9.6 Appendix 6

As Constructed Information And GIS (ACDC)

The As Constructed Design Certification (ACDC) system verifies and validates all asset attributes, geometric and spatial data, describes a clearly defined set of business intelligence and requirement's to capture data for Westernport Water's needs, which improves the quality and latency of asset information to the organisation.

The developer must arrange for the design, construction and survey of the works in accordance with the Development Agreement and Westernport Water's policy requirements.

A qualified surveyor must be engaged for the purpose of confirming the As Built construction, with a validated and approved ACDC Submission that satisfies Westernport Water's business requirements have been met. A survey field report must accompany the submitted plans, confirming how the correct horizontal orientation and height datum was maintained throughout the survey. It is advised that asset locations must be recorded before backfill or otherwise agreed upon methodology.

Any faults need to be addressed by the developer before the submission will be accepted by Westernport Water. A tolerance report must be provided highlighting the differences between the design and As Constructed details. This will include differences in invert levels, cover levels, grades, lengths and offsets. Also, any change of material or diameter from the design should be noted.

The final ACDC Submission is required to be submitted by a licensed surveyor or engineer. Additionally, Westernport Water Project Managers and Engineers will manually check all submitted data for completeness and accuracy; only then will an ACDC Submission be accepted by Westernport Water.

Westernport Water reserves the right to carry out the survey of these works if the information provided by the owner's surveyor is deemed to be of an unacceptable standard. Should this occur, the owner will be notified in writing and incur the expense of the Westernport Water-conducted survey.

Please see ACDC Developers Guide Appendix 1 for further mandatory details and advice.

As Constructed Design Certification and Online Validation Portal

Developers Guide - Version 7 - 2018

Presented by: Michael Balfour - GIS coordinator

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As Constructed Design Certification Overview

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ACDC Portal Definitions

Authority

An organisation, such as a council or utility, which creates projects and assigns them to Developers. For example, Westernport Water, Bass Coast Shire Council, etc.

Developer

An organisation, such as a Developer, Consultant or Surveyor, which submits ACDC submissions to be validated. For example, Beveridge Williams, Brosnan Engineering, etc.

Business Rules

The name for the set of rules and standards used to validate a drawing. This information is configured in the ACDC configuration tables in the database by Westernport Water.

System Admin

The Westernport Water System Administrator who can create and manage organisations, offices and users as required. Only the System Administrator can create an organisation and configure business rules in database tables.

Project Manager

The Westernport Water representative in charge of the overall planning and execution of a project.

Introduction

Utilities need to capture accurate information about infrastructure assets gifted to them from the Developers that build these assets. Using Design and Business Intelligence ensures that asset information is correctly recorded and improves the organisation's ability to better manage valuable infrastructure assets.

Managing data that an Engineer designs, builds and captures, and submits to the organisation, is a fundamental first step to ensure that valuable engineering data is not lost or diminished in value as it transforms into the organisation's Geospatial and Asset Management Information Systems.

Improving the turnaround time, between the dates of the first submission by the Developer to the date their Development Deposit is released, is an essential productivity improvement.

ACDC describes a clearly-defined set of requirements that allows an Engineer to capture data to the organisation's needs. The data is intelligent because ACDC verifies and validates all attribute and geometric errors prior to being submitted to the Authority.

ACDC improves the quality and latency of asset information to the organisation. ACDC provides functionality that allows Developers, Consultants and Engineers to manage the accuracy and validation of As Constructed data from submission to the eventual populating of the organisation's database.

How ACDC Works

1. **Business Intelligence and Validation Rules are embedded in two (2) places:**

   a. ACDC Template Attribute Blocks;

   b. Organisation's Database tables.

2. **ACDC Template:**

   ACDC template has pre-defined layers and attribute blocks. The blocks are designed to capture attributes. The maintenance and configuration of the drawing is done by the GIS Coordinator in coordination with Engineering and Construction Project Managers.

