Unitywater

ADAC XML

Data Capture Guidelines

Version 3.2

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Reference	URL
IPWEA-QNT	https://www.ipwea-qnt.com/products-resources/adac/adacinformation
Asset Information Specification	https://www.seqcode.com.au/seq-asset-information-specification
Infrastructure Products and Materials	http://www.seqcode.com.au/products/
Unitywater Reference Library	https://www.unitywater.com/building-and-developing/reference-library

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Glossary of Terms

Status	Description
Active Assets	Assets other than pipelines, which contain electrical or mechanical equipment such as pumping stations, treatment plants, reservoirs and the like.
ADAC	Asset Design As Constructed is used to facilitate the collection and lodgement of detailed information on civil infrastructure and associated assets.
ADAC Data Dictionary	A comprehensive list of all data elements, attributes, and definitions within the Asset Design As Constructed (ADAC) specification.
ADAC User Guidelines	Unitywater specific guidelines based on the Asset Information Specification v4.0 to provide practical direction on asset attribute capture requirements.
AHD	Australian Height Datum is a standardized vertical datum used in Australia for measuring heights, with its reference point being mean sea level. Essentially, it is a national benchmark that defines zero elevation as approximately the mean sea level.
AIS	Asset Information Specification v4.0 is the formal document that specifies the requirements for the capture, delivery, and quality of asset data.
As Constructed	As Constructed refers to the asset and geometric details of constructed works as shown in engineering and survey drawings.
DSMH	Downstream Maintenance Hole is a chamber or access point located further along the flow path of a pipe network, away from the point of origin.
DWG	DWG is the file format for computer aided drafting software
GDA2020	Geocentric Datum of Australia 2020 is Australia's official national datum, replacing the older GDA94. It is a static reference frame that is aligned with the Australian continent and designed to be more accurate and consistent with global positioning systems like GPS.
GDA94	Geocentric Datum of Australia 1994 is a coordinate reference system used in Australia that is based on the Earth's center of mass. It replaced older datums like AGD66 and AGD84 and is compatible with satellite-based navigation systems like GPS.
GIS	Geographical Information System designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.
IO	Inspection Opening of a sewer house connection branch
IO Distance	Distance from a point perpendicular to the inspection opening to the centre of the downstream maintenance hole along the axis of the sewer main.

Status	Description
IPWEA-QNT	Institute of Public Works Engineering Australasia – Queensland & Northern Territory
MGA2020	Map Grid of Australia 2020 is a metric, rectangular coordinate system used for mapping in Australia. It is a 2D Cartesian system based on the Universal Transverse Mercator (UTM) projection and the Geocentric Datum of Australia 2020 (GDA2020). Essentially, it is the official grid system for representing locations on a flat map while accounting for the Earth's curvature.
MGA94	Map Grid of Australia 1994 is a projected coordinate system used in Australia. It utilizes the Universal Transverse Mercator (UTM) projection and is based on the Geocentric Datum of Australia 1994 (GDA94). Essentially, it provides a grid-based system for mapping and spatial data, using eastings and northings (in meters) instead of latitude and longitude.
PDF	Portable Document Format
Redline markup drawings	Marked up copy of the approved design drawings highlighting changes to asset features or geographical location.
Schema	A formal, machine-readable definition that specifies the structure, content, and data types of an XML file.
SEQ Code	South East Queensland Water Supply and Sewerage Design and Construction Code
SO Nearest	Perpendicular distance from the service (inspection) opening to the nearest cadastral boundary, measured in meters.
SO Other	Perpendicular distance from the service (inspection) opening to the next nearest cadastral boundary.
SUI	Subsurface Utility Information is the details about underground infrastructure and utilities such as pipes, cables, and conduits, typically used for planning and construction.
UW	Unitywater
XML	Extensible Markup Language is a file format designed for storing, transmitting, and reconstructing data by electronic means.
XSD	XML Schema Definition is a formal description of the structure, content, and data types of an XML document, used to validate that an XML file conforms to ADAC version 6.0.

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1. Purpose

The purpose of these ADAC XML Data Capture Guidelines is to provide practical assistance and comprehensive instructions for the creation and submission of compliant Asset Design As Constructed (ADAC) XML files. These guidelines are crucial for ensuring that all civil infrastructure asset data, encompassing both design and as-constructed phases, adheres to Industry standard and Unitywater specific requirements.

For design data, the guidelines enable early digital submission of asset specifications, allowing for proactive identification and resolution of potential design discrepancies.

For as constructed data, the guidelines ensure that the final digital record accurately reflects built infrastructure.

ADAC XML files are required to accompany RPEQ signed As Constructed civil survey drawings (DWG & PDF) and redline markup drawings (PDF only) for new or upgraded civil infrastructure and associated assets.

2. Introduction to ADAC XML

ADAC is a digital data standard used for delivering as-constructed asset data to local Councils and service providers such as Unitywater in a machine-readable format known as XML.

