



Asset Management

Technical Standard

TS 0130 – As Constructed Data Requirements for Linear Assets

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Only the current revision of this Standard should be used which is available for download from the SA Water website.

Significant/Major Changes Incorporated in This Edition

Nil.

This is the first issue of this Technical Standard.

Document Controls

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1 Introduction

SA Water is responsible an extensive portfolio of physical infrastructure. Data describing those assets is critical for a range of activities including:

- Field Operation
- Maintenance and Repair
- Engineering Design
- Data Modelling
- Financial Valuation
- Public Safety (DBYD)

Delivery of asset data is a required output of all design and construction work. Asset data often forms part of the legal documentation of works carried out and in several processes release of payment is contingent on delivery of asset data that is accepted as having met requirements.

1.1 Purpose

This standard has been developed with the intent of assisting the creation of asset data for linear assets by providing clear guidance regarding the requirements expected for handover of as-built asset data.

If any requirements are unclear, please contact one of the parties involved in approving this document so we can review and address the issue.

1.2 Glossary

The following glossary items are used in this document:

Term	Description
CAD	Computer Aided Design
CAMS	Customer Application Management System
DAFI	SA Water – Development Agreement Formal Instrument
DCDB	Digital Cadastral Database
DIT	Department for Infrastructure and Transport
DN	Nominal Diameter
GIS	Geographic Information System
GPS	Global Positioning System
ICCP	Impressed Current Cathodic Protection
Linear Assets	Assets associated with pipe and cable networks
SA Water	South Australian Water Corporation
TG	SA Water Technical Guideline
TS	SA Water Technical Standard

1.3 References

1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents referenced in this document:

Number	Title

1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Number	Title
TS 0100	Requirements for Technical Drawings
TS 0103	Survey Requirements Specifications
TS 0134	Requirements for Automated Assessment

1.4 Definitions

The following definitions are applicable to this document:

Term	Description
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Designer	The organisation responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or a Constructor, or an in-house entity
Drawing	An illustration intended to provide sufficient information to allow work to be constructed, or provide a record of works undertaken.
SA Water's Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): <ul style="list-style-type: none"> • Superintendent's Representative (e.g., AS 4300 & AS 2124 etc.) • SA Water Project Manager • SA Water nominated contact person
Responsible Discipline Lead	The discipline expert responsible for TS0130 defined on page 3 (via SA Water's Representative)

2 Scope

The scope of this standard shall be considered to cover all linear assets delivered to SA Water for ownership, operation, or maintenance.

This includes, but is not limited to:

- Pipework, such as:
 - Customer Connections
 - Pressure Mains
 - Non-Pressure Mains
 - Pipe Relining's
 - Casing pipes (a.k.a. sleeve pipes or jacking pipes)
- Cabling, such as:
 - Electrical (including cathodic protection)
 - Communication
 - Cathodic protection
- Assets involved in the physical support, operation, or maintenance of linear assets, such as:
 - Assets that allow access to or inside linear assets (i.e., maintenance holes)
 - Structures that support or protect linear assets (i.e., valve chambers or power poles)
 - Assets that connect linear assets (i.e., fittings)
 - Assets that allow control of resources transported through linear assets (i.e., valves, pumps, transformers)
 - Devices that monitor linear assets or the resources they transport (i.e., sensors and meters)
 - Cathodic protection systems (Galvanic and ICCP - see TS0440)

3 Measurement Requirements

This section covers the types of measurements, how to take measurements, and when they are required.

3.1 General Instructions

3.1.1 Units

Shall be provided in either metres or millimetres.

3.1.2 Precision

Measurements shall be to the nearest millimetre. If using metres, then specify to two decimal places.

3.1.3 Accuracy

Refer to TS 0103 Survey Requirements Specification.

3.1.4 Timing relating to Buried Assets

If the asset is to be buried, then measurements shall be taken prior to backfill covering the assets.

3.2 Horizontal Measurements

3.2.1 Frame of Reference

Measurements shall be provided relative to assumed property boundaries, unless otherwise approved or required.

3.2.1.1 Assumed property boundaries

Any visible demarcation such as fences, boundary pegs, or walls that exists on site that would ordinarily be assumed to be the property boundary.

It is understood that assumed property boundaries are not necessarily the legal property boundary. SAW require the use of the assumed boundary for the practical reason that field staff will want to measure from the physical features on site so a measurement from the legal property boundary will potentially be misleading.

According to state law (at time of publication) determining the property boundary requires the use of a licensed surveyor, so requesting the assumed property boundary avoids the need to engage a licensed surveyor to meet the requirements specified by this TS.

Note: *Construction works may require the engagement of a licensed surveyor to determine if an easement is required or pegging new property boundaries, but those requirements are outside the scope of this document.*

3.2.1.2 Use of GPS Coordinates

In an ideal setting, SA Water would prefer to use pure GPS Coordinates, but there are technical issues that make this option largely unsuitable at time of publication for the following reasons:

- Field staff generally do not have better than mobile phone level accuracy GPS devices which are rated for a 5m radius accuracy. When determining where to dig for a buried asset this is not sufficiently accurate. Boundary offsets and dimensions from existing SA Water fitting are preferred as measuring tape can be used to locate buried assets with a high degree of accuracy.
- SA Water assets need to be schematically correct relative to property boundaries. Unfortunately, South Australia's property boundaries (DCDB) are generally not correct relative to absolute coordinates (GPS). Averaging 1-2 metres offset in metropolitan areas, this can be greater than 20 metres offset in non-metropolitan areas.

Thus, if SA Water situate assets purely by GPS, then they will often appear to be inside properties represented by the DCDB when they should be in the road.

Figure 1: Example of problems around GPS data update

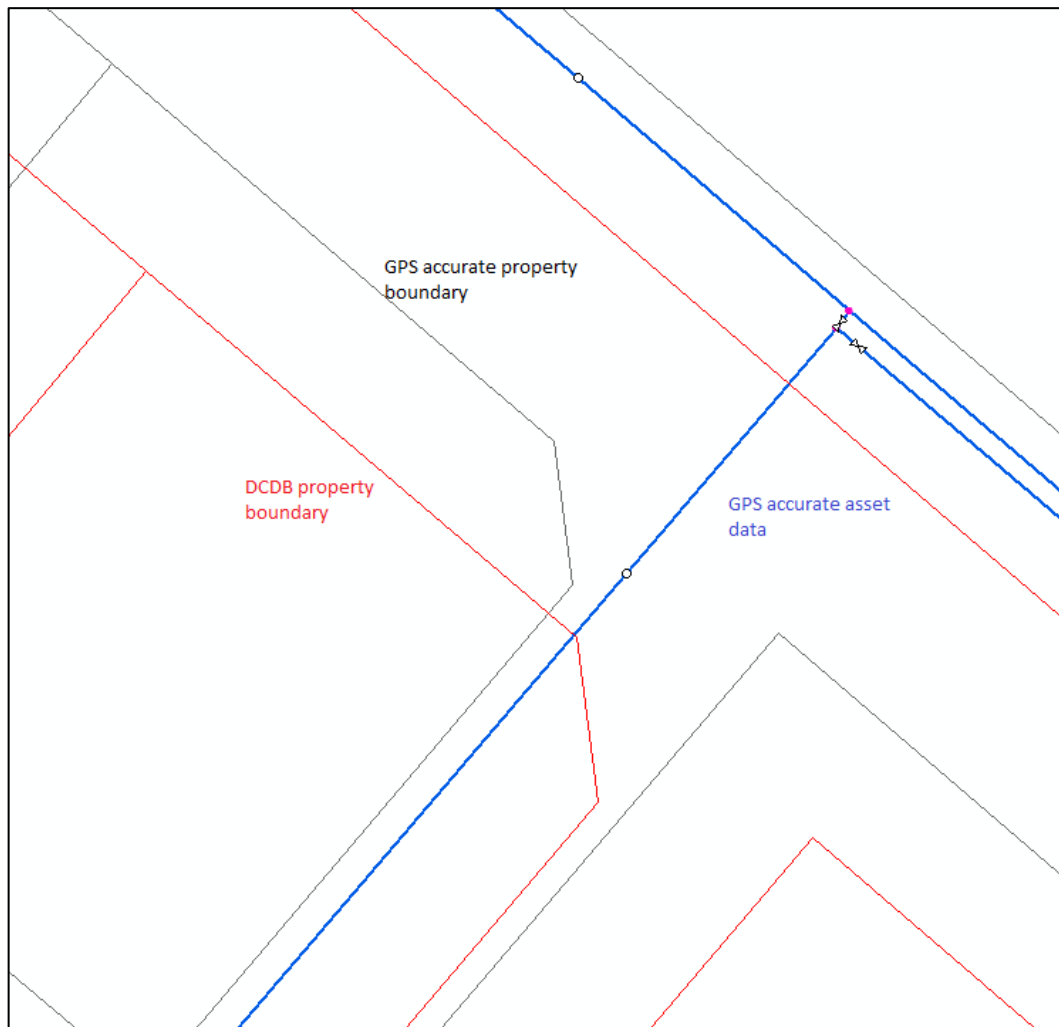


Figure 1 is based on an actual difference between true GPS boundary position and DCDB representation. If SA Water added assets based on GPS data, they would be inside properties when they should be in the roads.