3. **How to inspect the ACDC Template in AutoCAD:**

   Open the drawing and view the layers. Use the Insert command to view the available blocks. Inserting a block will prompt the user to input the attributes related to that block. The supporting *ACDC - WPW Data Dictionary.xlsx* is the guide to what data is valid for the attribute blocks.
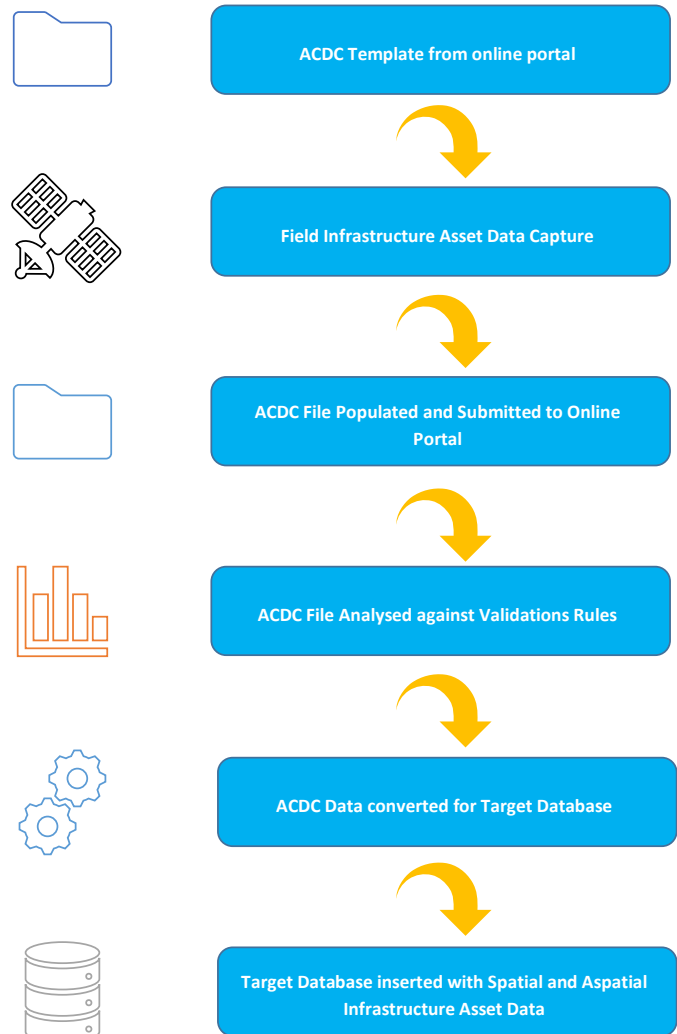
4. **Validating the ACDC Template:**

   a. Submit completed ACDC file to the Online Portal for validation.

   b. If the file fails validation analysis an error report is generated by the system and is required to identify and fix any errors in the file.

5. **Authority Database tables:**

   Overall there are six (6) tables used to configure the business rules for ACDC with a further seven (7) target Spatial tables for the data once it is validated and transformed. Some of the business rules are specific to making sure that what the user types for attributes are valid. Others are meant to enforce a standard template methodology, eg drawing certain assets on pre-defined layers, placing attributes blocks at specific locations, etc.

This diagram shows the high-level steps for ACDC

ACDC Template from online portal

Field Infrastructure Asset Data Capture

ACDC File Populated and Submitted to Online Portal

ACDC File Analysed against Validations Rules

ACDC Data converted for Target Database

Target Database inserted with Spatial and Aspatial Infrastructure Asset Data

ACDC drawing template

An ACDC template is available from the Online Portal to capture As Constructed data. A new template is to be used for every new project and all the stages throughout the life of the project. The ACDC template contains Business Intelligence of pre-defined attributed blocks and layers.

Each different block type (asset type) must be placed on its own layer in the ACDC template. That is, you cannot have a single layer in the ACDC template that contains multiple dissimilar block types; this will cause the ACDC template to fail validation. However, blocks associated with similar linear/polygon objects (to carry the attributes) may be located on the same layer as their related linear/polygon features. Please see Appendix 1 for further advice.

Notes:

– When a block is inserted into a drawing, you can specify attribute values on the command line OR in a dialog box.

– The ACDC template does not contain existing asset or parcel data.

ACDC validation process

The validation of the ACDC submission process exists in two (2) parts:

1. Online validation for attributes and geometries in the ACDC Portal.

2. Engineering data validation by WPW Project Managers and Engineers.

The validation process consists of two (2) processes, one for attributes and the second for geometry and topology. The attribute validation process compares data in the attribute blocks within the submitted ACDC file against the stored configuration and validation rules in the target database. Attribute Data that violates the defined rules will be flagged with yellow error markers and must be addressed by the submitting Developer before the submission will pass validation. The second process checks that geometries are topologically correct and linear objects representing pipes and services are drawn appropriately:

– Sewer Gravity Mains should be drawn beginning from the shallowest downstream depth.