In South-East Queensland, the provision of compliant ADAC XML files is a regulatory requirement mandated by the SEQ Water Supply and Sewerage Design and Construction Code.

By using a consistent digital format such as XML, ADAC allows for the efficient and dependable transfer of asset data directly into geographical information and asset management systems which reduces the need for manual data entry and minimises the potential for errors.

As Constructed XML files generated from survey data or engineering drawings must conform to the rules of the current ADAC Schema v6.0 as defined by the ADAC Consortium of subscribers which is principally made up of local Councils and water utilities that maintain and enhance the ADAC data specification.

Compliant ADAC XML files will contain a structured and precise digital record of survey accurate cadastral and boundary references, geometries and relative levels as well as detailed asset records and accompanying attributes such as pipe material, class, length and depth.

When the ADAC and As Constructed package are submitted, Unitywater will undertake a data format and conformance check to confirm the completeness and validity of the details.

Please note that if significant anomalies, errors or missing information are identified during these comparison checks, the As Constructed drawings and/or the ADAC XML file may be returned to the provider for correction and resubmission which can potentially delay the progress of asset handover and related approvals.

3. Datum Information

To align with our existing spatial infrastructure and enterprise systems, the following datums are mandated:

For Horizontal Coordinates (Location):

- Geocentric Datum of Australia 2020 (GDA2020): This is the current and most accurate national datum for Australia. All asset locations (X, Y coordinates) must be referenced to GDA2020. This supersedes the previous GDA94.
- Map Grid of Australia 2020 (MGA2020): This is the Universal Transverse Mercator (UTM) projection of GDA2020, providing plane (2D) coordinates. Your survey software should be configured to output

coordinates in MGA2020 zones relevant to our operating area (e.g., MGA Zone 56 for parts of Queensland).

For Vertical Heights (Levels/Elevation):

- Australian Height Datum (AHD): This is the national vertical datum for mainland Australia, defining mean sea level as zero elevation. All asset heights (Z coordinates) or levels must be referenced to AHD.

4. Creation of ADAC XML Files

The following sections are provided to assist with the capture of ADAC data when using proprietary ADAC XML generators either during the As Constructed survey pickup or when transferring asset information as part of the creation of design or As Constructed drawings.

The physical nature of assets will determine where assets are captured separately within the ADAC XML file such as a pipeline changing diameter, material, or class.

The South East Queensland Design and Construction Code is the primary source of information provided in the tables below and is legislated under the Water Distribution Act (2009).

All ADAC schema mandatory requirements outlined in the attribute tables below are in accordance with the current ADAC v6.0.0 schema based on the SEQ WS&S D&C Code – Asset Information Specification Version 3.03.

4.1 Project Attribution

Relates to project level information and is to be completed for all submitted ADAC XML files:

Attribute	Mandatory (Y/N)	Notes
ExportDateTime	**Y**	Auto-populated from the xml generating software
Name	**Y**	Project name (and stage number for subdivisions)
Owner	**Y**	UW (initials only)
Receiver	**Y**	Unitywater (one word)
WorksApprovalID	**Y**	UW issued application number or Capital Works project number
DrawingNumber	**Y**	UW issued drawing number (U-YYYY-XXXX)
DrawingRevision	**N**	
ConstructionDate	**Y**	YYYY-MM-DD
HorizontalCoordinateSystem	**Y**	MGA56
HorizontalDatum	**Y**	GDA2020
VerticalDatum	**Y**	**AHD**
IsApproximate	**Y**	False
OriginMark	**N**	

Attribute	Mandatory (Y/N)	Notes
Notes	**N**	
DrawingExtents-SouthWest	**Y**	Should never extend beyond: X: 430,700m Y: 6,944,100m
DrawingExtents-NorthEast	**Y**	Should never extend beyond: X: 534,700m Y: 7,131,700m
Description	**Y**	Water / Sewer capture
ProjectStatus	**Y**	Design / As Constructed
Software.Product	**Y**	Auto-populated from the xml generating software
Software.Version	**Y**	Auto-populated from the xml generating software
Surveyor.Name	**Y**	Registered Surveyor name and registration number
Surveyor.DateFinalSurvey	**Y**	YYYY-MM-DD
Surveyor.DateApproved	**Y**	YYYY-MM-DD
Engineer.Name	**Y**	RPEQ name and registration number
Engineer.DateApproved	**Y**	YYYY-MM-DD

4.2 Global Attribution

Relates to attributes that are common on all feature types in the ADAC Schema:

Element Name	Mandatory (Y/N)
ADACId	**Y**
Infrastructure Code	**N**
Owner+	**Y**
DrawingNumber	**N**
DrawingRevision	**N**
ConstructionDate	**N**
Department	**N**
Surveyor	**N**
Engineer	**N**
Status*	**Y**
DataQuality	**Y**

