



Consultant/Developer Specifications for the Delivery of Digital Data to Asset Managers and Owners

Version 5 FINAL

4th September 2023

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Table of Contents

TABLE OF CONTENTS	2
DATA TABLES	3
TABLE OF FIGURES	3
EXECUTIVE SUMMARY	4
INTRODUCTION	4
A-SPEC PROGRAM	4
A-SPEC MEMBERS	5
A-SPEC STANDARD	7
USE OF THE SPECIFICATIONS	8
VERSION CONTROL AND CHANGES IN DOCUMENTS	9
ROLL OUT OF NEW VERSIONS	9
IN SUMMARY	10
SUBMISSION OF "AS CONSTRUCTED INFORMATION" AS GIS READY DATA	11
CONSULTANT REGISTER	11
A-SPEC MEMBER CONTACT	11
INDUSTRY CONSULTANTS RESPONSIBILITIES	12
VICTORIA	12
WESTERN AUSTRALIA	13
NEW SOUTH WALES	14
TASMANIA	15
A-SPEC CONSORTIUM MEMBER'S RESPONSIBILITIES	16
ACCEPTANCE	16
ERRORS AND OMISSIONS	17
INTELLECTUAL PROPERTY	17
DISCLAIMER	17
DELIVERABLES	17
CERTIFICATION FORM - README / METADATA FILE	18
1 GRAPHICAL & TECHNICAL SPECIFICATIONS	19
1.1 DATUMS	19
VICTORIA	22
WESTERN AUSTRALIA	22
NEW SOUTH WALES	22
TASMANIA	22
1.2 FORMAT	23
1.3 THEME/LAYER STRUCTURE	24
1.4 GRAPHICAL DATA CONSTRUCTION PRINCIPLES	35
1.5 GRAPHICAL REPRESENTATION PRINCIPLES	36
1.6 ACCEPTANCE TESTING	37
1.7 MATCH TO AS 5488-2022	46
1.8 MATCHING TO EXISTING INFRASTRUCTURE	52
2 ATTRIBUTE FILE SPECIFICATIONS	55
2.1 ATTRIBUTE DATA FIELD REQUIREMENTS	55
2.2 ATTRIBUTE DATA VALIDATION REQUIREMENTS	56
2.3 ATTRIBUTE DATA TYPES	57
2.4 ATTRIBUTE TABLE COLUMN EXPLANATIONS	57
2.5 COORDINATE FIELDS	58
2.6 PHOTOGRAPHY REQUIREMENTS	58
3 CODE LISTS	59
4 A-SPEC DOCUMENT CONTROL	60

5	DOCUMENT REVISION HISTORY	60
6	SUMMARY OF SPECIFICATION CHANGES	61
	ATTACHMENT 1: QUALITY REPORT	62

Data Tables

TABLE 1 - SUITE OF SPECIFICATIONS LINKED TO THIS RELEASE	9
TABLE 2 - EPSG CODES OF AUSTRALIA HTTPS://EPSG.ORG	20
TABLE 3 - PRECISION CODES	39
TABLE 4 - B-SPEC – BUILDING ASSETS PRECISION REQUIREMENTS	39
TABLE 5 - D-SPEC – STORMWATER ASSETS PRECISION REQUIREMENTS	40
TABLE 6 - O-SPEC – OPEN SPACE ASSETS PRECISION REQUIREMENTS	41
TABLE 7 - R-SPEC – ASSETS IN ROAD RESERVE PRECISION REQUIREMENTS	42
TABLE 8 - S-SPEC – WASTEWATER ASSETS PRECISION REQUIREMENTS	43
TABLE 9 - W-SPEC – WATER ASSETS PRECISION REQUIREMENTS	44
TABLE 10 - TABLE A1 (MODIFIED) OF AS5488 UTILITY ASSET IDENTIFIERS AND MATCH TO A-SPEC	47
TABLE 11 - TABLE A2 OF AS5488 LOCATION SUPPLEMENTARY INFORMATION TO BE PROVIDED BY LOCATOR	48
TABLE 12 - AS5488 UTILITY ASSET TYPE AND MATCH TO A-SPEC ASSET CLASS	49
TABLE 13 - EXAMPLE PROBLEM LOG	54

Table of Figures

FIGURE 1 - TWO FRAME APPROACH IN AUSTRALIA FROM 2020	19
FIGURE 2 - MAP GRID OF AUSTRALIA	20
FIGURE 3 - APPROXIMATE SHIFT FROM GDA94 TO GDA2020 LOCATIONS ACROSS AUSTRALIA	21
FIGURE 4 - AREA OF WORK EXTENT	35
FIGURE 5 - EXAMPLE OF SIGN REQUIRING MULTIPLE PHOTOGRAPHS	59

EXECUTIVE SUMMARY

Introduction

A-SPEC Program

A-SPEC is the acronym for the program involved in developing specifications for the delivery of newly constructed assets as Digital Data in a GIS ready format to Asset Owners and Managers in Local Governments, Utilities and Water Authorities around the world.

The **A-SPEC** management model enables Local Governments, Utilities and Water Authorities around the world to participate in the development and use of the standard specifications developed under this program.

The key objectives of the **A-SPEC** initiative is to streamline stake holders' (local government/utilities/water authorities) processes for receiving, handling and storing of data related to newly constructed infrastructure assets either from subdivision developments or internal programs (e.g. capital works) in their GIS and AMIS **and, to have an aligned structure and processes for assets that are already existing.**

This process will increase the efficiency of information access and result in greater customer satisfaction when dealing with inquiries from engineering consultants, surveyors, developers and prospective residents.









