GUIDELINES FOR CREATION AND SUBMISSION OF ADAC XML FILES

ADAC XML Files to Accompany the

“As-Constructed” Bundle of Information

Version 2.3 (25th February 2024)

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1. PURPOSE

The purpose of this document is to provide practical guidelines and general assistance with respect to the creation and provision of compliant ADAC XML files. ADAC XML files are routinely required to accompany the bundle of “As-Constructed” drawings, schedules and associated information reflecting new civil infrastructure and associated assets handed over to the Receiving Entity e.g. Water Supply & Sewerage Services provider.

New assets and infrastructure may be either donated as a part of development works or handed over to the Service Provider via a particular contractual arrangement. Compliant ADAC XML files are an accompaniment to the “As-Constructed” bundle of information required by the Receiving Entity and form a necessary part of the final approval and handover process.

On or during completion of physical works and prior to asset handover, “As-Constructed” (also known as “As-Built” or “As-Executed”) information is collected. The “As-Constructed” data indicates the surveyed locations of infrastructure and associated assets installed as a part of the physical/operational works and ultimately to be taken over by the Receiving Entity.

In addition, the “As-Constructed” data accurately reflects material types, specifications and other asset-specific information. The ADAC XML file is a complete and detailed digital record of the “As-Constructed” Plan information and is used by the Receiving Entity to both confirm compliance with the design intent and to populate various information systems including GIS and Asset Systems.

Note: It is important that specific details regarding the preparation and presentation of any required “As-Constructed” drawings and plans accompanying the ADAC XML file be sourced from the Receiving Entity.

2. INTRODUCTION TO ADAC XML

The ADAC XML format (schema) is a non-propriety data specification and transport tool written in XML language. The schema is owned and managed by the ADAC consortium of subscribers principally made up of local authorities and water utilities. The schema and associated output files are used to facilitate the collection and translation of data related to new and existing infrastructure.

Compliant ADAC XML files contain a structured and precise digital record of the assets as they are described in the associated "As-Constructed" plans and other related engineering documentation. Details include survey-accurate cadastral and boundary references, geometries and relative levels as well as detailed records of the new assets including accompanying attribute information.

ADAC XML files are also be used as a cross-check on accuracy and completeness of the "As-Constructed" information provided. The digital files afford a further confirmation of compliance with development approval conditions as well as helping to verify engineering specifications and other design-related requirements.

Depending on the tools[1] (XML generator) being used to generate the ADAC XML, data is collected during survey capture and then finalised in conjunction with the creation of the "As-Constructed" drawings (e.g. DWGs). Alternatively the XML files may be generated after the electronic "As-Constructed" drawings have been completed. It is essential that the "As-Constructed" drawings are created using complete and survey-accurate information to correctly identify the assets and precise locations with all details identically represented in the ADAC XML file.

On acceptance of the "As-Constructed" bundle of information, the Receiving Entity will undertake data format and conformance checks on the ADAC XML file to confirm the completeness and validity of the details. This will typically include comparison with the associated drawings. Should significant anomalies, errors or missing information be identified during these checks, the ADAC XML file(s) may be returned to the provider for correction and resubmission in accordance with applicable conditions potentially delaying the progress of asset hand-over.

Once accepted by the Service Provider, ADAC XML data file(s) are uploaded to various internal information systems and used to assist in the long-term management of the new infrastructure. The detailed asset and location data may be made available in the future to external agencies via digital formats although release of this data is solely at the discretion of the Service Provider.

[1] Various software tools (purpose-built ADAC XML generators) are available to capture necessary details and asset attributes required to produce a compliant ADAC XML file. Advice on the choice and application of the products available can be sort from providers of most civil design suites and survey tools.

3. GENERAL REQUIREMENTS

The ADAC XML file is to be produced using the appropriate ADAC XML schema release (Urban Utilities currently accept Versions 4.2 and 5.0.1). The XML must be "validated" for compliance before being submitted to Urban Utilities. Details on the data schema (attributes and mandatory status) noting asset classes and sub-classes to be addressed by the ADAC capture process can be found in Appendix A.