Element Name	Mandatory (Y/N)
Notesx	**N**
SupportingFiles	**N**

* At the individual asset level, the Status field is both critical and mandatory with only the following applicable values to be used:

Status	Description
Newly Constructed	Newly constructed asset handed to Unitywater
Existing	Existing asset that is recorded as it is currently situated
Designed	Future asset that is recorded as 'designed'
Planned	Future asset that is known but prior to 'design approval'
Removed	Previously existing asset described as it was prior to removal
Retired	Previously existing asset no longer in operation but left in-situ. Also means 'Abandoned'
Rehabilitated	Existing asset that has been refurbished for ongoing use

+ At the individual asset level, the Owner field is both critical and mandatory with only the following applicable values to be used. Please note the difference between the allowable values of Owner at the asset level versus the Owner at the project level:

Asset Level Owner Value	Description
UW	Unitywater
P	Private
SEQ	Seqwater
Noosa	Noosa Shire Council
SCC	Sunshine Coast Council (Formerly SCRC)
CMB	City of Moreton Bay (Formerly MBRC)
UKN	Unknown

x At the individual asset level, the 'Notes' field should be used to record any additional information regarding the asset, or to record attribute information which is not available within defined values/enumerations in the ADAC xml schema. Refer to the relevant tables for applicable details required for individual asset types.

The ADACId is also considered mandatory by Unitywater as it is used to identify assets/features that are considered non-compliant when the xml file is processed. There is no defined naming convention required in creating the ADAC XML other than all features within the file should be uniquely identified by the naming convention chosen.

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4.3 Survey Conventions

4.3.1 Survey Tolerance and Confidence Levels

The Australian Standard AS 5488 “Classification of Subsurface Utility Information (SUI)” describes a classification system for the quality of the location and attribute data of buried infrastructure. It specifies four quality levels with level A being the highest quality and level D the lowest. This Specification also prescribes a higher quality level than level A, which is designated level A+. For convenience, this Specification applies the principles of AS 5488 to both surface features and buried features.

The quality-level required for information submitted in accordance with this Specification varies according to the stage of a project and the status and type of the infrastructure. The accuracy required increases as the project progress through planning, design, and construction. The accuracy required for proposed water and sewerage infrastructure, is also higher than it is for infrastructure of other types.

These requirements are shown in the table below:

Project Stage	Existing Buried Infrastructure	Existing and Proposed Surface Features and Boundaries	Proposed Designed / As Constructed Water & Sewerage Infrastructure
Preliminary Approval/ Pre-lodgement	D	C	N/A
Design Approval / Development Approval	C	B	Use the actual design values.
As Constructed (Except as described in the next row)	C for those parts where no additional information was gathered during construction. B for those parts where additional information was gathered.	A	A X, Y & Z coordinates of water mains and sewer pressure mains and XY coordinates of gravity sewerage pipes and maintenance structures.
As Constructed gravity sewerage	As above	A	A+ Z ordinates of the invert of gravity sewer pipes and the invert and cover level of gravity sewerage maintenance structures

DataQuality as shown in the Global Attribution table is related to the modified AS5488 information sources and tolerances as shown in the table below:

AS5488 Quality Level	Information Sources / Survey Requirements	XY Tolerance	Z Tolerance
D	Existing Records, cursory site inspection, anecdotal evidence	N/A	N/A
C	As for D plus site survey of visible evidence that may use relative or absolute positioning.	±300mm	N/A

AS5488 Quality Level	Information Sources / Survey Requirements	XY Tolerance	Z Tolerance
B	As for C but must include a survey of both the surface and buried features. Buried features of existing infrastructure may be captured by no-dig survey techniques.	±300mm	±500mm
A	Positive identification of attributes and the absolute location of subsurface and surface features in three dimensions.	±50mm	±50mm
A+	Positive identification of attributes and the absolute location of subsurface features in three dimensions.	±50mm	±10mm

Information detailed in the Asset Information Specification (AIS) 3.03 Section 2.1 states that for quality level A, AS 5488 specifically states that where a whole line segment cannot be checked by line of sight before backfilling, quality level A, and by extension level A+, shall not be attributed to the line segment between validating points. For example, it is not a valid assumption to assume a gravity sewer pipe is laid in a perfectly straight line between its recorded invert positions as surveyed in the maintenance structures at either end. Nevertheless, for the purposes of the AIS, the whole line segment shall be deemed to satisfy level A (and A+) where the maximum distance between survey points on a gravity sewer is less than 25 metres or some other means of verification, such as photographs, CCTV or site records, can be used to verify intermediate points. For pressure pipelines, the whole line segment shall be deemed to satisfy level A where the surveyor has picked up every change of direction and gradient and either the maximum distance between survey points is fifty metres or some other means of verification has been used and recorded.

The tolerances in the AS5488 Quality Level table above should not be used to round the survey data. The data given in an ADAC XML should be that shown on the drawings where an XML is submitted at some stage prior to the as constructed stage, or the actual values surveyed when the XML is submitted as an as constructed record.