DIT is gradually improving the spatial accuracy of the DCDB but at time of publication, less than 20% of metropolitan Adelaide has been improved.

3.2.1.3 Problems with boundary measurements

SA Water recognise that there will be circumstance where use of property boundaries is not suitable or possible, refer to Appendix A **Error! Reference source not found.** for guidance.

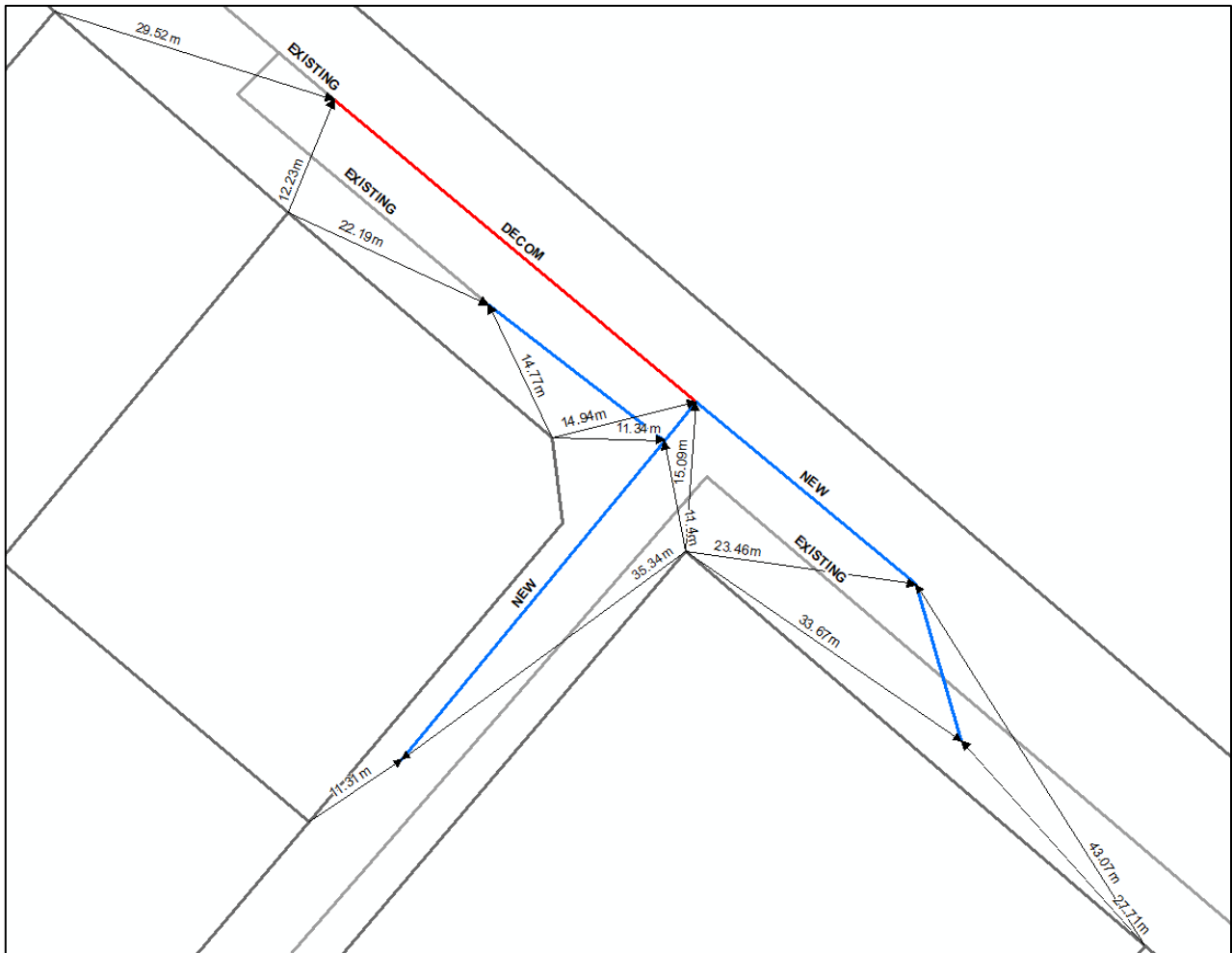
3.2.2 Paired Boundary Ties

Pair boundary ties is a measurement from an assumed property corner. By using a pair of boundary ties a point can be determined based on where they intersect (refer Figure 2).

Pair boundary ties are required for:

- New Assets:
 - The start and end of new linear asset
 - Coupling between new linear asset and existing linear asset
 - Junctions (tee or cross)
 - Horizontal Bend fittings on new linear assets
- Existing Assets:
 - Not required.
- Decommissioned Assets:
 - Point where the decommissioned asset formerly connected to existing asset (i.e., location of cut/capped).

Figure 2: Guide to Boundary Ties



3.2.3 Chainages and Dimensions

Chainages are a series of increasing distances from a specified 00 metres point (refer Figure 3).

Dimensions are individual distances between two points (refer Figure 4).

While chainages tend to better suit measurements along the extent of a linear asset and dimensions tend to suit enlargements, for the purposes of this document chainages and dimensions can be used interchangeably provided:

- When using chainages, they begin and end at points that have boundary ties.
 - By convention this should be at the start of a new main or an asset that can be located without unearthing the pipe such as a stop valve. This assists staff in the future in locating buried sections by starting from the visible asset.
- When using dimensions, they form a continuous set of distances from a point that has a boundary tie.

Exception Note: When a fitting is installed or removed from an existing linear asset then it is acceptable to provide only a dimensions/chainage from another existing fitting on that section of existing linear asset (refer Figure 5).

Chainages or dimensions are required for:

- New Assets:
 - All fittings along new linear assets
 - For example, valves, junctions, bends, inspection openings, etc.
 - Thrust blocks
 - Any change in the attributes along new linear assets
 - For example, change in material, nominal diameter, above/below ground status, grade, etc.
 - Bend fittings along new linear assets
 - Crossings of any kind (e.g., road, rail, creek etc.)
 - Changes in direction that are not the result of a bend fitting. See below for extended discussion of deflections.
 - New fittings installed on existing linear assets
- Existing Assets:
 - Not required
- Decommissioned Assets:
 - Where the decommissioned linear asset used to connect to the remaining existing linear asset.
 - Where different methods of decommissioning start and stop
 - The nearest existing fitting from where the existing asset has been removed (decommissioned).
 - For example, a cut and cap project would require two chainages detailing the first cut and then the distance of the gap to the second cut (unless all assets were removed after the first cut).

3.2.3.1 Missing Asset Data

SA Water owns and operates millions of assets, and there are likely to be occasions when a project wants to provide a chainage or dimension from a fitting that exists in the field, but which does not exist in SA Water's asset register/s.

In these situations, if the missing information would result in a potential position error of +/- 2m SA Water reserves right to require a chainage/dimension from different existing asset or failing that a coordinate or some other tie in that allows the update to be processed to a higher degree of accuracy.

Where encountering such a situation, please send information to GIS.Corrections@sawater.com.au and the existing records will be updated.