The ADAC XML files are to be supplied to the Service Provider in the format and by the means specified by the Entity in their As-Constructed information handover procedures.

4. DATUM INFORMATION

Data contained in the ADAC XML file(s) must reflect the survey details of the assets exactly as found in the real world and as accurately reflected in the associated "As-Constructed" drawings. Unless otherwise specified, survey details must be derived from permanent survey marks (PSMs), where available, with Datum GDA2020 and Map Grid of Australia (MGA) co-ordinates in the relevant UTM Zone for the survey area. All AHD levels to be to Fourth Order as defined by ICSM[2] Standard for the Australian Survey Control Network (SP1), Version 2.2, December 2020.

5. CREATION OF ADAC XML FILE(S)

In producing compliant ADAC XML files, information on the following asset classes will need to be captured according to the approved ADAC data schema. Vendors of ADAC XML generators are routinely provided with updates to the ADAC schema free of charge and take steps to have these updates incorporated into their products for release to customers in a timely manner.

[2] Intergovernmental Committee on Surveying & Mapping – http://www.icsm.gov.au

While the ADAC XML files are created from the survey-accurate "As-Constructed" information, attention must be given to how the Receiving Entity wishes to have particular elements captured and recorded for each individual asset class.

The following details are provided to assist with the capture of ADAC data when using proprietary ADAC XML generators either during the "As-Con" survey pickup or when capturing the ADAC asset information into an XML file as a part of the creation of the "As-Constructed" plans and associated drawings in civil design (software) suites.

The physical nature of assets will determine where and how individual assets are captured within the ADAC XML file. For example, individual water pipes are captured with separate individual sections broken at particular fittings (e.g. system valves) or must be broken to reflect any physical changes such as diameter or material type.

Note: It is not within the scope of this document to provide detailed advice on how to operate the various specialist products (propriety ADAC XML generators) used in the creation and provision of the compliant ADAC XML files. Assistance and advice on the use of any particular tool should be sourced from the provider of the product who are necessarily familiar with general ADAC requirements, processes and the most current data model (ADAC XML schema version). This document should be read in conjunction with SEQ Water Supply and Sewerage Design & Construction Code Asset Information Specification V 3.02 https://www.seqcode.com.au/s/2023-04-20-AIS-version-302.pdf

6. ASSET CAPTURE DETAILS

The guidelines have been designed from the perspective of being broad enough to suit all stakeholders and ADAC XML Tools yet specific enough to be of practical use. In preparing the guidelines it has been accepted that the lowest common capture of an asset is the physical nature of the asset.

The following section details the complete list of asset types relevant to the Receiving Entity that are contained within the current ADAC schema. Software vendors may also find these details helpful in configuring their ADAC XML data capture tools while Users and Receiving Agencies will be able to consider the specifics of asset data capture by Service Class and Asset Type.

Specific points noted in the reference tables below include:

- Allowable geometries;
- Particular spatial relationships with other asset types; and
- Details of the necessary "break points" of Linear Assets (e.g. pressure pipes)

Cadastre and Easements

Cadastral Connection

Capture:	Simple linear feature capturing the cadastral connections as deduced from observations and the survey reference mark(s).
Spatial Relationship:	Must be coincident to the vertices that define the Cadastre Lot boundary features and relevant PSMs.

Easement

Capture:	Multi-patched area feature representing a new or existing Easement.
Spatial Relationship:	May share boundaries with WaterCourseReserve, LotParcels or RoadReserve. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

LotParcels

Capture:	Multi-patched area feature representing the boundary of a titled or proposed Cadastral Lot.
Spatial Relationship:	May share boundaries with RoadReserves, WaterCourses or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

RoadReserve

Capture: Multi-patched area feature representing a gazetted or soon to be gazetted Road reserve boundary.

Spatial Relationship: May share boundaries with WaterCourseReserve, LotParcels, other RoadReserve or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

SurveyMark

Capture: Simple point feature representing a Permanent Survey Mark (PSM).

Spatial Relationship: May be used in a Cadastral Connection (as in lot parcels, noted above).