4.4 Capture Conventions

General advice is provided in the Asset Information Specification version 4.0 section 10 regarding mandatory survey capture conventions including but not limited to pipe breaking and snapping, direction of flow. location points for maintenance structures and fittings, envelopers and conduits, drop pipes into sewerage maintenance structures, pipe bedding types, water services, etc.

Note that the correct enumeration for asset attributes is shown in the ADAC_V600_ Data _Dictionary v2.

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4.5 Cadastral Information

4.5.1 Cadastral Connection

This represents an observed and reduced cadastral connection feature. This feature does not relate to lot boundaries, water boundaries or easements which are detailed in the tables below:

4.5.2 Chainage Line

Not required to be captured in ADAC format.

4.5.3 Lot Parcel

Asset Capture: Area feature (can be multi-part) representing the boundary of a titled or proposed Cadastral Lot.

Spatial Relationship: May share boundaries with RoadReserves or WaterCourses. Vertices must be coincident with any shared boundaries.

Element Name	Mandatory (Y/N)
LotNo	Y
PlanNo	Y
CancelledLotPlan	N
TitledArea_m2	Y

4.5.4 Road Reserve

Asset Capture: Multi-patched area feature (can be multi-part) representing a road reserve boundary.

Spatial Relationship: May share boundaries with WaterCourseReserve, LotParcels or other RoadReserve areas. Vertices must be coincident with any shared boundaries.

Element Name	Mandatory (Y/N)
Name	Y

4.5.5 Survey Mark

Asset Capture: Simple point feature representing a Permanent Survey Mark.

Spatial Relationship: May be used in a Cadastral Connection (to lot parcels).

Element Name	Mandatory (Y/N)
MarkName	Y

4.5.6 Water Course Reserve

Asset Capture: Area feature representing a boundary of a Water Course reserve.

Spatial Relationship: May share boundaries with RoadReserves and LotParcels. Vertices must be coincident with any shared boundaries.

Element Name	Mandatory (Y/N)
Name	**Y**

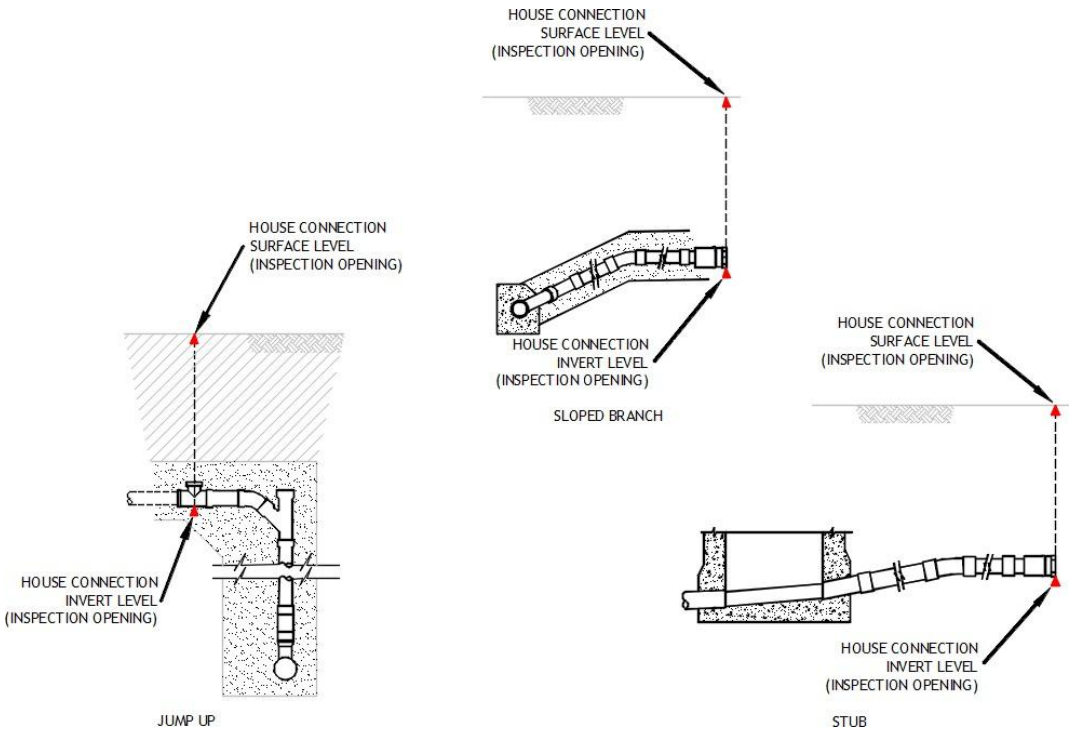
4.6 Sewerage Assets

4.6.1 Connection

Asset Capture: Complex linear feature (polyline not including curves read: straight line segments) representing the invert of the pipe asset. Enforced line direction from inspection opening to the non-pressure pipe/maintenance hole due to gravitational flow. Please refer to Figure 1 below for examples of a “jump up”, “sloped branch” and “stub” connection.