Figure 3: Chainages

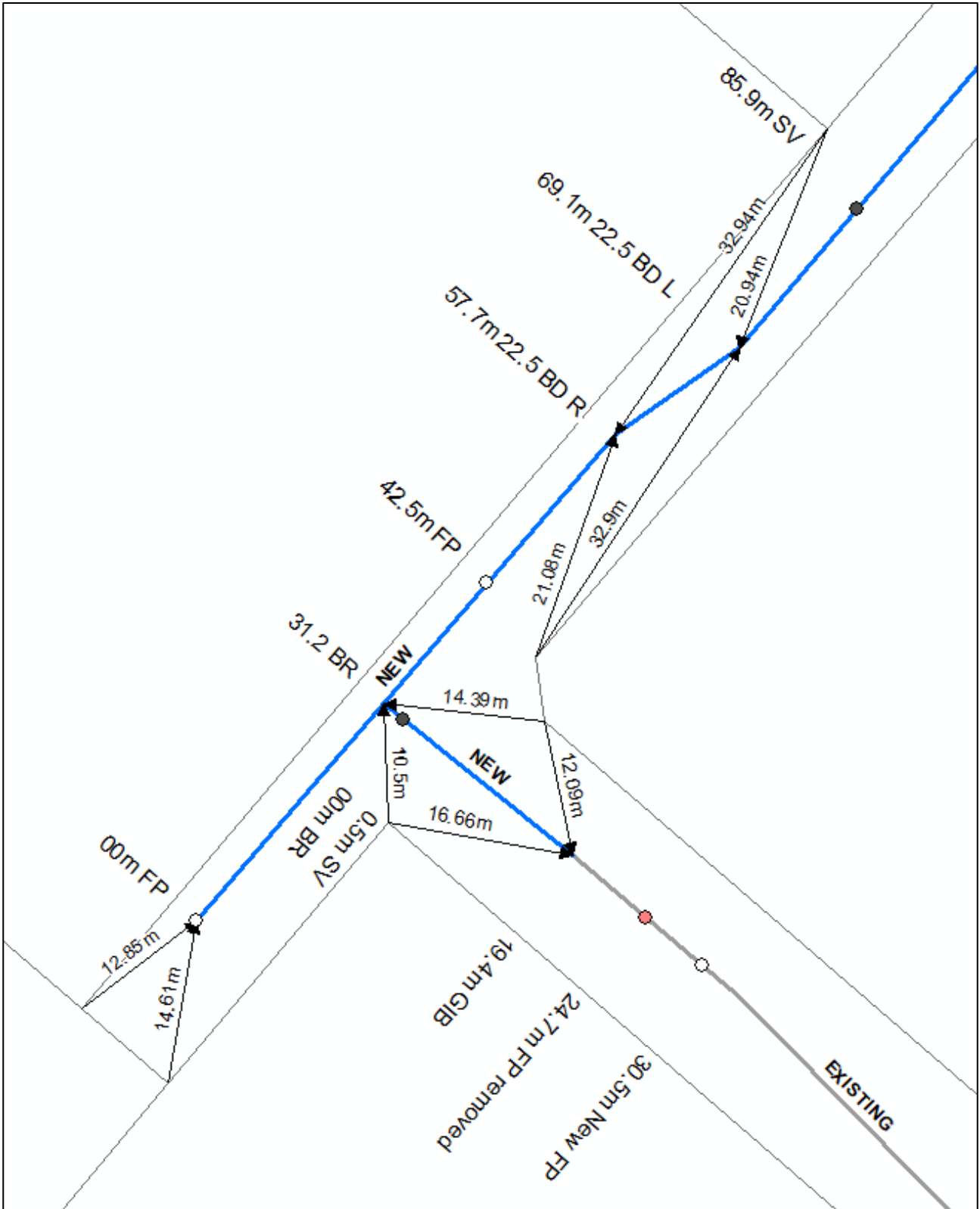


Figure 4: Dimensions

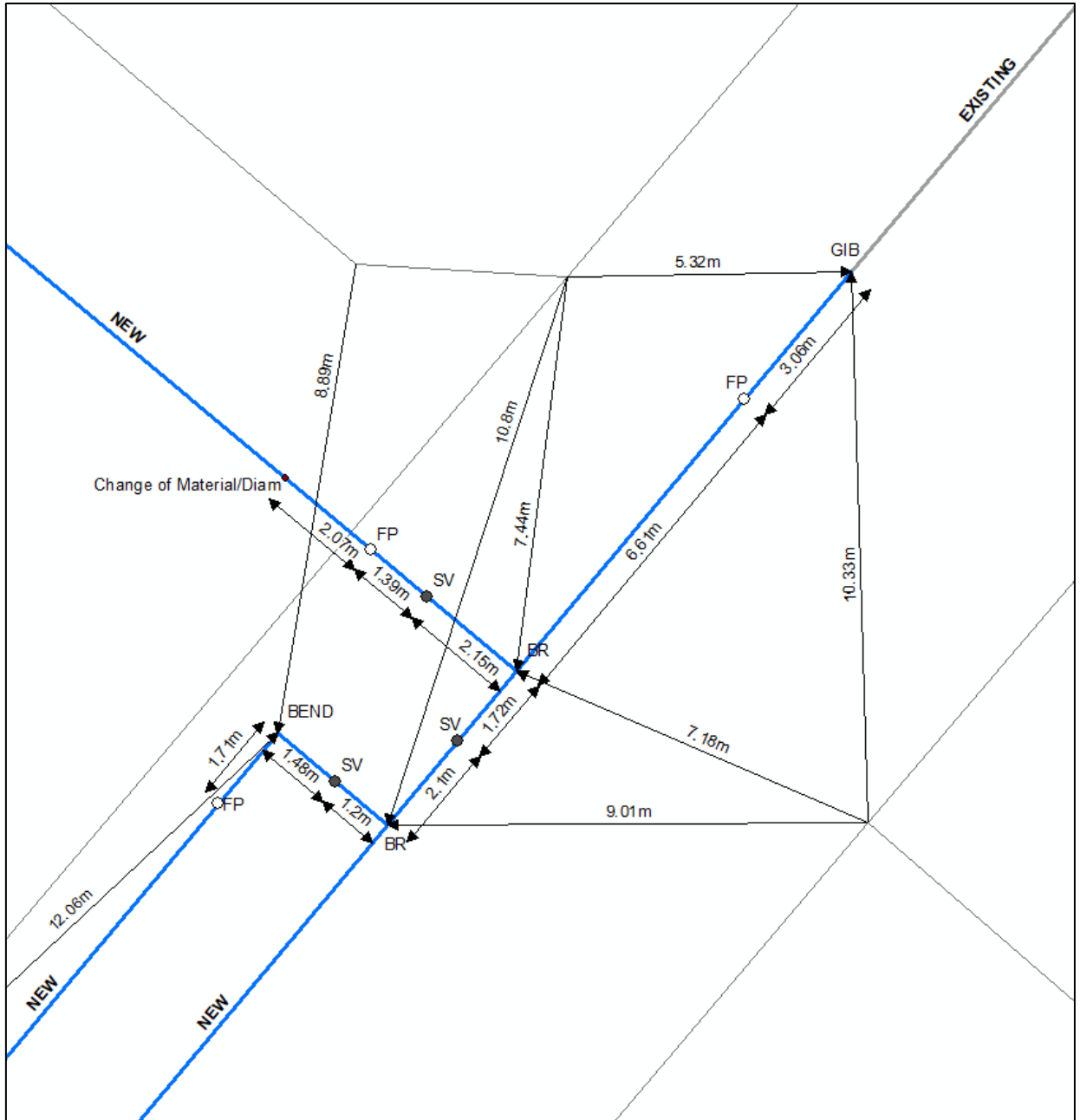
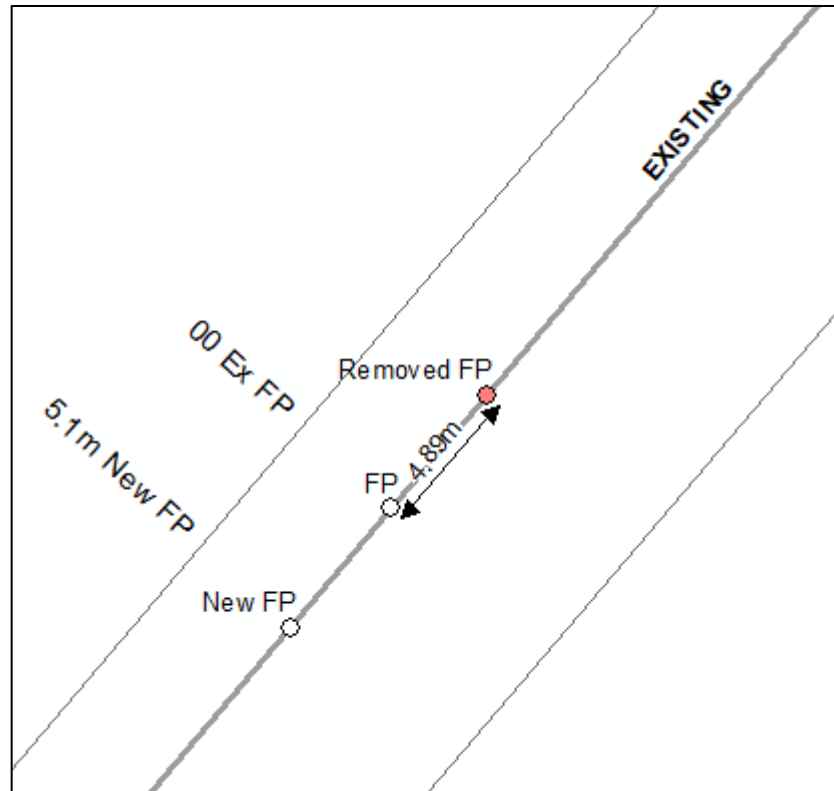


