MPVC SERIES 2
S0	STAINLESS STEEL (GENERAL)
S1	STAINLESS STEEL, GRADE 316, SEAM WELDED AND SEAMLESS, SCHEDULE PIPE TO SUIT APPLICATION
S2	STAINLESS STEEL, GRADE 316, SPIRAL WELDED, WELDED 2MM MINIMUM THICKNESS
S3	STAINLESS STEEL, GRADE 304

FLUID SERVICE	
CODE	DESCRIPTION
AA	ACETIC ACID
AEA	AERATION AIR
AG	AMMONIA GAS
AIR	AIR
ALS	ALUM SOLUTION (ALUMINIUM SULPHATE)
AMH	AMMONIUM HYDROXIDE
ANS	ANTISCALANT
BIO	BIOGAS
BWW	BACKWASH WASTEWATER
CA	COMPRESSED AIR
CEN	CENTRATE
CIT	CITRIC ACID
CLG	CHLORINE GAS
DR	DRAINAGE
DS	DIGESTED SLUDGE
EF	EFFLUENT
ETH	ETHANOL
FA	FOUL AIR
FE	FILTERED EFFLUENT
FECL	FERRIC CHLORIDE
FLT	FILTRATE
FM	FIRE MAIN
FS	FERMENTED SLUDGE
FSN	FERMENTER SUPERNATANT
FW	FOUL WATER
GRT	GRIT
HCL	HYDROCHLORIC ACID
IA	INSTRUMENT AIR
IW	INDUSTRIAL WATER
LP	LIME POWDER
M	METHANOL
MG	MAGNESIUM HYDROXIDE
MLR	MIXED LIQUOR RECYCLE
OF	OVERFLOW
OIL	OIL
PE	PRIMARY EFFLUENT
PES	POLYMER SOLUTION (POLYELECTROLYTE)
PS	PRIMARY SLUDGE
PW	POTABLE WATER
RAS	RETURN ACTIVATED SLUDGE
RE	RECLAIMED EFFLUENT
RSW	RAW SEWAGE
SA	SULPHURIC ACID
SB	SODIUM BISULPHATE
SC	SCUM
SCN	SCREENINGS
SE	SECONDARY EFFLUENT
SH	SODIUM HYPOCHLORITE
SL	SLUDGE
SLS	SODIUM LAURYL SULPHATE
SME	SODIUM METABISULPHITE

FLUID SERVICE	
CODE	DESCRIPTION
SOH	SODIUM HYDROXIDE
SPN	SUPERNATANT
SS	SCREENED SEWAGE
STW	STORM WATER
SW	SERVICE WATER
TE	TERTIARY EFFLUENT
TSW	TREATED STORM WATER
WAS	WASTE ACTIVATED SLUDGE