- **Eliminate duplication of effort.** Significant duplication of effort exists in the digitising of as constructed information. This duplication exists between the private sector (who capture as constructed information), and council, utility and water authority staff (who may digitise that information from paper plans);
- **Improve process efficiency**, in the process of accepting and processing lodgements, and in checking existing data against design criteria and/or design plans;
- **Improve customer service** to both internal and external customers of asset information;
- **Improve the quality** of drainage information held in council, utility and water authority systems for audit and financial requirements, as well as operational and business requirements;
- **Provide a structure** for the consistent recording of all council, utility and water authority owned assets, including those created through internal programs such as; capital works and renewals.
- And ultimately **manage assets better** to reduce the need for capital works and/or to reduce ongoing maintenance costs.

A-SPEC data is characterised by having an infrastructure role by:

- functioning as reference data - which means that other kinds of information can and will be linked to the core data.
- being of interest for many different kinds of applications (and being a common denominator and integrator between different data suppliers and product and service providers).
- containing information of specific interest for the public sector in its role to support asset management, efficient transportation, traffic safety, to handle environmental and social planning, etc
- having a structure that is stable over time (even if parts of the data content changes due to user input).
- having specific interest for cross border (across State or national/International boundaries) applications.

A-SPEC Members

Victoria	WA	NSW
                                   	                      	   

Victoria	WA	NSW
       		

A-SPEC Standard

A-SPEC currently comprises of **seven** **twelve (12)** specialised specifications; **B-Spec** (Buildings), **D-Spec** (Stormwater Drainage & Telecommunications-Optical Fibre. (please note that the Telecommunications & Optical Fibre specifications will become T-Spec), **O-Spec** (Open Spaces), **R-Spec** (Roads), **S-Spec** (Wastewater) and **W-Spec** (Water).

The specifications have been created to enable organisations to utilise the specifications that are most relevant to their requirements in accordance with the following two specific instances.

1. New assets

- Created from subdivision developments, capital works programs, including renewal and rehabilitation works or community projects.

2. Existing assets

- Projects initiated for backlog data capture programs
- Field capture activities to confirm where existing assets are and their characteristics
- Field capture activities to identify assets not previously captured

The versions are aligned and differentiated through the naming convention used for each.

- For new assets, the term 'DDS' is incorporated in the name. For example, 'D-Spec DDS - Version 9.0.6 Final.pdf.
- For existing assets, the term 'Existing' is incorporated in the name. For example 'D-Spec Existing - Version 1.0.6 Final.pdf.

Each specification was created to enable Local Governments, Utilities and Water Authorities around the world to participate in the use of a single specification when dealing with the creation of new Councils, Utilities and Water Authorities' assets **or capture of existing assets**. This enables Councils, Utilities and Water Authorities to deal more efficiently with Land Development and Industry Consultants in relation to subdivision developments and capital works programs within their local jurisdiction.

The standard specifications have been developed to streamline the processes undertaken to **record and consistently** display all new assets within each **A-SPEC** member's geographic information systems (GIS) and asset management information systems (AMIS).

A common specification for the supply of digital data for assets was identified as a major opportunity for the members to achieve efficiency and cost savings in the process of maintaining their corporate GIS and AMIS. Moreover, a common specification shared between Councils, Utilities and Water Authorities would also provide efficiencies to the Land Development and Industry consultants by removing the need to maintain separate processes, standards and software tools for numerous Councils, Utilities and Water Authorities.

Each standard specification will enable consultants to provide **"Survey Enhanced As – Constructed"** information as digital data with the specific characteristics required for each asset type as GIS ready data to comply with the relevant specification.

The framework will consist of specifications for data content enabling data exchange. **Each spec** will enable data to be collected and available in a harmonised, interoperable and quality assured way.

It is acknowledged that it is the asset owner's choice as to which ingestion process will be the most effective for their organisation.

Use of the Specifications

Each **A-SPEC** standard specification is for use by Private Developers, the representatives of Private Developers, engineering consultants and **their** surveyors **and landscape architects** (hereafter referred to as “Consultants”) who undertake Land Development or Capital Works activities for one or more members of the **A-SPEC** Consortium.

These specifications are not to be used for any other purpose.

Where applicable please refer to the section of the document that stipulates the specific requirements of the relevant region that you are conducting your business in. Be it Australia, New Zealand or another country. It is the responsibility of the consultants to understand the specific requirements of their local government, utility or water authority clients. Assistance will be provided wherever possible to clarify any issues or concerns.

The As Constructed asset data to be provided at time of practical completion, may also be referred to in the following ways.

- **As Built information**
- **Work/s As Executed**
- **Constructed Works**

It is to be supplied as feature objects and attributes. The feature objects to be used to depict each asset are described by one of the following three types:

1. Point
2. Line (or Polyline where there are more than two vertices)
3. Polygon

Storing the information as attributes means attaching the information directly to the features. Each asset has been catalogued in **Section 1.3** and cross referenced to the specific specification **where** details can be found describing the key requirements for their capture and attribution.

To access the specifications please complete the Contact form to be found on the A-SPEC website (<https://www.a-specstandards.com.au/contact>).

We previously stated that there are now two versions for each specification. One for new assets and one for existing assets. It is important to note that the specifications are in parallel and in harmony. That is, that the attributes for each asset class are the same across each pair of specifications.

Please refer to 2.1.1 Existing versus Newly Constructed Assets Attribute Data Field Requirements - for details.

Version Control and Changes in Documents

The objective of this section is to

1. define the specifications that are linked at each release and
2. identify when changes are made

The 'A-SPEC DDS – Introduction and Overview' document is the source of truth and is to be referred to at all times to ensure that all users of the specifications are clear about the current and previous versions available.