Figure 5: New and Removed Fittings on Existing Linear Assets example

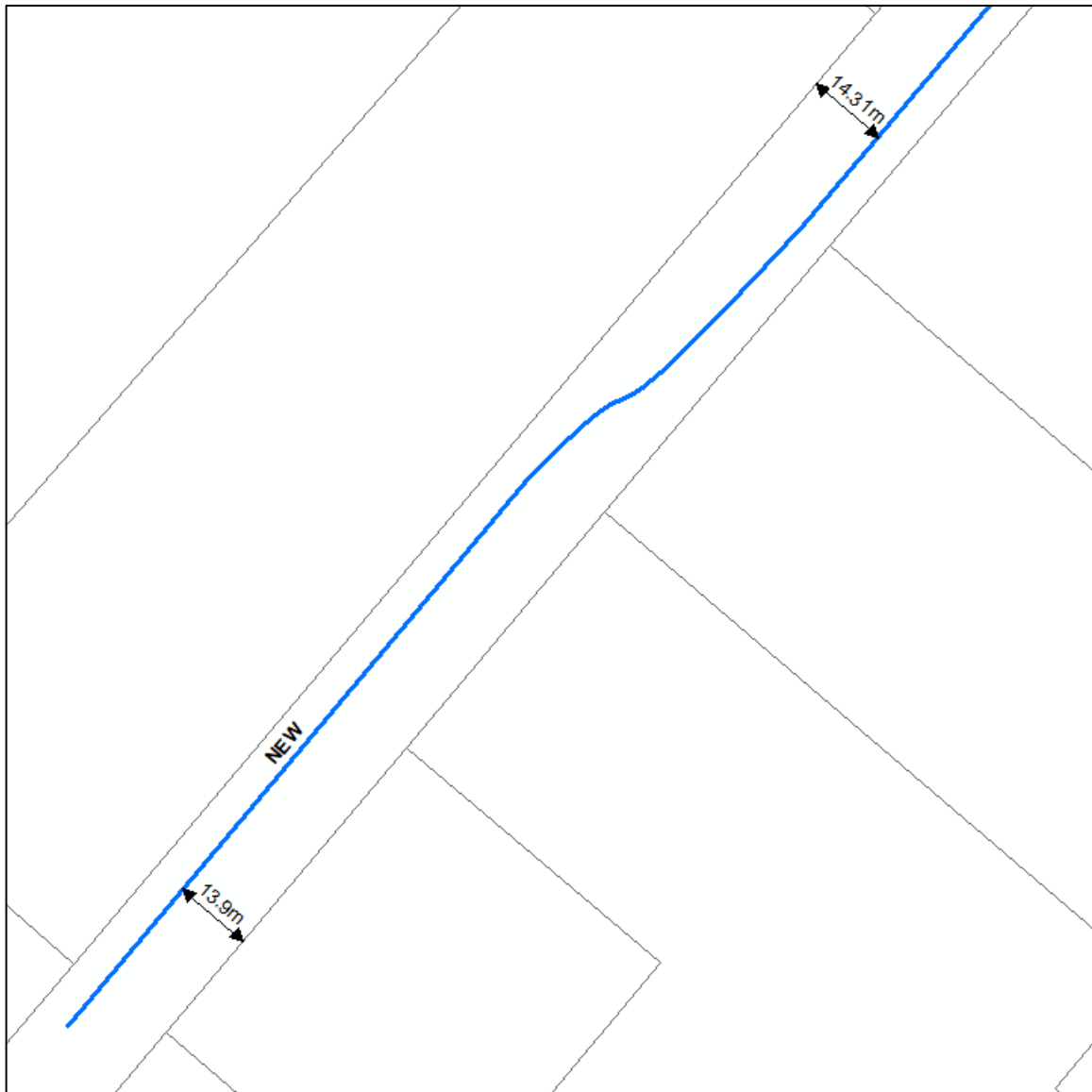
3.2.4 Boundary Offsets

A boundary offset is a measurement perpendicular from a property boundary to an asset. Field staff use these to locate assets that are generally running parallel to a property boundary.

Boundary offsets are required for:

- New Assets:
 - About every 50m along a new linear asset section that is nominally parallel to a boundary.
 - By convention this should be a distance from the nearest side of the road. Using the far side increases the likelihood that staff need to cross roads to measure offsets, which poses a risk to safety.
- Existing Assets:
 - Not required
- Decommissioned Assets:
 - Not required

Special note: A pair of perpendicular Boundary Offsets can be used in place of Boundary Ties. This is common practice with relay as constructed drawings.

Figure 6: Boundary Offsets

3.2.5 Deflections and Horizontal Curves

Some linear assets are flexible (and can be curved) or have joint types that allow minor deflections. Dealing with these minor changes of alignment can be a challenge and is frequently an issue that results in drawings being rejected.

To account for deflections and horizontal curves SA Water 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.

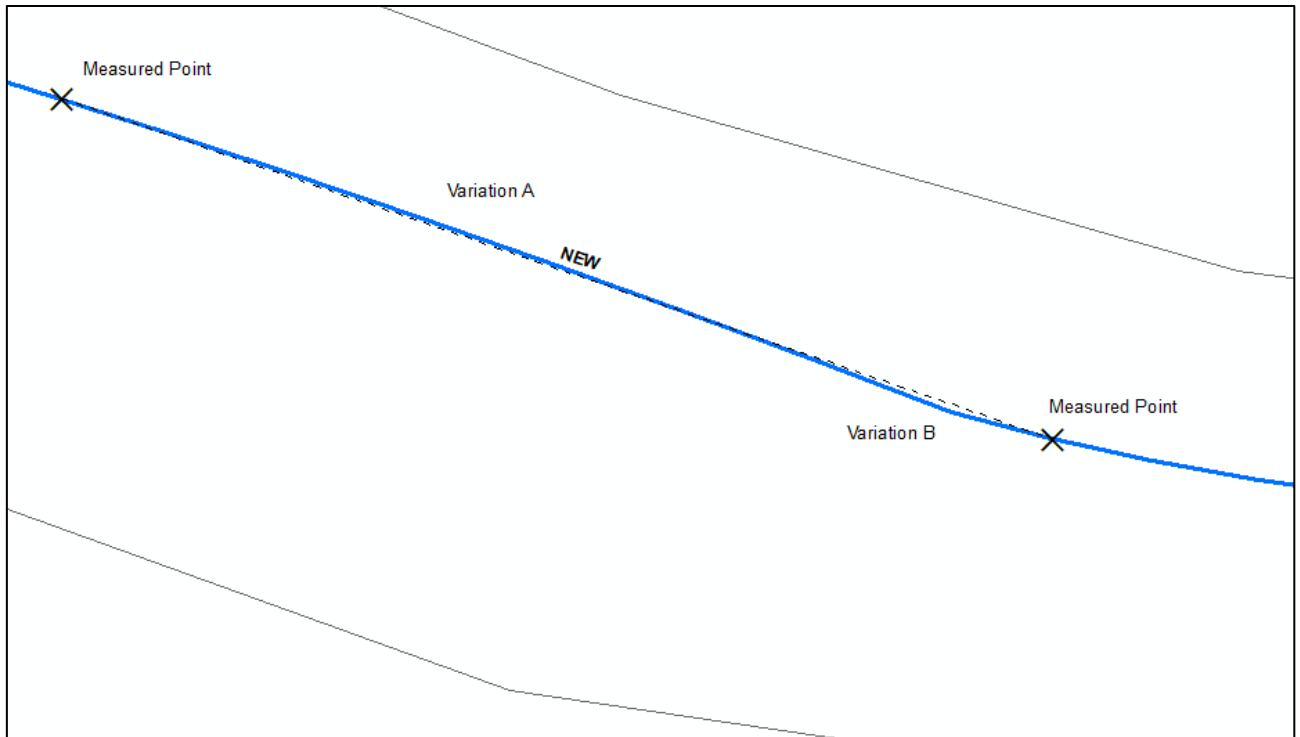
Figure 7: Illustration of Deflection and Horizontal Curve Requirement Principle

Figure 7 shows the centreline of the new asset which varies at two main points A and B. Provided the perpendicular distance from the straight line between the two measured points is less than 250mm, no additional measured points are required.

A means to check this (if using CAD) is to define a layer with a line width that displays as 500mm so by connecting your measured points with the lines on this layer you can observe if the centreline peeks outside that buffer.

Measured points can be defined as per the following examples (Figures 8-10).