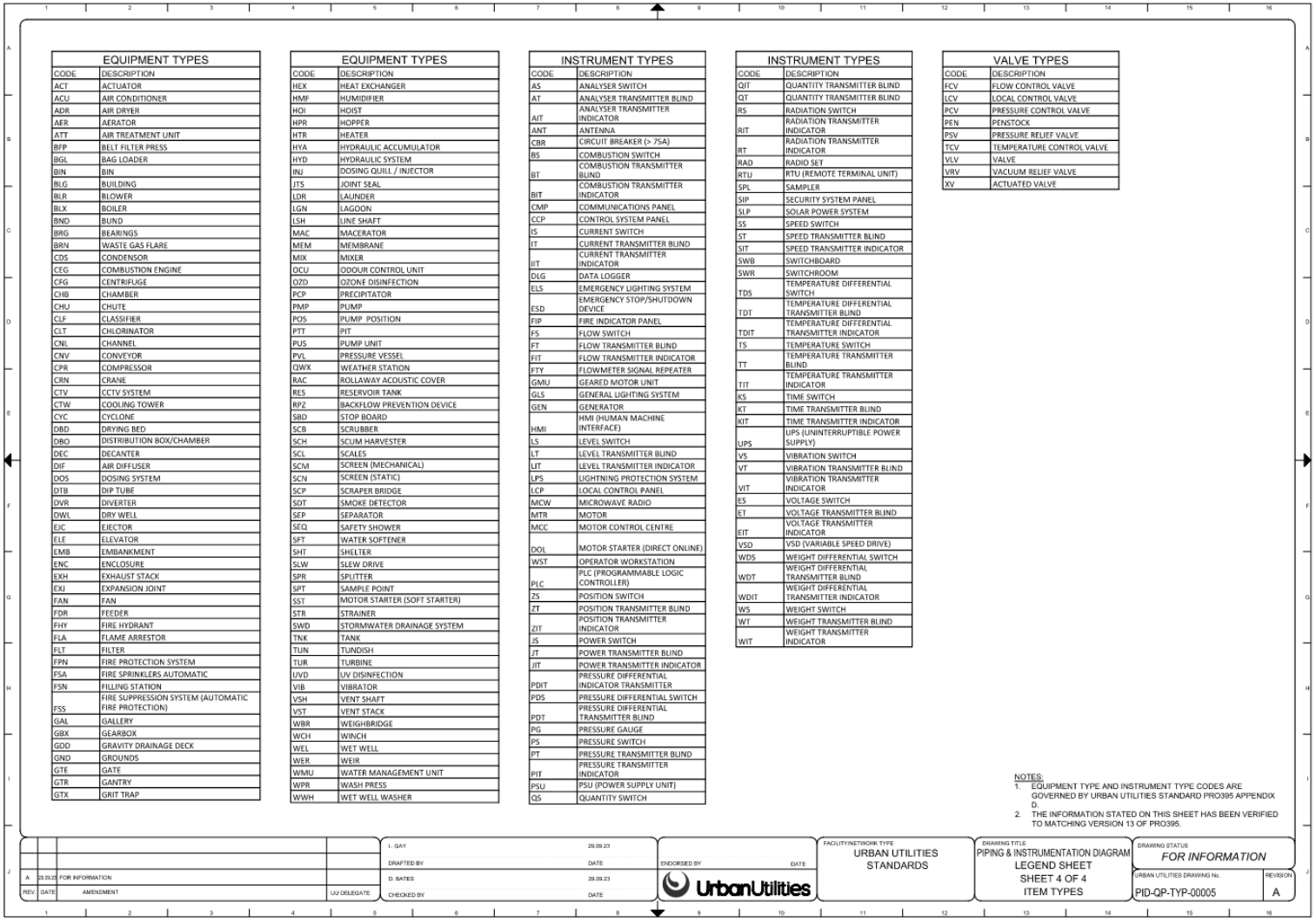
NOTES:
1. PIPE MATERIAL AND FLUID SERVICE CODES GOVERNED BY URBAN UTILITIES STANDARD TECHNICAL SPECIFICATION "PLANT AND EQUIPMENT NUMBERING", DOCUMENT NUMBER TMS1647.
2. THE INFORMATION STATED ON THIS SHEET HAS BEEN VERIFIED TO MATCHING VERSION 9 OF TMS1647.

REV.	DATE	AMENDMENT	UU DELEGATE
A	29.09.23	FOR INFORMATION	

L. GAY 29.09.23 DRAFTED BY DATE
D. BATES 29.09.23 CHECKED BY DATE
ENDORSED BY DATE
UrbanUtilities

FACILITY/NETWORK TYPE: URBAN UTILITIES STANDARDS
DRAWING TITLE: PIPING & INSTRUMENTATION DIAGRAM LEGEND SHEET SHEET 3 OF 4 PIPELINE TYPES
DRAWING STATUS: FOR INFORMATION
URBAN UTILITIES DRAWING No.: PID-QP-TYP-00004
REVISION: A

A4 PID-QP-TYP-00005



EQUIPMENT TYPES	
CODE	DESCRIPTION
ACT	ACTUATOR
ACU	AIR CONDITIONER
ADR	AIR DRYER
AER	AERATOR
ATT	AIR TREATMENT UNIT
BFP	BELT FILTER PRESS
BGL	BAG LOADER
BIN	BIN
BLG	BUILDING
BLR	BLOWER
BLX	BOILER
BND	BUND
BRG	BEARINGS
BRN	WASTE GAS FLARE
CDS	CONDENSOR
CEG	COMBUSTION ENGINE
CFG	CENTRIFUGE
CHB	CHAMBER
CHU	CHUTE
CLF	CLASSIFIER
CLT	CHLORINATOR
CNL	CHANNEL
CNV	CONVEYOR
CPR	COMPRESSOR
CRN	CRANE
CTV	CCTV SYSTEM
CTW	COOLING TOWER
CYC	CYCLONE
DBD	DRYING BED
DBO	DISTRIBUTION BOX/CHAMBER
DEC	DECANTER
DIF	AIR DIFFUSER
DOS	DOSING SYSTEM
DTB	DIP TUBE
DVR	DIVERTER
DWL	DRY WELL
EJC	EJECTOR
ELE	ELEVATOR
EMB	EMBANKMENT
ENC	ENCLOSURE
EXH	EXHAUST STACK
EXJ	EXPANSION JOINT
FAN	FAN
FDR	FEEDER
FHY	FIRE HYDRANT
FLA	FLAME ARRESTOR
FLT	FILTER
FPN	FIRE PROTECTION SYSTEM
FSA	FIRE SPRINKLERS AUTOMATIC
FSN	FILLING STATION
FSS	FIRE SUPPRESSION SYSTEM (AUTOMATIC FIRE PROTECTION)
GAL	GALLERY
GBX	GEARBOX
GDD	GRAVITY DRAINAGE DECK
GND	GROUNDS
GTE	GATE
GTR	GANTRY
GTX	GRIT TRAP