Spatial Relationship: Gravity downstream end point of the linear feature must be coincident to anywhere on a non-pressure pipe linear feature or the point feature of a maintenance hole if the asset is a ‘stub’ connection.

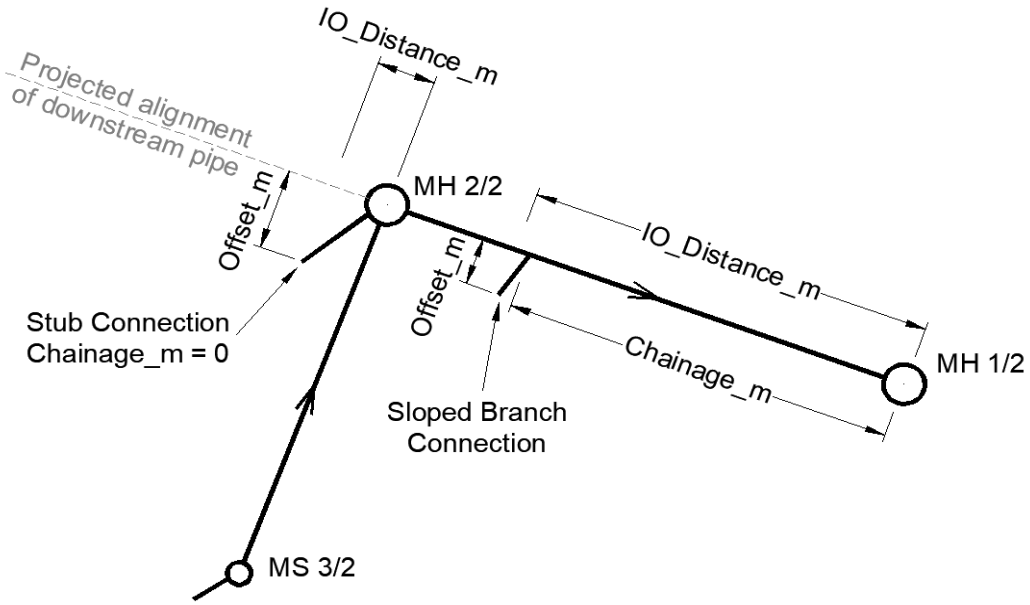
Fig. 1 – **House Connection Examples**



Element Name	Mandatory (Y//N)
SurfaceLevel_m	Y
InvertLevel_m	Y
Use	Y
Diameter_mm	Y
Material *	Y
Class *	Y
Length_m	Y
Type	Y
Chainage_m	Y
Offset_m	Y
LineNumber	N
DSMHID	N
IO_Distance_m	Y
SO_Nearest_m	Y
SO_Other_m	Y
Sediment_Trap	Y

* Generic Enumerations e.g. “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

Figure 2 - Dimensional attribution details for House Connections



4.6.2 Fitting

Asset Capture: Single point feature representing the centre point of the fitting.

Spatial Relationship: Must be coincident to the end of pipe assets or a pipe asset anywhere along its length.

Please note: Long radius bends are to be represented as a fitting in ADAC.

Element Name	Mandatory (Y//N)
Type	Y
Material *	Y
Lining *	Y
Protection *	Y
BodySize_mm	Y
BranchSize_mm	Y (If Type = Taper, Tee or Wye)
Rotation	N

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.6.3 Maintenance Hole

Asset Capture: Single point feature located at the centre of chamber on the top/lid surface. Note: Capturing centre of lid is appropriate only when the lid is centred over the chamber.

Spatial Relationship: Not applicable.

Please Note: Manufacturer and Model Number of prefabricated maintenance holes are to be included in the Notes element.

Element Name	Mandatory (Y//N)
Type	Y
Use	Y
ChamberSize.Rectangular.Width_mm	Y (if rectangular)
ChamberSize.Rectangular.Length_mm	Y (if rectangular)
ChamberSize.Rectangular.Width_mm	Y (if circular)
ChamberSize.Circular.Diameter_mm	Y (if custom)

Element Name	Mandatory (Y//N)
ChamberSize.Custom.Area_m2	Y
ShaftSizeDiameter_mm	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial *	Y
WallConstruction	Y
WallMaterial *	Y
RoofMaterial *	Y
Lining *	Y
LidType	Y
LidAccessRestraint	Y
LidMaterial *	Y
DropType	Y
Benching	N
CatchmentPS	N
LineNumber	Y
MH_Number	N
Chainage_m	N
TieDistance_m	N
OffsetDistance_m	Y
Rotation	Y

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.6.4 Maintenance Shaft (Including Inspection Openings at End-of-Lines)

Asset Capture: Single point feature located at the centre of shaft on the top/lid surface.

Spatial Relationship: Not applicable.

Note: Manufacturer and Model Number of prefabricated maintenance shafts are to be included in the Notes element.