– Sewer Services drawn from the parcel to the pipe.

– Potable and Reclaim Service Connections from the pipe to the parcel.

Geometries that violate the defined rules will be flagged with red error markers and must be addressed by the submitting Developer/Consultant before the submission will pass validation in the Online Portal.

An error report file (.TXT file) is also generated by the Online Portal during the validation of the ACDC submission. The report file contains a log of all the errors found during validation. For each error the report file will contain its coordinates, the created error block name, and the associated error message.

All errors need to be addressed before the submission will pass validation and be accepted by WPW for inspection and validation of the engineering data. WPW Project Managers and Engineers will check all data for completeness and accuracy.

Once all errors have been addressed and WPW stakeholders have validated and approved the submitted data, only then will the ACDC submission be accepted by WPW.

Geographic Data

The datum for all drawings is required to be collected in GDA 94 - Zone 55 and AHD format. The allowable tolerances are within an accuracy of '+ - 0.30m X, Y and + - 0.015m Z (AHD)'.

ACDC submissions are required to be submitted by a Licensed Surveyor or Engineer.

Ensure that:

1. The submitted file shows the model space in the World Coordinate System, rather than a User Coordinate System.

2. The origin of the drawing is maintained at (0,0) of the World Coordinate System.

3. Drawings must be flattened and submitted in 2D format and without 3D objects.

4. No externally referenced or additionally added layers should be in the file when submitting for validation.

ACDC Online Portal – Guide For Developers/Consultants

Target Audience

The intended audience of this section is the Developer/Consultant Project Administrator.

Instructions - Developer/Consultant

The developer users role

Developer organisations can **Submit** new drawings for projects that have been assigned to them. Please see Appendix 1 - Submission Recommendations for further guidance.

Downloading a Submission Template and Developers Guide

1. Click the **Documents** tab in the top right corner.

2. Select **Document(s)** for download by ticking box(es).

3. Click the **Action** menu for the submission > > **Download**. The submission will be downloaded.

Template Data – Submission will not pass validation without this information

1. **Common Block**

   a. Request Project information from WPW Project Manager to insert to Block,

   b. Or download Project information from **Documents** tab in the portal.

2. **Pipe Object Types** – see Appendix 1 - Table 1.

3. **Attribute Blocks** – use **WPW-ACDC Portal - Data Dictionary v6.xlsx** for Attribute information. See Appendix 1 – Table 2 for Block Insertion Locations

Validating a submission

1. The Developer/Consultant User will create a Log In password after receiving/completing the registration email.

2. Log in to the ACDC Portal as a User for an organisation with the Developer role assigned.

3. Click the **Validation** tab.

4. Click **Submit New**.

5. Fill in the required information and attach a submission for validation. The Authority and Project dropdown lists contain Organisation and projects to which the Developer has been assigned.

6. Click **Submit** - the drawing will be uploaded and appear in Validations.

7. Refresh the validations table (click in top right corner of table) for the status of the drawing to be updated.

8. Expand the submission (click on left hand side of table) to view the Result Summary or upload status of a drawing.

9. The Developer User will need to download the submission and check the error log file for the cause of the errors to amend them.

Downloading a validated submission

1. Click the **Validation** tab in the top right corner.

2. Click the **Action** menu for the submission > > **Download**. The submission will be downloaded.

3. Once the submission is downloaded, check the log file for errors and/or resolve the errors in the ACDC submission.

4. Error markers will appear in the ACDC submission highlighting the error location. Once the errors have been resolved, the submission can be re-submitted on the ACDC portal for re-validation.

Appendix 1

Submission Requirements

1. Template submissions

a. When a new project has begun, advise the Project Manager to create a project in the Online Portal to submit templates against.

b. Download Template and documentation from Online Portal.

c. Request Common Block details from the Engineering and Construction Team or GIS Coordinator.

d. A new template is to be used for each new development project and each stage throughout the life of the project.