Figure 8: Horizontal curve with boundary ties

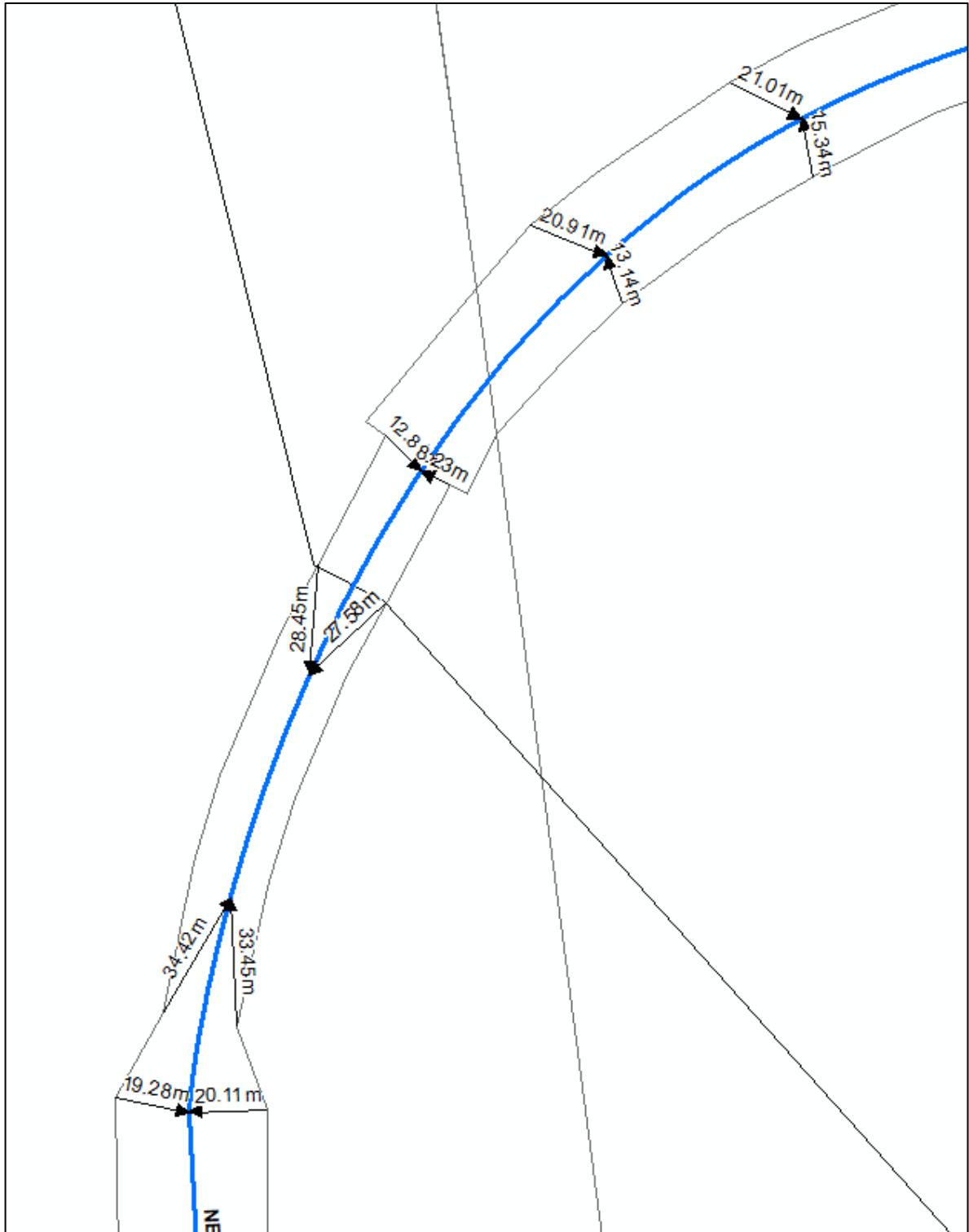


Figure 9: Deflections with Chainage paired to Boundary Offset

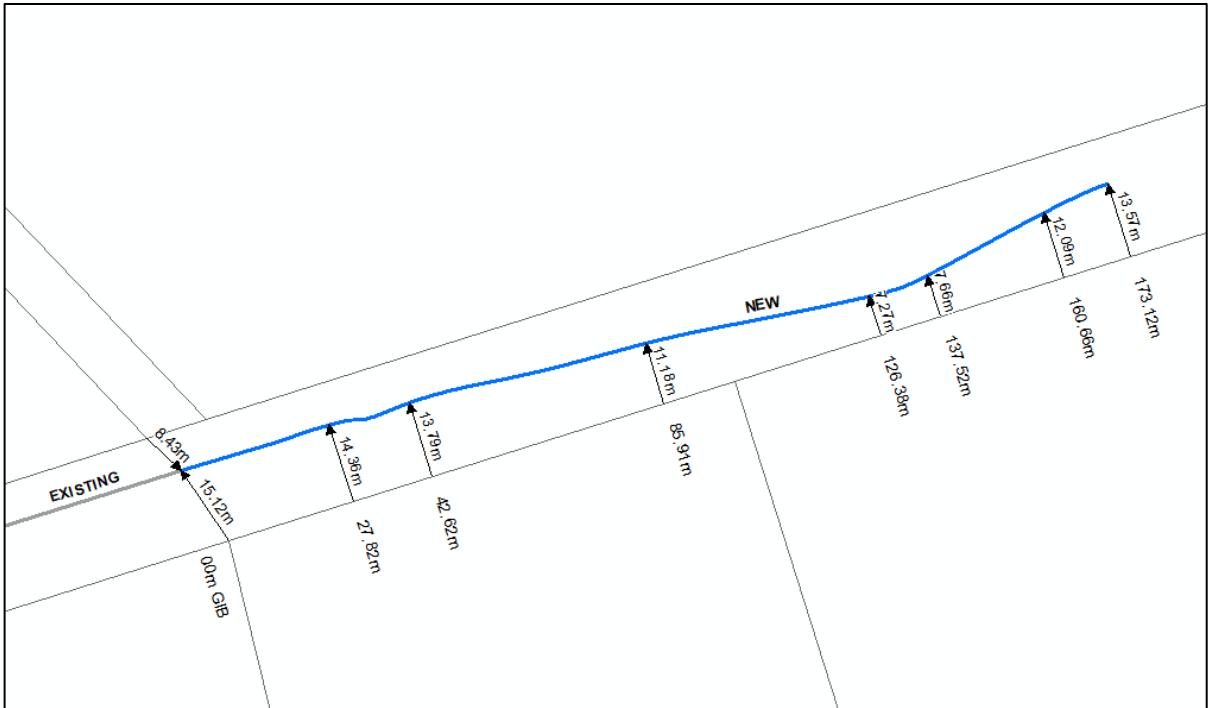
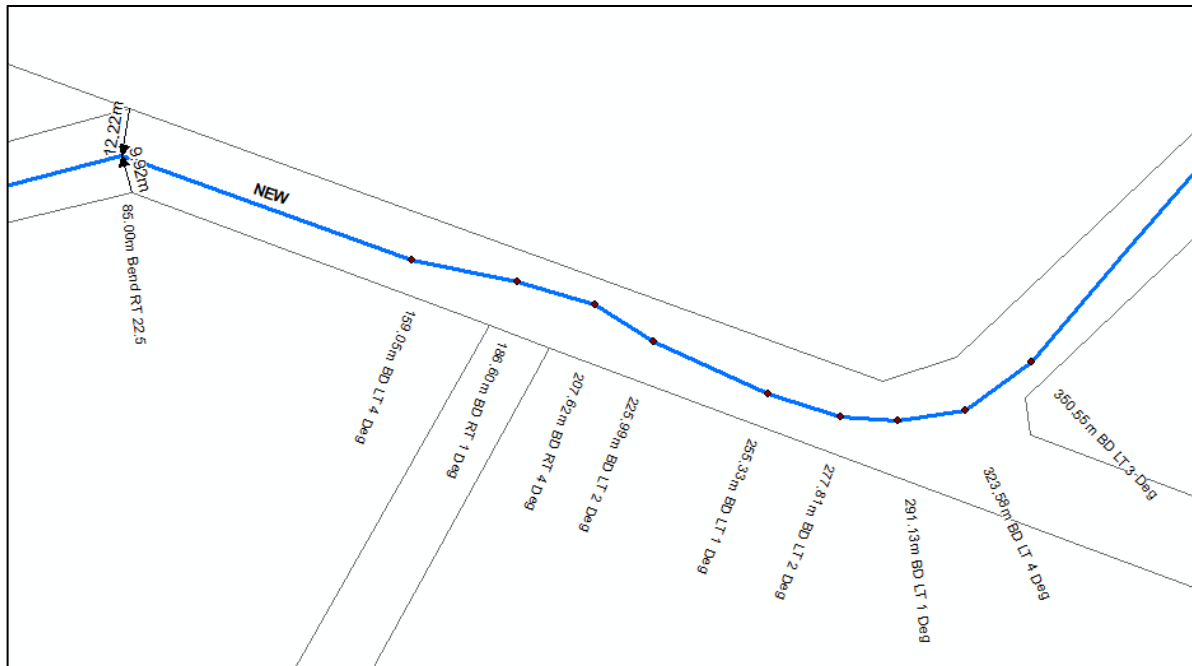


Figure 10: Deflection and Curve with Chainage paired to angle of deflection



These examples provide a degree of flexibility such that not every joint deflection needs to have measurements, and ‘wobbles’ in flexible assets can be overlooked. Shallow horizontal curves will require fewer measurement points than sharp curves.

3.2.5.1 Loading centrelines from CAD

SA Water’s eventual aim is to load centreline data from CAD. Unfortunately, this process can become complicated, and Appendix C outlines the approved CAD to GIS load process covered by TS 0134 Requirements for Automated Assessment.

3.3 Vertical Measurements

3.3.1 Frame of Reference

Unless otherwise specified vertical measurements shall be reduced levels relative to Australian Height Datum 1971.

3.3.2 Invert Levels

Invert levels are elevation measurements for the bottom of the inside of the pipe and are required for:

- New Assets:
 - Wastewater Gravity and Pressure Mains
 - Regardless of the length or DN of pipe involved.
 - Pressure Mains DN 375mm and above
 - Pressure Mains extending for more than 5km that are DN 200 and above
 - Long stretches of main like this are typically used for transmission. Thus invert values are essential for operation and modelling purposes, and are expected to be provided.
 - Start invert and end invert of any change in grade
 - Grade is a measure of the slope of a pipe
 - Start invert and end invert of pipes
 - Invert at each fitting along a pipe
 - Crossings of any kind (e.g., road, rail, creek etc.)
- Existing pipes:
 - Invert at nearest fitting from where the new pipe ties into existing.
- Decommissioned Assets:
 - Not required

3.3.2.1 Vertical and Horizontal Curves in Wastewater Gravity Network

The wastewater gravity network is more reliant on accurate and precise measures to function properly than other linear assets SA Water operates. Access to this information becomes particularly important when designing additions to the network. As such, SA Water apply a higher set of requirements around curves for this asset group.