Please note the changes in the specifications are indicated as follows:

1234	Blue highlighted text and text struck out	Text to be deleted
5678	Green Highlighted text	Existing attribute moved to another table
9101	Yellow highlighted text	New or modified text

An attribute which is specified as "Conditional" means, it is to be populated if certain conditions are met.

Example: The attribute 'Source' is to be populated in the Area of Work Extent table only if the 'Source' of the information is the same for the whole project. If the asset doesn't meet this condition, then the Code 'SeeTables', is to be used and each table is to be populated accordingly.

Read attribute descriptions carefully to ensure the conditions are met before populating.

Table 1 - Suite of Specifications linked to this release

The version of this release of the **A-SPEC Specifications** will be known as **Version 5** and will contain the specifications listed in the Current column. Each update to this document will be incremented by +1.

	Current valid from 4 September 2023	Previous Supported	No longer Supported from 4/9/2023
A-SPEC Version 5	<ul style="list-style-type: none"> B-Spec DDS – Version 2.0.6 Final Draft B-Spec Existing – Version 1.0.6 Final Draft 	<ul style="list-style-type: none"> B-Spec DDS – Version 2.0.5 Previous B-Spec Existing – Version 1.0.5 - Previous 	<ul style="list-style-type: none"> B-Spec DDS – Version 2.0.1
	<ul style="list-style-type: none"> D-Spec DDS - Version 9.0.6 Final D-Spec Existing - Version 1.0.6 Final 	<ul style="list-style-type: none"> D-Spec DDS - Version 9.0.5 - Previous D-Spec Existing - Version 1.0.5 - Previous 	<ul style="list-style-type: none"> D-Spec DDS - Version 9.0.1
	<ul style="list-style-type: none"> O-Spec DDS – Version 3.0.6 Final O-Spec Existing – Version 1.0.6 Final 	<ul style="list-style-type: none"> O-Spec DDS – Version 3.0.5 - Previous O-Spec Existing – Version 1.0.5 - Previous 	<ul style="list-style-type: none"> O-Spec DDS – Version 3.0.1
	<ul style="list-style-type: none"> R-Spec DDS – Version 3.0.6 Final R-Spec Existing – Version 1.0.6 Final 	<ul style="list-style-type: none"> R-Spec DDS – Version 3.0.5 - Previous R-Spec Existing – Version 1.0.5 - Previous 	<ul style="list-style-type: none"> R-Spec DDS – Version 3.0.1
	<ul style="list-style-type: none"> S-Spec DDS – Version 2.0.6 Final Draft S-Spec Existing – Version 1.0.6 Final Draft 	<ul style="list-style-type: none"> S-Spec DDS – Version 2.0.5 - Previous S-Spec Existing – Version 1.0.5 - Previous 	<ul style="list-style-type: none"> S-Spec DDS – Version 2.0.1
	<ul style="list-style-type: none"> W-Spec DDS – Version 2.0.6 Final Draft W-Spec Existing – Version 1.0.6 Final Draft 	<ul style="list-style-type: none"> W-Spec DDS – Version 2.0.5 Previous W-Spec Existing - Version 1.0.5 - Previous 	<ul style="list-style-type: none"> S-Spec DDS – Version 2.0.1

Roll Out of New Versions

The A-SPEC Community advocates that all users of the specifications take on a 6 month phase in period for the adoption of a published new release.

Once a new version has been published and the phase in period is completed, the previous older version will no longer be supported.

In Summary

The key objectives of the **A-SPEC** initiative is to streamline stake holders' (local government/utilities/water authorities) processes for receiving, handling and storing of data related to newly constructed infrastructure assets either from subdivision developments or internal programs (e.g. capital works) in their GIS and AMIS and, to have an aligned structure and processes for assets that are already existing.

This document is a companion document to the suite of specifications. Its primary purpose ~~The key objective of this standard specification~~ is to provide information to the Consultants that will be dealing with **A-SPEC Consortium** members. ~~This~~ The document outlines the specific requirements for the submission of "**As-Constructed/As-Built Information**" of all works, as GIS Ready digital data in particular, of for newly constructed and existing assets as defined by the **A-SPEC** Consortium members in Australia.

Whilst all care has been taken with the preparation of this document it is the responsibility of each reader to confirm that all details are current and relevant. For example, there are specific references in this document that **only** relate to particular jurisdictions.

The project to determine the suitability of the **A-SPEC** standard specifications was developed and is being managed by GISSA International Pty Ltd.

The Atrium Suite 10, 476 Canterbury Road, Forest Hill Victoria, 3131.

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Submission of “As Constructed Information” as GIS Ready Data

The key objective of the specifications is to record and provide “As Constructed Information” as digital data of newly created or retrospectively captured assets in a GIS ready format to the **A-SPEC Consortium** members.



D-Spec outlines the specifications for digital files containing stormwater drainage data: pipe, pit, property connections and Water Sensitive Urban Design Elements (**WSUD**).



R-Spec outlines the specifications for digital data of authorities’ assets within the Road Reserve.



O-Spec outlines the specifications for digital data of Public Open Space and Recreation assets.



S-Spec outlines the specifications for digital data containing sewerage/waste water asset data.



W-Spec outlines the specifications for digital data containing Water supply assets.



B-Spec outlines the specifications for the delivery of digital data relating to Building Assets.



T-Spec outlines the specifications for the collection of digital data relating to optical fibre/telecommunications assets.

*Please note: It is planned to further develop it from its current format within **D-Spec***

Consultant Register

The **A-SPEC** Consortium will list Consultants who have registered through the **A-SPEC** website and will provide updates or revisions as necessary. You are advised to read this specification carefully and any comments or suggestions you have regarding this specification are welcomed.