WaterCourseReserve

Capture: Multi-patched area feature representing the boundary of a dedicated Water Course reserve.

Spatial Relationship: May share boundaries with RoadReserves, LotParcels or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

Sewerage Assets

Property Connections

Asset Capture: Complex linear feature (read: polylines including curves but not Bezier Curves) 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 3 below.

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.

Further to ADAC: ADAC.Type = Sloped Branch → Type A → Standard Drawing SEQ-SEW-1106-2 and SEQ-SEW-1106-3 (superseded QUU Standard 486/5/25/SD001/3)

ADAC.Type = Ramp Riser → Type B → Standard Drawing SEQ-SEW-1106-4 (Superseded QUU Standard 486/5/25/SD001/4)

ADAC.Type = Jump Up → Type C → Standard Drawing SEQ-SEW-1106-5 (superseded QUU Standard 486/5/25/SD001/5)

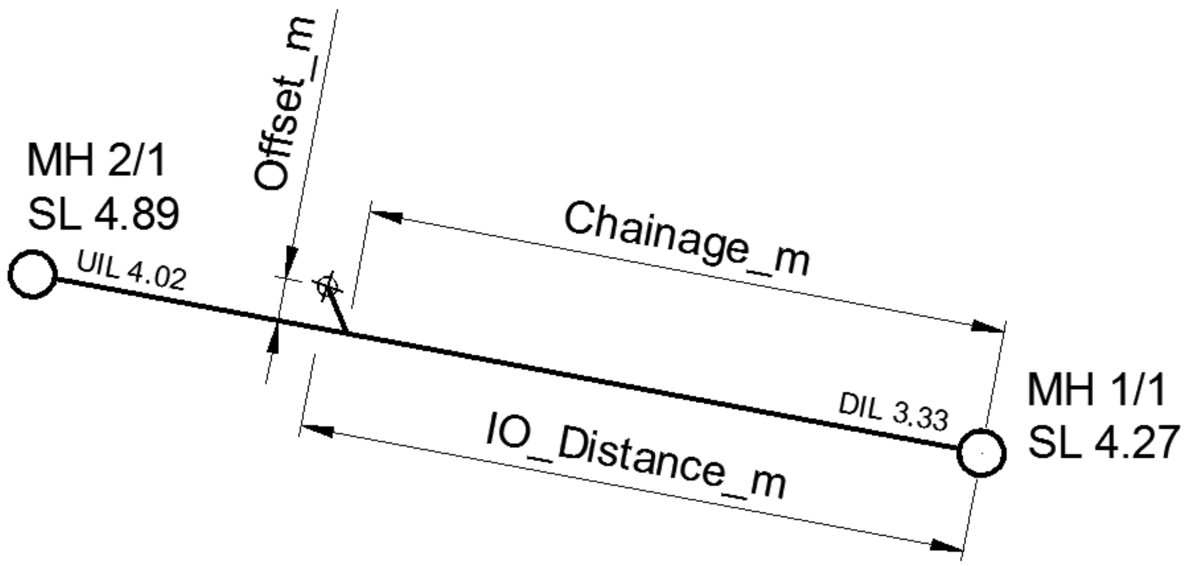

Figure 3

Fittings

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.

Maintenance Holes (Including Inspection Openings at End-of-Line)

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

Spatial Relationship: Must be coincident to the end of pipe assets.

Non Pressure Pipes

Asset Capture: Complex linear feature (read: polylines including curves but not Bezier Curves) 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 4 (on next page) 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.