For vertical curves, the distance and invert levels shall be calculated at the tangent points of the curve and shall be shown on the longitudinal section view of the Drawings.

Where the curve length is greater than 6 metres, the distance and invert level at the centre of the vertical curve, (i.e., opposite the curve intersection point) shall also be calculated and shown on the Drawings.

For horizontal curves, the distances and invert levels at the tangent points shall be calculated and shown on the Plan and Longitudinal Section views of the Drawings.

For every horizontal curve, a table shall be provided on the plan view drawing detailing:

- the curve length
- the deflection angles
- the radius of the horizontal curve
- the tangent length
- the offset measurement from the curve to the intersection point

3.3.3 Longitudinal Section Drawings

Constructors are expected to produce a longitudinal drawing for linear assets that require the capture of invert values.

3.3.4 Surface Levels

Surface levels are required for:

- New Assets
 - Wastewater access point lids
 - These are places where wastewater can potentially overflow and having the surface level of the lid allows risk assessments to be carried out.
 - Maintenance Holes, Inspection Points, etc
 - On cross section views where ground level is depicted
 - Other points at which it is a reasonable to consider the impact of overflow events.
 - Tanks
 - Dissipation Chambers
 - etc
- Existing Assets
 - Inverts of existing maintenance holes, maintenance shafts, or inspections openings that new pipe connect to should be verified and listed.
 -
- Decommissioned Assets
 - Not required

3.3.5 Other Elevations

Elevations are required for the following:

- Closest surface of non-SA Water obstructions (against new assets) that require dog leg installations.

3.3.6 Use of Cross Sections

Cross section enlargements for new assets, which show invert and elevation values, are required for:

- Doglegs
 - A series of vertical bends in a short distance.
- Vertical pipework installations
 - Installations such as pump stations, control installations, etc
- Crossings
 - For example, rail, road, or creek crossings.

4 Display Requirements

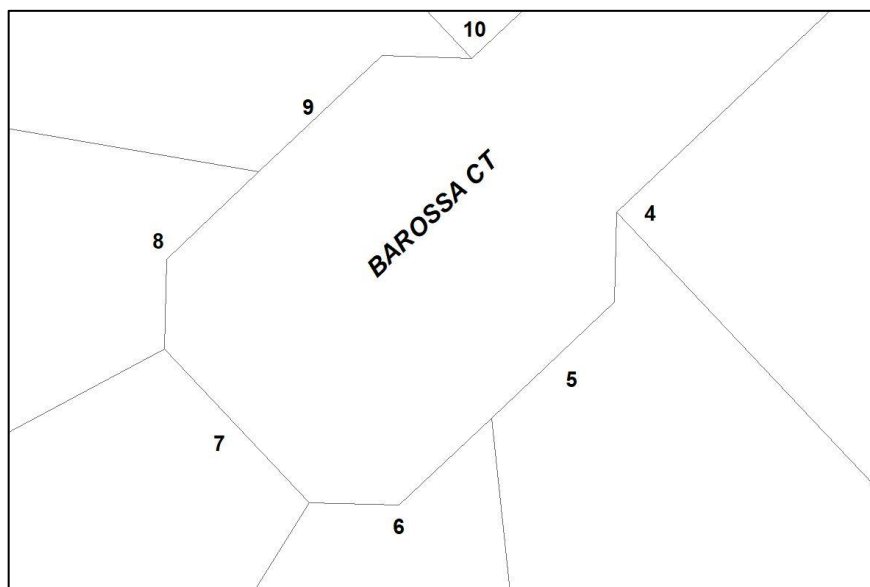
4.1 Display Extent

If the as-constructed data includes a spatial display component, then the extent of what needs to be displayed is as follows:

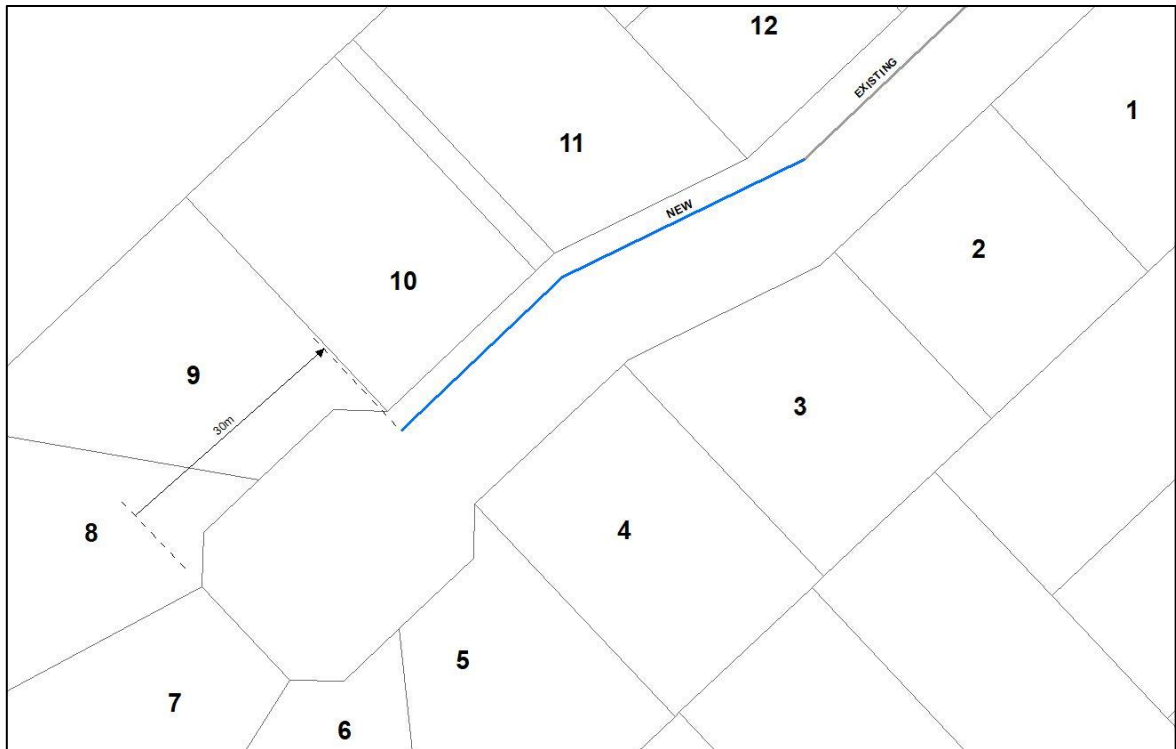
- Assumed Property Boundaries:
 - For properties that have a frontage onto a road in which the works are being carried out then the frontage of each property should be identifiable.

Figure 11: Inclusion of property numbers (where available) for property boundaries shown on as-constructed drawing.

Figure 11: Inclusion of property numbers (where available) for property boundaries

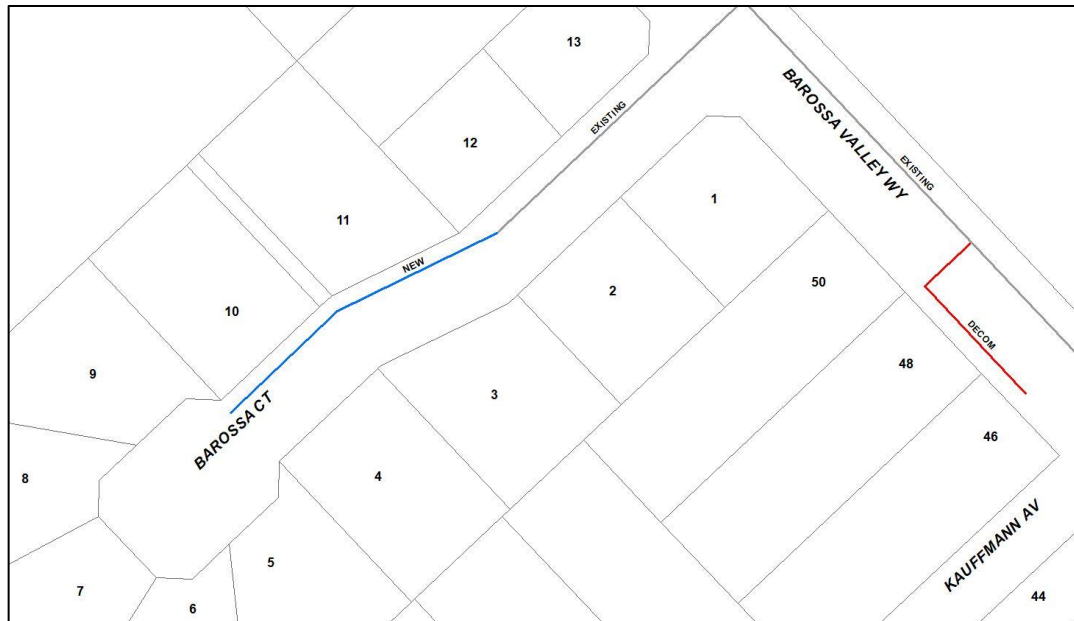


For properties that have works carried out internally then boundaries within 30m shall be displayed as shown in Figure 12.