- Consultants who have registered will be shown on the **A-SPEC** website;
www.a-specstandards.com.au (formerly dspec.com.au)

A-SPEC Member Contact

All inquiries relating to the delivery of the digital information should be directed to the **A-SPEC** representative of the relevant organization:

- Please either contact GISSA International on +613 9877 6972 or email info@gissa.com.au or your local point of contact with the organisation you are dealing with.

Industry Consultants Responsibilities

Victoria

Responsibility of the Developer/Consultant

The developer/consultant or his representative shall be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified prior to any works being undertaken.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a **Statement of Compliance**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in the **Information Services Branch (a business unit within DEPI)** digital cadastral map base.

In the event that the **Developer engages a surveyor** separately to record the **"As-Constructed Information"** of the works, then the surveyor will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by prior to any works being undertaken.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a **Statement of Compliance**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in the **Information Services Branch (a business unit within DEPI)** digital cadastral map base.

In the event that the **Developer engages a consulting engineer** to supervise all works including those of a surveyor to record the **"As-Constructed Information"** of the works, then the consulting engineer will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by prior to any works being undertaken.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a **Statement of Compliance**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in the **Information Services Branch (a business unit within DEPI)** digital cadastral map.

Western Australia

Responsibility of the Developer/Consultant

The developer or his representative shall be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by the consultant prior to any works being undertaken.
- ✓ ensuring that the **Survey Enhanced "As-Constructed Information"** and details of the Works as shown on the approved Engineering Plans are recorded and certified by the Surveyor in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and receiving a **"Clearance"**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in LANDGATE's digital cadastral map base.

In the event that the **Developer engages a surveyor** separately to record the extent of the **"As Constructed Information"** of the works, then the surveyor will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by the consultant prior to any works being undertaken.
- ✓ ensuring that the **Survey Enhanced "As-Constructed Information"** and details of the Works as shown on the approved Engineering Plans are recorded and certified by the Surveyor in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and receiving a **"Clearance"**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, complete** and on the projection requested by the **A-SPEC** member
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in LANDGATE's digital cadastral map base.

In the event that the **Developer engages a consulting engineer** to supervise all works including those of a surveyor to record the extent of the **"As Constructed" Information** of the works, then the engineer will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by the consultant prior to any works being undertaken.
- ✓ ensuring that the **Survey Enhanced "As-Constructed Information"** and details of the Works as shown on the approved Engineering Plans are recorded and certified by the Surveyor in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and receiving a **"Clearance"**.
- ✓ ensuring that the **"As-Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, complete** and on the projection requested by the **A-SPEC** member.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in LANDGATE's digital cadastral map base.

New South Wales

Responsibility of the Developer/Consultant

The developer/consultant or his representative shall be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified prior to any works being undertaken.
- ✓ ensuring that the **"Works as Executed" – WAE (also known as As-Constructed Information)** as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared, to receive a Completion Certificate **or sign off** for Capital projects.
- ✓ ensuring that the **"Works as Executed" – WAE (also known as As-Constructed Information)** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a "Certificate of Practical Completion".
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed to with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being specified by the relevant authority.

In the event that the **Developer engages a surveyor** separately to record the extent of the **"WAE"** of the works, then the surveyor will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by the consultant prior to any works being undertaken.
- ✓ ensuring that the **Survey Enhanced "WAE Information"** and details of the Works as shown on the approved Engineering Plans are recorded and certified by the Surveyor in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and receiving a **"Statement of Compliance"**.
- ✓ ensuring that the **"WAE Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, complete** and on the projection requested by the **A-SPEC** member.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being recorded in the State's digital cadastral map base.

In the event that the **Developer engages a consulting engineer** to supervise all works including those of a surveyor to record the extent of the **"WAE Information"** of the works, then the engineer will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by the consultant prior to any works being undertaken.
- ✓ ensuring that the **Survey Enhanced "WAE Information"** and details of the Works as shown on the approved Engineering Plans are recorded and certified by the Surveyor in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and receiving a **"Statement of Compliance"**.
- ✓ ensuring that the **"WAE Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC** Consortium member prior to works being accepted and cleared to receive a Certificate of Practical Completion.
- ✓ ensuring that the data supplied to the **A-SPEC** member is **correct, accurate, complete** and on the projection requested by the **A-SPEC** member.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.

Tasmania

Responsibility of the Developer/Consultant

The developer or his representative shall be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified prior to any works being undertaken.
- ✓ ensuring that the **"Survey Enhanced As Constructed Information"** and details of the Works as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Statement of Compliance"** or **"Certificate of Practical Completion"**.
- ✓ ensuring that the **"As Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Certificate of Practical Completion"**.
- ✓ ensuring that the data supplied to the **A-SPEC member** is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being maintained in Department of Primary Industries, Parks, Water and Environment's (DPIPWE) digital cadastral map base.

In the event that the **Developer engages a surveyor** separately to record the **"Survey Enhanced As Constructed Information"** of the works, then the surveyor will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by prior to any works being undertaken.
- ✓ ensuring that the **"Survey Enhanced As Constructed Information"** and details of the Works as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Statement of Compliance"** or **"Certificate of Practical Completion"**.
- ✓ ensuring that the **"As Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Certificate of Practical Completion"**.
- ✓ ensuring that the data supplied to the **A-SPEC member** is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being maintained in Department of Primary Industries, Parks, Water and Environment's (DPIPWE) digital cadastral map base.