Element Name	Mandatory (Y//N)
Type	Y
Diameter_mm	Y
RiserDiameter_mm	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
Base Material *	Y
RiserMaterial *	Y
LidType	Y
LidAccessRestraint	Y
LidMaterial *	Y
Manufacturer	Y
ModelNumber	Y
CatchmentPS	N
LineNumber	N
MH_Number	Y
Chainage_m	N
TieDistance_m	N
OffsetDistance_m	N
Rotation	Y

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.6.5 Non-Pressure Pipe

Asset Capture: Complex linear feature (read: polylines with no curves only straight-line segments) representing the invert of the pipe asset. Enforced line direction from Gravity Upstream (read: higher AHD level) to Gravity Downstream (read: lower AHD level) due to gravitation flow in each individual pipe.

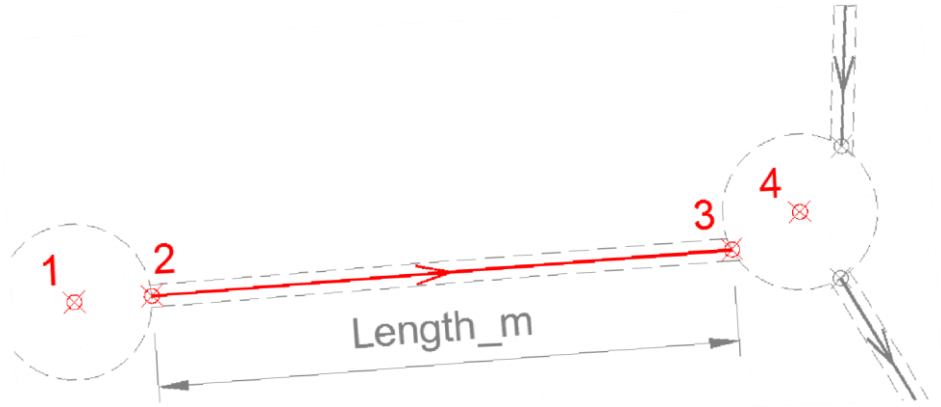
The gravity upstream and downstream ends of an individual pipe are captured at the intersection between the pipe material and the wall of the chamber. Please refer to Figure 3 below for a detailed diagram. Points 2 and 3 represent the intersection of pipe material and chamber wall whereas points 1 and 4 represent the Maintenance Holes capture. Pipes to be captured based on their physical and spatial properties and attributes. For example, if a pipe changes size, material, or class. Sewer pipes are NOT to be broken at connections.

Spatial Relationship: Not applicable.

Element Name	Mandatory (Y/N)
LineNumber	Y
Use	Y
Diameter_mm	Y
Material *	Y
Class *	Y
Lining *	Y
Protection *	Y
JointType *	Y
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y
Alignment_m	N
Depth_m	Y
Embedment *	Y
RockExcavated	Y
PipeGrade	N
Length_m	N

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

Figure 3 – Intersection of pipe material and chamber wall



4.6.6 Pressure Pipe

Asset Capture: Complex linear feature (read: polylines with no curves only straight line segments) representing the invert of the pipe asset. Enforced line direction from Pump active asset to Discharge Maintenance Hole due to pumped flow. Pipes to be captured based on their physical and spatial properties and attributes. For example, if a pipe changes size, material, or class then it must be broken and captured separately.

Spatial Relationship: Must be coincident to Pressure pipe point features in the pumped sewerage network.

Element Name	Mandatory (Y/N)
Type	**Y**
Use	**Y**
Diameter_mm	**Y**
InternalDiameter_mm	**N**
US_InvertLevel_m	**N**
DS_InvertLevel_m	**N**
US_SurfaceLevel_m	**N**
DS_SurfaceLevel_m	**N**
Material *	**Y**
Class *	**Y**
Lining *	**Y**

Element Name	Mandatory (Y/N)
Protection *	**Y**
JointType *	**Y**
Alignment_m	**N**
Depth_m	**Y**
Embedment *	**Y**
RockExcavated	**Y**
Length_m	**N**

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.6.7 Septic Tank

Not required to be captured in ADAC format.

4.6.8 Valve

Asset Capture: Single point feature representing the centre of a valve body, typically, the spindle.

Data Capture: The relationship between Use and Type is as per the below table.

Spatial Relationship: Must be coincident anywhere along its length or at the end of Pressure Pipe assets.

ADAC.Use	ADAC.Type
Non-Return	Generic Rubber Gate Swing Check
Service **Stop** **Scour** **Diversion** **Zone Boundary** **Flow Control**	Gate Butterfly Knife Gate Eccentric Plug Globe Ball Generic Penstock
Pressure Control	Overflow

ADAC.Use	ADAC.Type
	Pressure Release Vacuum Release
Gas Release	Air Valve
Other	Special

Element Name	Mandatory (Y/N)
Use	**Y**
Type	**Y**
Diameter_mm	**Y**
Lining *	**Y**
Protection *	**Y**
Manufacturer	**N**
ModelNumber	**N**
GearboxActuator	**Y**
ConnectionType	**Y**
Rotation	**N**

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.6.9 Break Points for Linear Sewerage Assets – Sewerage Pipes

The following details identify where “breaks” are to be made and pipe lengths to be recorded as individual records during ADAC XML file creation.