Figure 12: Properties within 30m of relevant construction works

Data for other asset construction/decommissioning shall be provided as follows (and shown in Figure 13):

- New/Decommissioned Assets:
 - All new assets delivered by the construction works
 - All linear assets decommissioned by the construction works
 - For fittings and other such assets include if there is possibility of confusion regarding what has been decommissioned.
- Existing Assets:
 - Existing assets that are in the same road as the new/decommissioned assets
 - Existing assets that are in the same property as the new/decommissioned assets

Figure 13: New and decommissioned assets

4.2 Display Accuracy

4.2.1 Design linework vs As Constructed linework

Drawings are to be provided with a scale reference, as if a drawing is as constructed, it is expected that it could be used to scale measure distances from the Drawing.

For this reason, it is expected that for the as constructed drawing the linework has been updated from design linework to reflect measurements of the installed assets.

4.2.2 Relative Accuracy

Ideally features depicted on as-con drawings should be scale accurate, but there are several scenarios where this is impossible. As such, SA Water expects at minimum features are shown correct relative to each other (for example, if two pipes are running parallel to each other, then the one shown on the left on the drawing is the one on the left in the ground).

In practice this means if linework must be moved from the placement of the asset SA Water has provided to meet relative accuracy requirements, then do so.

5 Date Requirements

Required date values are:

- Date of construction start
- Date of substantial completion of works
- Date of survey

6 Attribute Requirements

Attribute requirements shall be provided as described in subsequent sections.

6.1 Pipes:

- New:
 - Description of use
 - Material abbreviation code (see Appendix E)
 - Installation Date
 - Nominal or external diameter in mm as appropriate to material
 - Specification and classification as appropriate to material
 - Pressure Rating (PN)
 - Wall Thickness
 - Class
 - Joint type and restraint system
 - Lining and lining thickness
 - Coating as appropriate to material
 - Availability for customer connection (see Appendix F)
 - Above/Below Ground
 - If non-pressure, then list the Grade of the pipe.
 - If pipe not listed in SA Water Authorised Products guide:
 - Manufacturer
 - Product name
- Existing and Decommissioned:
 - Material Abbreviation code
 - Nominal Diameter
 - Noting of hazardous materials such as asbestos if known
 - If decommissioned, then note if removed, grouted, or filled.
 - If removed, then it is something that can be ignored for future construction works in the area.
 - If abandoned without fill, then SA Water can potentially repurpose the asset (e.g., to be used by cable utilities)

6.2 Fittings

- New:
 - Description of use
 - Manufacturer
 - Product Code
 - Size in mm (nominal or internal diameter) as appropriate
 - Pressure rating (PN)
 - Joint and restraint type
- Existing and Decommissioned:
 - Type of fitting

6.3 Cables

- New:
 - Description of use
 - Material
 - Cable sizing in mm²
 - Conduit nominal diameter
 - Voltage type
- Existing and Decommissioned:
 - Type of cable
 - Noting of hazardous materials such as asbestos if known

6.4 Unspecified Linear Assets

- New:
 - Description of use
 - Manufacturer
 - Product Code
 - Product Specifications
- Existing/Decommissioned
 - Description of use

6.5 Cathodic Protection

MSCL pipes with cathodic protection require the following attributes and a test point running plans compliant with TS0440:

- Test point running plan
- Insulating flanges
- Anode cable
- Cathode cable
- TRU
- Anode
- Test points
- Bonds

Appendix A : Use of Coordinates

Applicable when:

- Assumed property boundaries cannot be determined on site
- Assumed property boundaries are a significant distance away from relevant assets

Requirements Change:

- Coordinates can be used in place of boundary ties and chainages/dimensions for deflections.
- Reference specifying the datum and projection added to drawing

Coordinates shall be in GDA 2020 MGA zone easting and northing coordinates (use of local grid coordinates will not be approved).

Note regarding GDA 2020: SA Water has migrated its base data sets to GDA 2020. For projects commenced prior to mid-2020 using GDA 1994, the current advice is to continue using GDA 1994 through to completion. For new projects the expectation is that GDA 2020 is used.

When displaying coordinates either:

- Use a linked text box with the XY values from the relevant item (Figure 14) or
- Use a table of XY values and an asset code that identifies the relevant item (Figure 15)
 - This table is preferably on the same drawing as the map display but specific drawing sheets for this are a suitable option.

Figure 14: Callout boxes for XY values on significant points/vertices

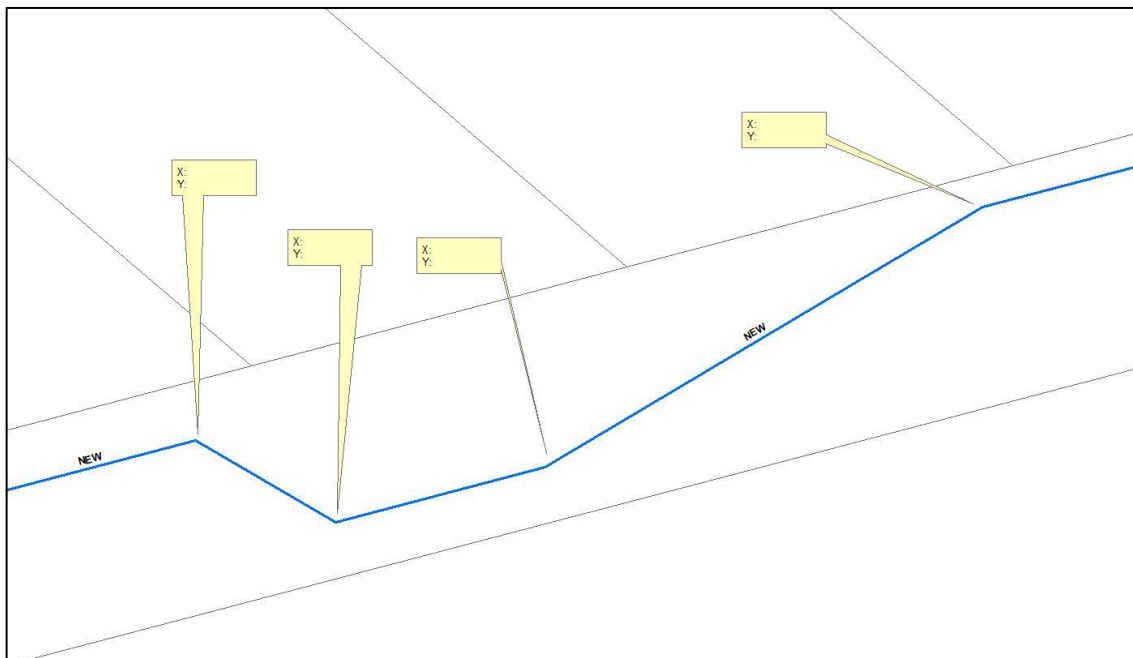
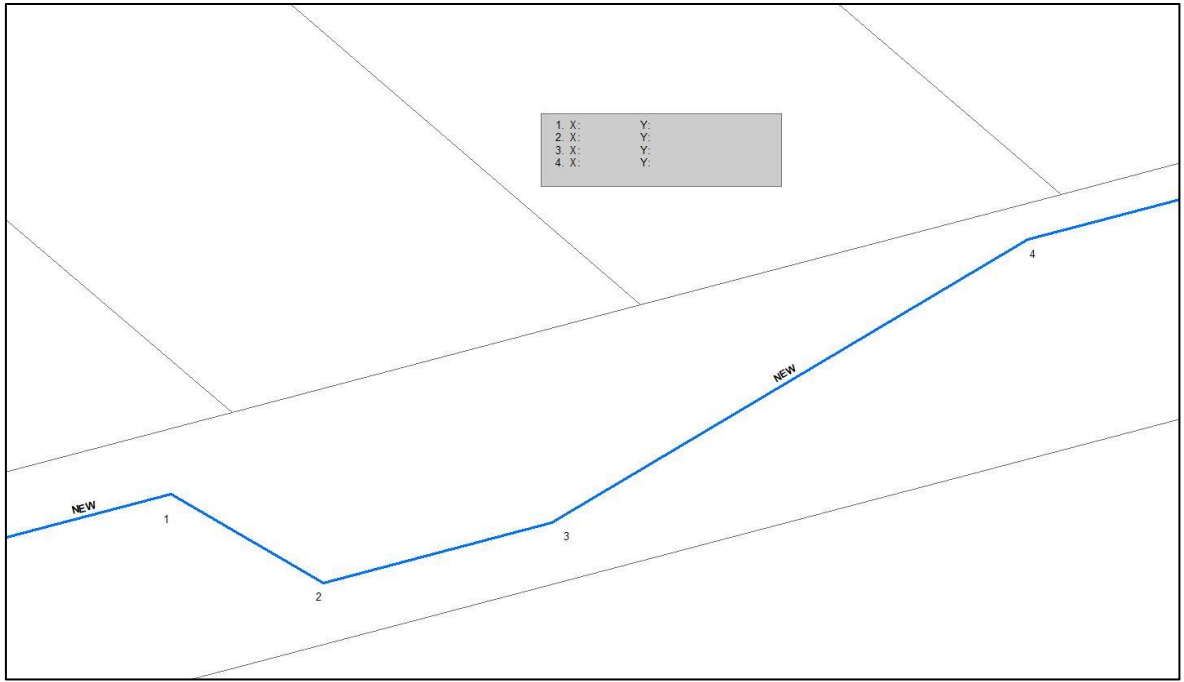


Figure 15: Referenced XY values on significant points/vertices



Appendix B : When to use Meridian and TS0100

The expectation is that all SA Water capital projects will handover as-constructed linear asset drawings through Meridian in the discipline Networks-Reticulations, with the exceptions defined in B1-B4.