EQUIPMENT TYPES	
CODE	DESCRIPTION
HEX	HEAT EXCHANGER
HMF	HUMIDIFIER
HOI	HOIST
HPR	HOPPER
HTR	HEATER
HYA	HYDRAULIC ACCUMULATOR
HYD	HYDRAULIC SYSTEM
INJ	DOSING QUILL / INJECTOR
JTS	JOINT SEAL
LDR	LAUNDER
LGN	LAGOON
LSH	LINE SHAFT
MAC	MACERATOR
MEM	MEMBRANE
MIX	MIXER
OCU	ODOUR CONTROL UNIT
OZD	OZONE DISINFECTION
PCP	PRECIPITATOR
PMP	PUMP
POS	PUMP POSITION
PTT	PIT
PUS	PUMP UNIT
PVL	PRESSURE VESSEL
QWX	WEATHER STATION
RAC	ROLLAWAY ACOUSTIC COVER
RES	RESERVOIR TANK
RPZ	BACKFLOW PREVENTION DEVICE
SBD	STOP BOARD
SCB	SCRUBBER
SCH	SCUM HARVESTER
SCL	SCALES
SCM	SCREEN (MECHANICAL)
SCN	SCREEN (STATIC)
SCP	SCRAPER BRIDGE
SDT	SMOKE DETECTOR
SEP	SEPARATOR
SEQ	SAFETY SHOWER
SFT	WATER SOFTENER
SHT	SHELTER
SLW	SLEW DRIVE
SPR	SPLITTER
SPT	SAMPLE POINT
SST	MOTOR STARTER (SOFT STARTER)
STR	STRAINER
SWD	STORMWATER DRAINAGE SYSTEM
TNK	TANK
TUN	TUNDISH
TUR	TURBINE
UVD	UV DISINFECTION
VIB	VIBRATOR
VSH	VENT SHAFT
VST	VENT STACK
WBR	WEIGHBRIDGE
WCH	WINCH
WEL	WET WELL
WER	WEIR
WMU	WATER MANAGEMENT UNIT
WPR	WASH PRESS
WWH	WET WELL WASHER

INSTRUMENT TYPES	
CODE	DESCRIPTION
AS	ANALYSER SWITCH
AT	ANALYSER TRANSMITTER BLIND
AIT	ANALYSER TRANSMITTER INDICATOR
ANT	ANTENNA
CBR	CIRCUIT BREAKER (> 75A)
BS	COMBUSTION SWITCH
BT	COMBUSTION TRANSMITTER BLIND
BIT	COMBUSTION TRANSMITTER INDICATOR
CMP	COMMUNICATIONS PANEL
CCP	CONTROL SYSTEM PANEL
IS	CURRENT SWITCH
IT	CURRENT TRANSMITTER BLIND
IIT	CURRENT TRANSMITTER INDICATOR
DLG	DATA LOGGER
ELS	EMERGENCY LIGHTING SYSTEM
ESD	EMERGENCY STOP/SHUTDOWN DEVICE
FIP	FIRE INDICATOR PANEL
FS	FLOW SWITCH
FT	FLOW TRANSMITTER BLIND
FIT	FLOW TRANSMITTER INDICATOR
FTY	FLOWMETER SIGNAL REPEATER
GMU	GEARED MOTOR UNIT
GLS	GENERAL LIGHTING SYSTEM
GEN	GENERATOR
HMI	HMI (HUMAN MACHINE INTERFACE)
LS	LEVEL SWITCH
LT	LEVEL TRANSMITTER BLIND
LIT	LEVEL TRANSMITTER INDICATOR
LPS	LIGHTNING PROTECTION SYSTEM
LCP	LOCAL CONTROL PANEL
MCW	MICROWAVE RADIO
MTR	MOTOR
MCC	MOTOR CONTROL CENTRE
DOL	MOTOR STARTER (DIRECT ONLINE)
WST	OPERATOR WORKSTATION
PLC	PLC (PROGRAMMABLE LOGIC CONTROLLER)
ZS	POSITION SWITCH
ZT	POSITION TRANSMITTER BLIND
ZIT	POSITION TRANSMITTER INDICATOR
JS	POWER SWITCH
JT	POWER TRANSMITTER BLIND
JIT	POWER TRANSMITTER INDICATOR
PDIT	PRESSURE DIFFERENTIAL INDICATOR TRANSMITTER
PDS	PRESSURE DIFFERENTIAL SWITCH
PDT	PRESSURE DIFFERENTIAL TRANSMITTER BLIND
PG	PRESSURE GAUGE
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER BLIND
PIT	PRESSURE TRANSMITTER INDICATOR
PSU	PSU (POWER SUPPLY UNIT)
QS	QUANTITY SWITCH