In the event that the **Developer engages a consulting engineer** to supervise all works including those of a surveyor to record the **"Survey Enhanced As Constructed Information"** of the works, then the consulting engineer will be responsible for:

- ✓ ensuring that any information provided by the consortia members is verified by prior to any works being undertaken.
- ✓ ensuring that the **"Survey Enhanced As Constructed Information"** and details of the Works as shown on approved Engineering Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Statement of Compliance"** or **"Certificate of Practical Completion"**.
- ✓ ensuring that the **"As Constructed Information"** as shown on approved Landscape Plans are recorded and certified in accordance with this document and forwarded to the **A-SPEC Consortium member** prior to works being accepted and cleared to receive a **"Certificate of Practical Completion"**.
- ✓ ensuring that the data supplied to the **A-SPEC member** is **correct, accurate, and complete**.
- ✓ ensuring the data is supplied within 15 working days of work being completed unless otherwise agreed with the relevant Consortium member.
- ✓ ensuring that the information provided is relative to the cadastral information being maintained in Department of Primary Industries, Parks, Water and Environment's (DPIPWE) digital cadastral map base.

A-SPEC Consortium Member's Responsibilities

Each participating member shall be responsible for:

- ✓ Correctly inserting the data provided by the certifying company into their respective GIS environments (**A-SPEC** Consortium members are NOT responsible for scaling, rotating or manipulating the data supplied by the consultants).
- ✓ Providing extracts of existing data from their GIS in a timely manner.
- ✓ In Victoria – providing acknowledgment of the receipt of Certified "**As-Constructed Information**" of the Works from the Developer or their representative.
- ✓ In Western Australia – providing acknowledgment of the receipt of Certified "**Survey Enhanced As-Constructed Information**" of the Works from the Developer or their representative.
- ✓ In NSW – providing acknowledgment of the receipt of Certified "**Survey Enhanced As-Constructed Information**" of the Works from the Developer or their representative.
- ✓ In Tasmania – providing acknowledgment of the receipt of Certified "**Survey Enhanced As-Constructed Information**" of the Works from the Developer or their representative
- ✓ Processing the data in a timely manner in accordance with the **A-SPEC** specified timeframes or as otherwise arranged with the consultant.
- ✓ Informing Consultants of non-conformance in accordance with the **A-SPEC** specified timeframes.
- ✓ Application of quality control programs relevant to the respective **A-SPEC** Consortium member.
- ✓ Undertaking random in-house testing of the data.

Acceptance

Each of the **A-SPEC** Consortium members has independent processes that will take the digital files and place them in their respective GIS and Asset Management Information Systems. At the same time quality control programs will check the validity of the data, and maps may be printed.

Where applicable, this document includes suggested data validation checks for attribute fields. It is strongly recommended that each consultant implement and run these prior to the submission of data to the **A-SPEC** Consortium member. The **A-SPEC** Consortium members will undertake random in-house testing to ensure compliance.

The **A-SPEC** Consortium members will carry out acceptance testing within the following guidelines or from time to time, as otherwise arranged with the consultant.

- | | | | |
|----|------------------------|-------------|--------------------------|
| 1. | Developments | < 10 lots | 5 working days |
| 2. | Developments | 10 -50 lots | 10 working days |
| 3. | Developments | 50 + lots | 15 working days |
| 4. | Capital Works Projects | | up to 15 working days ** |

**** Please note this will be dependent upon project size and as agreed to with the consultant.**

Following the acceptance of the data and the provision of a "**Statement of Compliance**" or "**Clearance**" or "**Certificate of Practical Completion**" or "**Compliance with s224C**" the ownership of the data will revert to the relevant **A-SPEC** Consortium member.

Errors and Omissions

It is an expectation of the **A-SPEC Consortium** that all data be verified by the developer or their representatives (consultants) with relation to its completeness and graphical accuracy prior to submission.

Errors and omissions will result in the data being returned to the consultant for correction and may result in a non-conformance being placed on the data submission.

Intellectual Property

The **A-SPEC Consortium** members own the intellectual property of the developed specifications in conjunction with **GISSA International** and Intellectual Property rights are not to be sold, transferred or assigned to any party (other than a new participating **A-SPEC Consortium** member) without the prior written approval of the **A-SPEC Consortium** and **GISSA International**.

The **A-SPEC** suite of standard data specifications will be available free of charge to the consulting & development industry. **A-SPEC** data structures are only to be used for the delivery of As Constructed data to **A-SPEC Consortium members only**.

All material is copyrighted and under a trademark.

Disclaimer

On occasion **A-SPEC Consortium** members may supply consultants with digital data to assist them with their planning and design phases. The **A-SPEC Consortium** accepts no liability for the accuracy or completeness of the information and it is the responsibility of the consultants to ensure that the data supplied is appropriate and applicable to the end use intended.

Deliverables

The following are acceptable media for providing the digital data files.

- ✓ Email files to **A-SPEC** member representative.
- ✓ USB memory device, portable hard drive
- ✓ Cloud Mediums (FTP, Dropbox, Google Drive etc.)

Certification Form - Readme / Metadata File

The readme.txt is a simple text file that contains information about the project the digital data is being provided for and must accompany **EVERY** digital data submission. This is complimentary to the Area of Works details. This document is to be provided as an Excel Spreadsheet to enable ease of ingestion. An excel template is available upon request. Please refer to the A-SPEC website.

It is an expectation of the A-SPEC Consortium that all data be verified by the developer or their representatives (consultants) with in relation to its completeness and graphical accuracy prior to submission.

Errors and omissions will result in the data being returned to the consultant for correction and may result in a non-conformance being placed on the data submission.

The following information may also be used as part of validating the data submission.