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

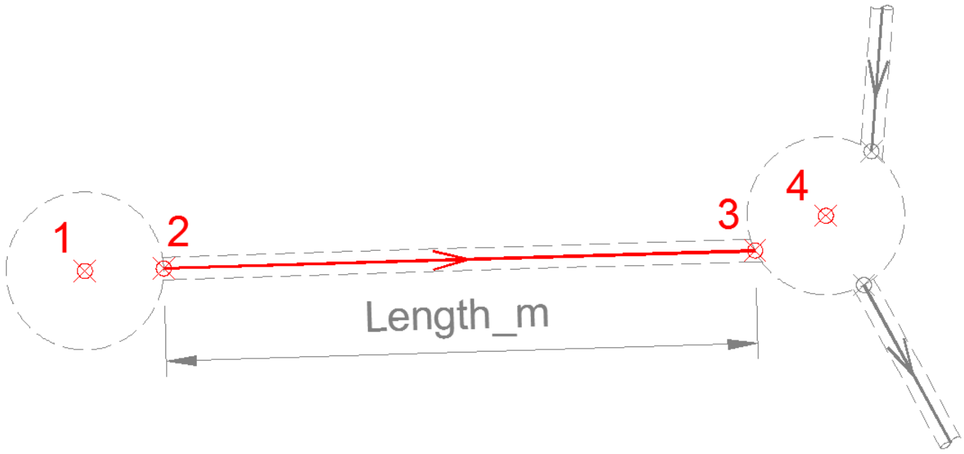

Figure 4

Pressure Pipes

Asset Capture: Complex linear feature (read: polylines including curves but not Bezier curves) 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, class, embedment or direction etc. then it must be broken and captured separately.

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

Valves

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

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

- System valves e.g. sluice, butterfly and gate at end of pipe only.
- Some Control valves e.g. air and scour can be coincident or at end of pipe.

Supplementary

PointFeature / PolylineFeature / PolygonFeature

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

Spatial Relationship: Not applicable.

Surface

Contour

Asset Capture: Linear feature capturing a single contour feature.

Spatial Relationship: Not applicable.

SpotHeights

Asset Capture: Simple point feature representing a single elevation point.

Spatial Relationship: Not applicable.

Water Supply Assets

Fittings / Service Fittings / Irrigation Fittings

Asset Capture:	Single point feature representing the centre point of the fitting. Please refer to the yellow circles in figure 11 (below) for representations of a "Tee" and "Tapping Band".
Spatial Relationship:	Must be coincident to a pipe asset or at the end of the pipe in the water reticulation network.

Hydrants

Asset Capture:	Single point feature representing the centre of the vertical hydrant branch.
Spatial Relationship:	Must be coincident to a pipe asset.

Maintenance Holes / Storage Tanks

Asset Capture:	Single point feature located on the centre of the chamber. If required to capture the polygon feature please utilise the Supplementary Polygon feature (refer to Supplementary Features page 13 above).
Spatial Relationship:	No connectivity is enforced due to the size and shape of the object.

Meters

Asset Capture:	Single point feature located at the centre point of the domestic 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."
Spatial Relationship:	Must be coincident to a water pipe with a Use of "Fire Service", "Service" or "Fire Service Thru Meter".

Pipes

Asset Capture: Simple Linear feature (i.e. straight lines) representing the Invert 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 11 below. The red lines represent reticulation pipes whereas the green line represents a service pipe. Note: the dash-dot pipe is broken at the tee but not at the tapping band for the service.

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

Valves

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

Spatial Relationship: Must be coincident to a Water Pipe asset or at the end of Water Pipe asset.

- System valves e.g. sluice, butterfly and gate at end of pipe only.
- Some Control valves e.g. air and scour can be coincident or at end of pipe.

Asset Relationship: When a valve is in-line with a Water Pipe asset with ADAC.Use = “Fire” or “Service”; the Valve ADAC.Use value must be “Service”.

Below is an image of a Tee and Tapping Band (yellow circles) connected to reticulation mains (redlines) and a service pipe (green line).

Figure 11

Break Points for Linear Assets

Water Pipes

When capturing water pipe networks the actual pipe lengths (individual pipe assets) must not be routinely broken at every fitting i.e. bend, elbow or air valve.