Sewer Pipe lengths are to be broken or terminated under the following circumstances:

- Changes in Pipe Size.
- Changes in Pipe Material.
- Changes in Pipe Class.

And at the following fittings, devices, and structures:

- Sewer Maintenance Holes and Shafts (all features)
- Fittings (all features except Bends on Pressure Pipes)
- Valves (all features)

4.7 Supplementary

4.7.1 PointFeature / PolylineFeature / PolygonFeature

Asset Capture: Simple Point, Complex Polyline or Multi-patch Area feature (depending on the feature type) representing objects or assets that add clarity or context to the strict ADAC features.

Element Name	Mandatory (Y/N)
Class	Y
Note	N
Attribute()TextValue	N
Attribute()IntegerValue	N
Attribute()DecimalValue	N
Attribute()DateValue	N
Attribute()TimeValue	N
Attribute()DateTimeValue	N

4.8 Surface

4.8.1 Breakline

Not required to be captured in ADAC format.

4.8.2 Contour

Not required to be captured in ADAC format.

4.8.3 Spot Height

Not required to be captured in ADAC format.

4.8.4 Profile Line

Not required to be captured in ADAC format.

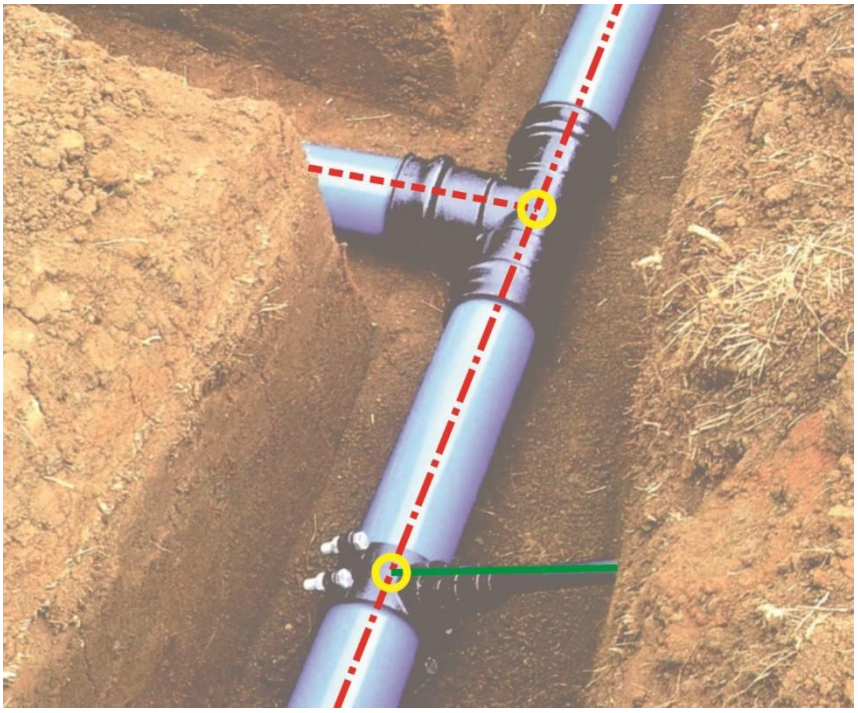
4.9 Water Supply Assets

4.9.1 Fitting

Asset Capture: Single point feature representing the centre point of the fitting. Please refer to the yellow circles in Figure 4 below for representations of a ‘Tee’ and ‘Tapping Band’.

Spatial Relationship: Must be coincident to a pipe asset in the water reticulation network.

Figure 4 – Tee and tapping band representation



Note: IPAM approved Manufacturer name is to be recorded in the Notes field for all service connection tapping bands.

Element Name	Mandatory (Y/N)
Type	Y
Material *	Y
Lining *	Y
Protection *	Y
BodySize_mm	Y
BranchSize_mm	Y (If Type = Cross Connection, Ready Tap, Taper, Tapping Band, Tee or Wye)
Rotation	N
WaterQuality	Y

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.9.2 Hydrant

Asset Capture: Single point feature representing the centre of the vertical hydrant branch.

Spatial Relationship: Must be coincident to a pipe asset.

Note: Hydrant Diameter refers to the riser pipe diameter in millimetres not the connecting reticulation pipe size.

Element Name	Mandatory (Y/N)
Use	Y
Diameter_mm	Y
Rotation	N
WaterQuality	Y

4.9.3 Maintenance Hole

Asset Capture: Single point feature located on the centre of the chamber/structure.