Label	Description	Example
COMPANY	Company name taking responsibility for the data	GISSA International
CONTACT	Contact name for this project	George Havakis
TELEPHONE	Telephone number	(03) 9877 6972
FACSIMILE	Facsimile number	(03) 9878 2819
EMAIL	Email address (as applicable)	george@viccadd.com.au
MAILING ADDRESS	Mailing address	Suite 10, 476 Canterbury Rd, Forest Hill VIC 3131
PHYSICAL ADDRESS	Physical business address	'As Above'
A-SPEC MEMBER	Participating Authority	City of Gosnells
DATE SUBMITTED	Date the digital data submitted to A-SPEC member	31/1/2022
DOCUMENT VERSION	Version of the document used	D-Spec v9.5.0
PROJECT or SUBDIVISION	Project or Subdivision name	Wyndham Estate
STAGE	Subdivision Stage Name	Stage 3B
DESIGN COMPANY	Design Company Name	Fred Charles & Associates
PLAN NUMBER	As Constructed Plan Number	6080R212
CONSTRUCTION COMPANY	Construction Company Name	Jamieson Construction
CONSTRUCTION DATE	Date of Construction	12/01/2022
COORDINATES/DATUM	The coordinate system the data is in	GDA2020 Zone 50
SPATIAL REFERENCE (SRID)	The specific EPSG code. (Please refer to EPSG Codes - Table 2 for relevant codes).	28350
DATUM	Vertical Height Datum	AHD71
START DATE OF OBSERVATION	Start Date of Measurements	10/1/2022
END DATE OF OBSERVATION	End Date of Measurements	20/1/2022
TRANSFORMATION	The coordinate system the data was transformed from	Perth Coastal Grid to GDA94 Zone50
TRANSFORMATION BY	Who carried out the transformation from the original coordinate system to the relevant system	City of Gosnells – Jack Dowling
SOURCE OF DATA	The type of capture used	Field Asset Capture
NOTES/COMMENTS	Important notes or information to be included here.	Information provided in this submission is a combination of data picked up in the field along with confirmation by the contractor responsible ICANDOIT Pty Ltd

1 Graphical & Technical Specifications

The key principle of this specification is to provide a standardized structure to record the characteristics/attributes of each graphical element. Where data is being supplied in a GIS format, it can be assumed that this is already the case.

It is an expectation from the A-SPEC Consortium that all consultants providing data will be required to conform to the current A-SPEC standard specifications. Therefore, it is of vital importance that the release date of the specification is known in the event that an update is issued specifying any variations.

All graphical information is to be projected in accordance with the preference of each individual **A-SPEC** member. It is requested that the height datum and coordinate system used is recorded within the Certification Form to be provided with each submission of data.

The digital data provided to the A-SPEC Consortium must conform to the following specifications:

1.1 Datums

1.1.1 Australia

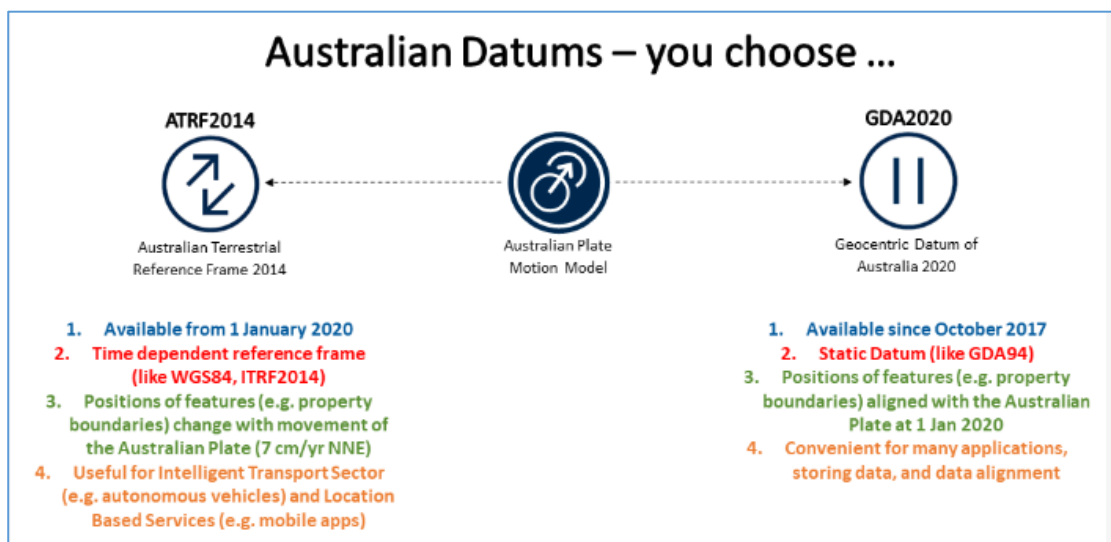


Figure 1 - Two Frame approach in Australia from 2020

Image Source ICM website 11 November 2022

1.1.1.1 The Geocentric Datum of Australia

All graphical information is to be projected in accordance with the preference of each individual **A-SPEC** member.

Over the next few years, users of Australian spatial datasets will have the opportunity to transition from using coordinates referenced to the Geocentric Datum of Australia 1994 (GDA94) to the Geocentric Datum of Australia 2020 (GDA2020).

¹ Referenced from the ICSM website

The technical information that covers the use of both national datums can be found on ICSM website page <http://www.icsm.gov.au/datum/gda2020-and-gda94-technical-manuals>.

The technical information provided on the page includes:-

- Technical Manuals for GDA94 & GDA2020
- Technical Fact Sheet GDA94 to GDA2020 transformations
- Examples to assist with conversions
- GDA2020 online Forum and sub-Forums

The Map Projection to be used is Map Grid of Australia. The applicable zones are 49, 50, 51, 52, 53, 54, 55 & 56.