2. Survey data

a. Asset locations **must** be recorded before backfilled or otherwise agreed upon methodology.

b. A survey field report must accompany the submitted plans, confirming how the correct horizontal orientation and height datum was maintained throughout the survey.

c. The datum for all drawings must be collected in GDA 94 - Zone 55 and AHD.

d. Accuracy of '+ - 0.30m on the X, Y' and '+ - 0. 015m on the Z (AHD)' is required.

e. Cover levels and invert levels must be accurate to 0.005 metres AHD.

f. ACDC survey data must be submitted by a Licensed Surveyor.

g. Ensure that the submitted drawing shows the model space in the World Coordinate System, rather than a User Coordinate System.

h. Ensure that the origin of the drawing is maintained at (0,0) of the World Coordinate System.

i. Submissions **must** be delivered in 2D format and **NOT 3D**.

j. There must be **no** externally referenced (XREF) layers in the submission.

k. Offsets showing distance from pipes to nearest title boundary must be shown and at changes of directions and accurate to 0.1 metre.

3. Drawing objects

a. Ensure that all blocks for linear assets are snapped to the advised insertion point.

b. Drawing direction for Potable and Reclaim Service Connections is Pipe to Parcel.

c. Drawing direction for Sewer Service Connections is Parcel to Pipe.

d. Flow and drawing direction for the Sewer Gravity Pipes follows the gravity flow - draw the pipe from highest to lowest point.

e. The attribute block for Service Connections are to be snapped at the parcel end of the connection.

f. Convert Light Weight Polyline to Arc for smoother lines.

g. Do not use Splines.

h. See Table 1 for Line object types.

4. Data dictionary

a. When adding data into Attribute Blocks please take care to read and follow **ACDC - WPW Data Dictionary.xlsx.**

b. LCODE is the attribute acronym value for a data field in a Block.

c. LVALUE is the written definition of the LCODE value.

d. Attributes not in the data dictionary are to be advised to the GIS Coordinator for updating of the dictionary.

5. Engineering data

a. A tolerance report must be provided highlighting the differences between the design and As Constructed details. This will include differences in invert levels, cover levels, grades, lengths and offsets. Also, any change of material or diameter from design should be noted.

b. Add surveyed property outlines to the drawing, please.

c. NODE SIZE is the nominal size of a fitting.

d. NODE DIAMETER is the diameter of the main a node is connected to.

Attribute Block Geometrical Insertion Locations and Line Drawing

Table 1

Asset	Object Type	Drawing Direction
Water Main	Lightweight polyline	Node to Node
Reclaim Main	Lightweight polyline	Node to Node
Gravity Pipe	Lightweight polyline	Highest to Lowest point
Rising Main	Lightweight polyline	Node to Node
Sewer Service Connection	Lightweight polyline	Parcel to Pipe
Potable/Reclaim Service Connection	Lightweight polyline	Pipe to Parcel

Table 2

Asset	Object Type	Attribute Block Insertion Location
Sewer Manhole	Block	End of pipe
Sewer End Cap	Block	Start of pipe
Sewer Valve	Block	Start/End of pipe
Sewer Junction	Block	Start/End of pipe
Sewer Scour Valve	Block	Start/End of pipe
Sewer Air Pressure Valve	Block	Start/End of pipe
Sewer Pump Station	Block	End of pipe
Sewer Reducer	Block	Start/End of pipe
Sewer Termination Maintenance Shaft	Block	End of pipe
Sewer Inspection Maintenance Shaft	Block	Start/End of pipe
Sewer Service Connection	Block	Start of connection
Potable/Reclaim Hydrant	Block	Start/End of pipe
Potable/Reclaim End Cap	Block	Start/End of pipe
Potable/Reclaim Scour Valve	Block	Start/End of pipe
Potable/Reclaim Valve	Block	Start/End of pipe
Potable/Reclaim Air Release Valve	Block	Start/End of pipe
Potable Pressure Reducing Valve	Block	Start/End of pipe
Potable Pressure Sustaining Valve	Block	Start/End of pipe
Potable/Reclaim Storage	Block	Start/End of pipe
Potable/Reclaim Pump	Block	Start/End of pipe
Potable Bore	Block	Start/End of pipe
Potable/Reclaim Junction	Block	Start/End of pipe
Potable/Reclaim Reducer	Block	Start/End of pipe
Potable/Reclaim Washout	Block	Start/End of pipe
Potable/Reclaim Service Connection	Block	Start of pipe