Spatial Relationship: No connectivity is enforced due to the size and shape of the object.

Element Name	Mandatory (Y/N)
Use	Y
ChamberSize.Rectangular.Length_mm	Y (if rectangular)
ChamberSize.Rectangular.Width_mm	Y (if rectangular)
ChamberSize.Circular.Diameter_mm	Y (if circular)
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial *	Y
WallConstruction	Y
WallMaterial *	Y
RoofMaterial *	Y
LidMaterial *	Y
Rotation	N

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is

only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.9.4 Meter

Asset Capture: Single point feature located at the centre point of the meter itself.

Please note: The definition for the OffsetSide element is "the offset from the left or the right-side boundary when looking from the road."

Note: In-line Flow Meters are also to be captured in the schema here as Type = "Magflow" or "Ultrasonic."

Spatial Relationship: Domestic Meters must be coincident to a water service pipe or water pipe with a Use of "Fire Service," "Service" or "Fire Service Through Meter." Flow Meters must be coincident to a water pipe only.

Element Name	Mandatory (Y/N)
SerialNumber	Y
Type	Y
Diameter_mm	Y
Dials	N
Manufacturer	N
ModelNumber	Y
InitialReading	N
PrivateBooster	Y
OffsetSide	Y
Offset_m	Y
InstallationDate	Y
LotNo	Y
PlanNo	Y
Rotation	N
WaterQuality	Y

4.9.5 Pipe

Asset Capture: Simple Linear feature (i.e., straight lines) representing the top of a circular pipe asset. Pipe segments are to be captured based on the pipe attributes. If any physical element of a pipe changes (e.g., size, material, class etc.) then the pipe asset must be broken and captured separately. Please refer to the red and green polylines in Figure 4 above. The red lines represent reticulation pipes whereas the green line represents a service pipe. Pipes are not to be broken at WaterServices.

Note: Service pipes connecting domestic meters to the water network are to be captured as WaterService, not Pipe.

Spatial Relationship: Pipes must be coincident to water valves and fittings that participate in a flow network.

Element Name	Mandatory (Y/N)
Use	Y
WaterQuality	Y
Alignment_m	N
Diameter_mm	Y
Material *	Y
Class *	Y
Lining *	Y
Protection *	Y
JointType *	Y
Depth_m	N
Embedment *	Y
Length_m	N

* Generic Enumerations e.g., “M_1”,” M_2” etc and “Unknown” are not acceptable. “Other” is only acceptable if the enumeration is not available in the allowable values with the actual enumeration populated in the Notes element.

4.9.6 Service Fitting

Not required to be captured in ADAC format.

4.9.7 Storage Tank

Not required to be captured in ADAC format.

4.9.8 Valve

Asset Capture: Single point feature representing the centre of a valve body, typically, the spindle.

Data Capture: The relationship between Use and Type is as per the below table.

Spatial Relationship: Must be coincident anywhere along its length or at the end of Pressure Pipe assets.

ADAC.Use	ADAC.Type
Non-Return	Generic NR Rubber Gate Swing Check Wafer RPZ
Service **Stop** **Scour** **Diversion** **Zone Boundary** **Flow Control**	Gate Butterfly Knife Gate Eccentric Plug Globe Ball Valve Vee Ported Ball Control
Pressure Control	Overflow Pressure Relief Pressure Sustaining Altitude Valve Vacuum Release
Gas Release	Air Valve
Other	Special

Spatial Relationship: Must be coincident to a Water Pipe asset.

Element Name	Mandatory (Y/N)
Use	**Y**
Type	**Y**
Diameter_mm	**Y**

Element Name	Mandatory (Y/N)
Manufacturer	N
ModelNumber	N
GearboxActuator	Y
ConnectionType	Y
Rotation	N
WaterQuality	Y

4.9.9 Water Service

Asset Capture: Simple Linear feature (i.e., straight lines) representing the top of a circular pipe asset as per the solid green line in Figure 4 above. Only Service pipes connecting domestic meters to the water network are to be captured here. Larger sized Service pipes or those in a Fire/Domestic Water meter arrangement are to be captured in Water pipe with a Use of "Service."

Spatial Relationship: Water Services must be coincident to a water pipe, valve or fitting that participate in a flow network.

Element Name	Mandatory (Y/N)
Diameter_mm	Y
Material	Y
Class	Y
Protection	Y
Termination	Y
WaterQuality	Y
Length_m	N

4.9.10 Break Points for Linear Water Assets – Water Pipes

Water Pipe lengths are to be broken or terminated where there are:

- Changes in Pipe Size.
- Changes in Pipe Material.
- Changes in Pipe Class.
- At all Valves and Hydrants.
- At the following fittings:
    - Dead Plates, Dead Ends (all Types).
    - Connectors, Cross Connections, Connector Thrusts.
    - Dismantling Joints, Gibaults, Tapers.
    - Wyes, Tees; and
    - Booster Pumps