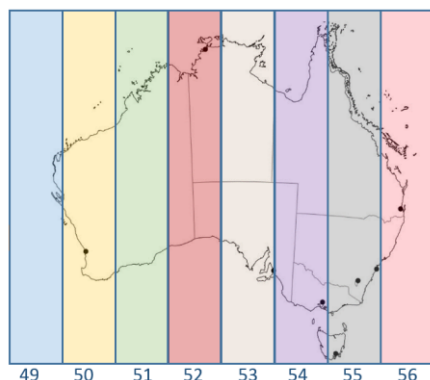


Figure 2 - Map Grid of Australia

Image Source - [Source of map of Australia](#) - Geoscience Australia

1.1.1.2 Common EPSG Codes - Coordinate Reference Systems – Australia

The following table represents the relevant Codes applicable to Australia, including Lord Howe Island, Macquarie Island, Ashmore and Cartier Islands, Christmas Island, Cocos (Keeling) Islands, Norfolk Island. All onshore and offshore.

Please note: These codes are to be used to populate the “Spatial Reference” field in the Certification Form to be supplied with each submission.

Table 2 - EPSG Codes of Australia <https://epsg.org>

EPSG Code	CRS Name
28349	MGA zone 49 (GDA94)
28350	MGA zone 50 (GDA94)
28351	MGA zone 51 (GDA94)
28352	MGA zone 52 (GDA94)
28353	MGA zone 53 (GDA94)
28354	MGA zone 54 (GDA94)
28355	MGA zone 55 (GDA94)
28356	MGA zone 56 (GDA94)
28357	MGA zone 57 (GDA94)
7849	MGA2020 Zone 49
7850	MGA2020 Zone 50
7851	MGA2020 Zone 51
7852	MGA2020 Zone 52
7853	MGA2020 Zone 53
7854	MGA2020 Zone 54
7855	MGA2020 Zone 55
7856	MGA2020 Zone 56
7857	MGA2020 Zone 57

1.1.1.3 Australian Terrestrial Reference Frame 2014

As outlined on the ICSM website:-

- The Australian Terrestrial Reference Frame 2014 (ATRF 2014) is a time dependent reference frame aligned to the International Terrestrial Reference Frame 2014 (ITRF2014).
- Coordinates expressed in ATRF2014 require a time-stamp in order to be unambiguous.
- A user can choose to use either GDA2020 or ATRF2014 depending on their requirements.
- Please confirm with you're A-SPEC member their Datum preference.

Please refer to the ICSM website link - <https://www.icsm.gov.au/australian-terrestrial-reference-frame-frequently-asked-questions>

1.1.1.4 Preparing for Shift to GDA2020 or ATRF 2014

We acknowledge that Australia is transitioning to new datums and recognize the importance of recording the appropriate Datum for A-SPEC infrastructure asset data and as such have included two new attributes in the Certification Form to be completed for each project.

1. Start date of Observation
2. End Date of Observation

In future proofing your data, recording the specific detail of the observation dates will assist in determining the transformation parameters required.

It is the responsibility of individuals and organisations to comply with jurisdictional requirements.

Please refer to the ICSM website link - <https://www.icsm.gov.au/australian-datums-and-how-move-between-them>

ICSM state to **"know your data know your datum"**, it is important to always contain the method and parameters as part of the project metadata for whichever transformation is selected.



Figure 3 - Approximate shift from GDA94 to GDA2020 locations across Australia

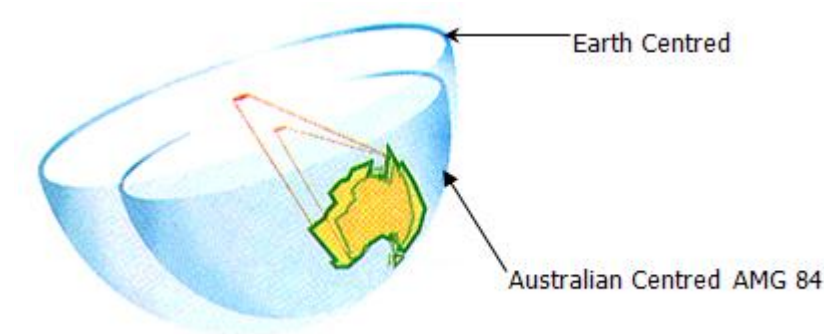
Image source ICSM website 11 November 2022

1.1.1.5 Australian Height Datum

The term AHD is used to refer to both the Australian Height Datum 1971 (AHD71; Australian mainland) and Australian Height Datum (Tasmania) 1983 (AHD–TAS83).

Please refer to the ICSM website for further details. <http://www.icsm.gov.au/australian-height-datum>.

The Australian Height Datum (AHD) will not be affected by the adoption of GDA.



Victoria

The Map Projection to be used is Map Grid of Australia. The applicable zones will be 54 & 55 (MGA Zone 54/55, GDA94).

Western Australia

The Map Projection to be used is Map Grid of Australia. The applicable zones will be 49, 50, 51 and 52 (MGA Zone 54/55, GDA94).

New South Wales

The Map Projection to be used is Map Grid of Australia. The applicable zones will be 54 & 55 (MGA Zone 54/55, GDA94).

Tasmania

The levelling network in Tasmania was adjusted on 17 October 1983 to re-establish heights on the Australian Height Datum (Tasmania).

GDA geographic coordinates (latitude & longitude) are known as GDA94, GDA2020 or ATRF 2014, and the equivalent UTM grid coordinates are known as MGA94 and MGA2020.