The rationale for this is as follows:

- Meridian allows SA Water to satisfy its obligations in relation to the State Records Act.
- Use of Meridian has greatly improved the as constructed drawing review process, making it much easier to find drawings relating to a project and determine if asset data signoff can be given during project closeout.
- Use of Meridian is a key part of initiatives aimed at further tightening the asset data handover process so that there is less scope for human error (resulting in SA Water having incorrect asset registers) and greater visibility of the progress of data handover for large projects (not having to trawl emails spanning several years).

SA Water's intent is for all linear asset as constructed data to be delivered through Meridian.

This is a long-term goal, and SA Water are intending incremental progress to that final state. In the interim there are several areas where we expect and accept other forms of handover.

B1 : Alternate option for Short Relays

Applicable when:

- Length of linear asset replaced is less than 10m.

Requirements Change:

- Boundary ties are not required. Instead provide a chainage/dimension from an existing fitting along the same stretch of linear asset.
- **Note:** SA Water recommend use of the Aquamap A3 Gazettal print to avoid costs associated with CAD drawing production.

Delivery Method:

- Deliver to As-Con Review Request List for review and sign off

B2 : Alternate option for Customer Connections

Applicable when:

- Works exclusively involves standard size customer connection pipes (up to 63mm DN for water/recycled water and DN 200 for wastewater)

Requirements Change:

- Boundary ties only required for customer end of connection.
- For bends only chainage/dimension and degree of deflection
- For end connection to main provide a chainage/dimension from an existing fitting along the same stretch of main pipe.
- **Note:** SA Water recommend use of the Aquamap Connection print templates. These are designed for Land Development but are suitable for capital projects where simplicity is required.

Delivery Method:

- If works process involves CAMS and will result in the sketch being attached to a case, then that process will deliver the sketch to the right team.
- Else, deliver to As-Con Review Request List for review and sign off

B3 : Alternate option for Fire Services

Applicable when:

- Works exclusively involve standard size Fire Service connections (DN100)
- No doglegs installed (series of vertical bend fittings)

Requirements Change:

- Boundary ties only required for customer end of service.
- For bends only chainage/dimension and degree of deflection
- For end connection to main provide a chainage/dimension from an existing fitting along the same stretch of main pipe.
- **Note:** SA Water recommend use of the Aquamap Connection print templates. These are designed for Land Development but are suitable for capital projects where simplicity is required.

Delivery Method:

- If works process involves CAMS and will result in the sketch being attached to a case, this process will deliver the sketch appropriately.
- Else, deliver to [GIS As-Con Review Request List](#) for review (for internal SA Water use only) and sign off.

B4 : Alternate option for Wastewater Pipe Relining

Wastewater Assets have compiled a map sheet for each relining section as part of their relining programme. This is intended to inform Constructors of the location of works required and contains sections for relevant construction information to be recorded.

Construction information required:

- Output ID.
- Nominal pipe diameter.
- Host pipe material.
- Renewal length.
- Street name/Suburb.
- Lining material.
- Lining date.
- Manhole IDs identifying start and end of lined pipe sections
- Associated manhole diameters and invert depths.

This replaces the excel spreadsheet handover option which was briefly trialled to reduce CAD drafting costs.

Applicable when:

- Works are specifically part of the Wastewater Relining Programme.
 - In this case the Wastewater Assets team will have provided you the required maps detailing the pipe sections to be relined.

Requirements Change:

- No measurements required other than total length of relining unless a new access structure (Maintenance Hole, Maintenance Shaft, Inspection Opening) has been installed where there was previously not one.
 - In this case a chainage from another fitting is suitable

B5 : Alternate option for Land Development

Applicable when:

- Works are being carried out by a Land Developer via a DAFI
- Are not capital works.

Requirements Change:

- None.

Delivery Method:

- If works process involves CAMS and will result in the sketch being attached to a case, this process will deliver the sketch appropriately.
- Else, deliver to [GIS As-Con Review Request List](#) for review (for internal SA Water use only). Note this step is important to ensure that the project has asset information sign off given for PC checklist.

Appendix C : When to use Automated Assessment

TS0134 is currently required for:

- Major Land Development (since Jan 2018)
- Capital Works delivering more than 1000 metres of linear asset.

Note: This requirement for SA Water capital projects comes into place July 2021.

Automated assessment provides a means to prepare asset data in a manner that allows SA Water to ensure it meets asset information requirements by running the data through a program. The advantages of this are:

- Clear requirements
 - Using the tools provided, will be asked for asset information required. Less referring to other documents or reliance on the subject matter expert to know the requirements.
- Consistency of response.
- Rapid response
 - SA Water's current version has a self-service validation portal that constructors are free to use to check their work. It generally takes under 5 minutes to process and return a mark-up.

For SA Water it means drawings can be reviewed to see if there is suitable information for field crews if they need to use it to locate up a buried asset. This is simpler and quicker than reviewing for asset data requirements.

Requirements change:

- Display of measurements not required for deflections and horizontal curves.
- Boundary ties to bends not required.
- If the asset is above ground
 - Chainages are the only measurements need to be displayed for field staff.
 - Long sections are still expected if required.

Note: This is an area that is still maturing interstate and internationally. Suggestions are welcome and can be directed to the Responsible Discipline Lead for this document.

Appendix D : Network Drawings and Facility Drawings for GIS Acceptance

On an SA Water site, network discipline drawings are required for linear assets that are not within the area covered by a building's footprint.

SA Water require as-constructed record of the linear assets within facility buildings but within a building a network discipline drawing is not required.

One of the core reasons for needing these details within buildings is so that when data is extracted from our GIS and loaded into various hydraulic models or outage management tools that process doesn't have to manually add these assets for the models to function properly.

Appendix E : Material Codes

Code	Description
ABS	Acrylonitrile Butadiene Styrene
AC	Asbestos Cement
ACOS	Asbestos Cement Oversized – thicker walled
CI	Cast Iron
CICL	Cast Iron Concrete Lined
CICS	Cast Iron Concrete Lined in Situ
CIRJ	Cast Iron Rubber Jointed
CU	Copper
DCTJ	Ductile Iron Concrete Lined with Tyton Lok
DICL	Ductile Iron Concrete Lined
DIFB	Ductile Iron Fusion Bonded coating
GRP	Glass Reinforced Plastic
MS	Mild Steel
MSCL	Mild Steel Concrete Lined
MSCLA	Asbestos Coated Mild Steel Concrete Lined
MSCS	Mild Steel Concrete Lined in Situ
MSCSA	Asbestos Coated Mild Steel Concrete Lined in Situ
PE100	Polyethylene Grade 100
PE80	Polyethylene Grade 80
PCVM	Poly Vinyl Chloride Modified
PCVO	Poly Vinyl Chloride Oriented
PVCU	Poly Vinyl Chloride Unplasticised
RC	Reinforced Concrete
SS	Stainless Steel
UNKN	Unknown
VC	Vitreous Clay

Appendix F : Availability for Customer Connection

The availability of a given pipe for customer connection has a range of implications for SA Water:

- How much a new customer is charged to connect to the pipe
- Whether SA Water can levy rating on abuttal charges
- Whether a customer connection is permitted at all

This process has a long history, dating back to the 1870's, when newly available mains would be published in the government gazette. This continued until 2019.

Some guidelines:

- For relays they will inherit the availability of the mains they replace.
- For pipes of DN 375 or above, unless indicated otherwise they are assumed to be Not Available
- For pipes on SA Water sites, unless indicated otherwise they are assumed to be Not Available.

For new water pressure mains, recycled water pressure mains and wastewater gravity mains there needs to be an indication of the pipe's availability for connection. If in doubt, contact the network modelling team who should have made a capacity and demand assessment

Availability options are provided below:

Application Only
Application East Side Only
Application by Agreement Only
Application North Side Only
Application South Side Only
Application West Side Only
Available
Available East Side Only
Available North Side Only
Available South Side Only
Available West Side Only
Not Available Constant Rate Supply - Application Only
Not Available Constant Rate Supply - East Only
Not Available Constant Rateable Supply - East Side without Augmentation
Not Available Constant Rate Supply - North Only
Not Available Constant Rateable Supply - North Side without Augmentation

Not Available Constant Rate Supply - South Only
Not Available Constant Rateable Supply - South Side without Augmentation
Not Available Constant Rate Supply - West Only
Not Available Constant Rateable Supply - West Side without Augmentation
Available at Manhole Only
Not Available
Not Available Constant Rateable Supply