INSTRUMENT TYPES	
CODE	DESCRIPTION
QIT	QUANTITY TRANSMITTER BLIND
QT	QUANTITY TRANSMITTER BLIND
RS	RADIATION SWITCH
RIT	RADIATION TRANSMITTER INDICATOR
RT	RADIATION TRANSMITTER INDICATOR
RAD	RADIO SET
RTU	RTU (REMOTE TERMINAL UNIT)
SPL	SAMPLER
SIP	SECURITY SYSTEM PANEL
SLP	SOLAR POWER SYSTEM
SS	SPEED SWITCH
ST	SPEED TRANSMITTER BLIND
SIT	SPEED TRANSMITTER INDICATOR
SWB	SWITCHBOARD
SWR	SWITCHROOM
TDS	TEMPERATURE DIFFERENTIAL SWITCH
TDT	TEMPERATURE DIFFERENTIAL TRANSMITTER BLIND
TDIT	TEMPERATURE DIFFERENTIAL TRANSMITTER INDICATOR
TS	TEMPERATURE SWITCH
TT	TEMPERATURE TRANSMITTER BLIND
TIT	TEMPERATURE TRANSMITTER INDICATOR
KS	TIME SWITCH
KT	TIME TRANSMITTER BLIND
KIT	TIME TRANSMITTER INDICATOR
UPS	UPS (UNINTERRUPTIBLE POWER SUPPLY)
VS	VIBRATION SWITCH
VT	VIBRATION TRANSMITTER BLIND
VIT	VIBRATION TRANSMITTER INDICATOR
ES	VOLTAGE SWITCH
ET	VOLTAGE TRANSMITTER BLIND
EIT	VOLTAGE TRANSMITTER INDICATOR
VSD	VSD (VARIABLE SPEED DRIVE)
WDS	WEIGHT DIFFERENTIAL SWITCH
WDT	WEIGHT DIFFERENTIAL TRANSMITTER BLIND
WDIT	WEIGHT DIFFERENTIAL TRANSMITTER INDICATOR
WS	WEIGHT SWITCH
WT	WEIGHT TRANSMITTER BLIND
WIT	WEIGHT TRANSMITTER INDICATOR

VALVE TYPES	
CODE	DESCRIPTION
FCV	FLOW CONTROL VALVE
LCV	LOCAL CONTROL VALVE
PCV	PRESSURE CONTROL VALVE
PEN	PENSTOCK
PSV	PRESSURE RELIEF VALVE
TCV	TEMPERATURE CONTROL VALVE
VLV	VALVE
VRV	VACUUM RELIEF VALVE
XV	ACTUATED VALVE

NOTES:
1. EQUIPMENT TYPE AND INSTRUMENT TYPE CODES ARE GOVERNED BY URBAN UTILITIES STANDARD PRO395 APPENDIX D.
2. THE INFORMATION STATED ON THIS SHEET HAS BEEN VERIFIED TO MATCHING VERSION 13 OF PRO395.

REV.	DATE	AMENDMENT	
A	28.09.23	FOR INFORMATION	

I. GAY — DRAFTED BY — 28.09.23 DATE
D. BATES — CHECKED BY — 28.09.23 DATE
UU DELEGATE
ENDORSED BY — DATE
UrbanUtilities
FACILITY/NETWORK TYPE: URBAN UTILITIES STANDARDS
DRAWING TITLE: PIPING & INSTRUMENTATION DIAGRAM LEGEND SHEET SHEET 4 OF 4 ITEM TYPES
DRAWING STATUS: FOR INFORMATION
URBAN UTILITIES DRAWING No.: PID-QP-TYP-00005
REVISION: A