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

Water Pipe lengths are to be broken or terminated at the following valves and fittings:

- Valves (ADAC.Use)
  - Non-Return Valves
  - Stop Valves
  - Zone Boundary Valves
  - Flow Control Valves
  - Pressure Control Valves
- Fittings (ADAC.Type)
  - Dead Plates, External Dead Ends
  - Connectors, Cross Connections, Connector Thrusts
  - Dismantling Joints, Gibaults, Tapers
  - Wyes, Tees
  - Taper, Reducer
  - Tee Branch Dead Ends, Tee Branch External Dead Ends
  - Booster Pumps
- Water Maintenance Holes (all features)

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 at the following fittings, devices and structures:

- Sewer Maintenance Holes (all features)
- Fittings (all features)
- Valves (ADAC.Use)
  - Non-Return
  - Service
  - Stop
  - Overflow

APPENDIX A - ADAC DATA SCHEMA

The following hierarchy identifies the individual asset types including attributes available to be captured as well as the mandatory status of these attributes.

Global Object Model

All assets gain the following:

Element Name	Mandatory (Y/N)
ADACId	N
InfrastructureCode	N
Owner	Y
Status	Y
Notes	N
SupportingFile() *	N

* Brackets denote an "array", used to specify a variable(s) that can be indexed

Cadastre Object Model

Connection

Element Name	Mandatory (Y/N)
Bearing	Y
Distance_m	Y

EasementADACId

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

Lot

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

RoadReserve

Element Name	Mandatory (Y/N)
Name	Y

SurveyMark

Element Name	Mandatory (Y/N)
MarkName	Y

WaterCourseReserve

Element Name	Mandatory (Y/N)
Name	Y

Sewerage Object Model

Connection

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

Fitting

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
BodySize_mm	Y
BranchSize_mm	N
Rotation	N

MaintenanceHole

Element Name	Mandatory (Y/N)
Use	Y
Length_mm	Y (Rectangular only)
Width_mm	Y (Rectangular only)
Diameter_mm	Y (Circular only)
Area_sqm	Y (Custom only)
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial	Y
WallConstruction	Y
WallMaterial	Y
RoofMaterial	Y
Lining	N
LidMaterial	Y
DropType	Y
CatchmentPS	N
LineNumber	N
MH_Number	Y
Chainage_m	N
TieDistance_m	N
OffsetDistance_m	N
Rotation	Y

PipeNonPressure

Element Name	Mandatory (Y/N)
LineNumber	N
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
AverageDepth_m	Y
Embedment	Y
RockExcavated	N
PipeGrade	N
Length_m	N

PipePressure

Element Name	Mandatory (Y/N)
Use	Y
Diameter_mm	Y
Material	Y
Class	Y
Lining	Y
Protection	Y
JointType	Y
Alignment_m	N
AverageDepth_m	N
Embedment	N
RockExcavated	N
Length_m	N

Valve

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Diameter_mm	Y
Protection	N
Manufacturer	N
ModelNumber	N
Rotation	N

Water Supply Object Model

Fitting

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Lining	N
Protection	N
BodySize_mm	Y
BranchSize_mm	N
Rotation	N

Hydrant

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

IrrigationFitting

Element Name	Mandatory (Y/N)
Type	Y
BelowGround	Y
Rotation	N

MaintenanceHole

Element Name	Mandatory (Y/N)
Use	Y
Length_mm	Y (Rectangular only)
Width_mm	Y (Rectangular only)
Diameter_mm	Y (Circular only)
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial	Y
WallConstruction	Y
WallMaterial	Y
RoofMaterial	Y
LidMaterial	Y
Rotation	N

Meter

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

Pipe

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

ServiceFitting

Element Name	Mandatory (Y/N)
Type	Y
BelowGround	Y
WaterSaver	Y
AutoShutOff	Y
Rotation	N

StorageTank

Element Name	Mandatory (Y/N)
Material	Y
Source	Y
Manufacturer	N
ModelNumber	N
Volume_m3	Y
Rotation	N

Valve

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Diameter_mm	Y
Manufacturer	N
ModelNumber	N
Rotation	N

Supplementary Object Model

Note: These features only contain the Object_Id element from the Global elements.

SupplementaryPoint / SupplementaryPolyline / SupplementaryPolygon

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

Surface Object Model

Note: These features only contain the Object_Id element from the Global elements.

Contour / SpotHeight

Element Name	Mandatory (Y/N)
Status	Y
Elevation_m	Y