Further information about the GDA is available from the Geocentric Datum of Australia Technical Manual.

The Australian Height Datum (Tasmania) AHD83

The Australian Height Datum (Tasmania) is based on mean sea level for 1972 at the Hobart and Burnie Tide Gauges.

The Map Projection to be used is Map Grid of Australia. The applicable zone is 55.

Flinders Island Local Datum (Tasmania)

Datum used for topographic mapping of the Furneaux Group islands which carried out in 1972 is considered the mean sea level by the division of national mapping. Heights of Brougham Sugarloaf (ST343) and Vinegar Hill (ST354) are held fixed in a trigonometry height adjustment which used to propagate heights through the Furneaux Group Islands.

1.2 Format

Format relates to the **data exchange format** e.g. MIF/MID, ESRI Shapefile, Intergraph native, LandXML or GeoPackage etc. ~~and is flexible~~. It is not used in this specification with any other meaning.

The requirement of consultants is to provide data in a GIS Ready Format and is flexible.

Whilst **A-SPEC** does not specify any one format over another it should be noted that each member may have a preference.

Therefore all data is to be supplied in a **GIS READY Format** or as otherwise arranged with the individual **A-SPEC Consortium member**.

We acknowledge that the Open Geospatial Consortium ("OGC") advocate the use of GeoPackage ("GPKG").

To cite Wikipedia: *"An OGC GeoPackage (GPKG) is an open, non-proprietary, platform-independent and standards-based data format for geographic information systems implemented as a SQLite database container"*.

1.3 Theme/Layer Structure

The level/layer structure provided in each **A-SPEC Standard Specification** is intended as a guide to assist Consultants when arranging their graphical information for members of the **A-SPEC Consortium**. The key **principal principle** is that each asset type must be delivered on a separate level/layer and the files must be clearly labelled in accordance with the **“Universal File Name”** as indicated in the table provided in each digital data standard specification.

Asset Type	Universal File Name	Data Type	Description	Attribute Table
Area of Work Extent	Graphics	Polygon	Polygon representing the extents of the subdivision development or capital works	Yes

Depending on the asset to be captured, not all the levels/layers indicated may be required in the final data to be submitted.

It is important to note that each level/layer should only contain the listed features; any other features present will impede the acceptance testing and may result in non-conformance with the requirements.

1.3.1 Asset Types and their Relevant Specifications

There may be instances where assets other than the ones documented in the particular specification will **also** need to **also** be provided. These may be the result of assets that are part of areas such as precincts or compounds or maintenance yards or the principal office of a business organisation.

Where this occurs, please refer to the relevant **A-SPEC** standard specifications listed to ensure compliance with the delivery of the digital data of the **“As Constructed”** information required. Table 1 below lists all the asset types that can be found in the A-SPEC standard Specifications. A related checklist can be found on Page 29 Section 1.3.2 that can be used to identify the assets that will be delivered at the handover stage of each development or project.

After completing the checklist we recommend that this is signed off by both parties. i.e. the asset owner receiving the assets and asset data and the consultant delivering the assets and asset data.

Please note this list will be updated from time to time.

Table 1 - Asset Types

Asset Type	Specification to Refer to
Abutments	R
Access Points / Manholes / Pits	D, S, W
Amenities	O
Area of Work Extent	B,D,O,R,S,W
Bar Tables & Stools (see Amenities)	O
Basins (see OSDS Area), Sump, Pond, Swale (areas), Wetland, and Lake	D
BBQ (see Amenities)	O
Bins	O
Bio retention Swale / Swale (linear) / Buffer Strips and Rain Gardens (see OSDS Linear)	D
Boardwalks	O
Boat Ramps	O
Bollards (see Traffic Management Device – point)	R
Breakwaters	O
Bridge / Major Culvert	R
Bridge / Major Culvert Component	R

Asset Type	Specification to Refer to
Buffer Strips (see OSDS Linear)	D
Building Floor Plan	B
Building Footprint	B
Building Space	B
Bund (see Tank)	W
Channel Drain (see Pipes)	D
Car Parking	R
Cathodic Protection	W
Cathodic Protection Sites - PROPOSED FUTURE UPDATE	W
Collection pipes for swales - Stormwater	D
Communication and Data Equipment	B
Communication and Data Cabling	B
Conduits	B, S, W
Conveyance Systems	B
Conveyance Paths	B
Detention Chambers	D
Doors & Windows	B
Electrical Cabling	S, W
Electrical Equipment	B, S, W
Electrical Lines	B
Emergency Markers Linear	O
Emergency Markers Point	O
Escalators (part of Conveyance System)	B
Fences/Walls	O
Fire Protection Equipment	B
Fire Protection Lines	B
Fittings & Fixtures – Areas	B
Fittings & Fixtures – Lines	B
Floor Plan Lines	B
Gates	O
Grandstands (see Building Footprint)	B
Gravity Pipes	S
Gravity Pipe Miscellaneous Text	S
Gross Pollutant Traps (see Pits)	D
Ground Water Bores	O
Hard Stands	R
Head/End Walls	D
HVAC Mechanical Systems	B
HVAC Equipment	B
HVAC Lines	B
Infiltration Chambers (see Water Harvesting Device)	D
Instrumentation	S, W
ITS (Intelligent Transport Systems) – Lines	R
ITS (Intelligent Transport Systems) – Points	R
ITS (Intelligent Transport Systems) – Polygon	R
Irrigation (Linear)	O

Asset Type	Specification to Refer to
Irrigation (Point)	O
Jetties, Piers and Marinas	O
Kerbs / Kerbs & Channel and Shoulders	R
Lakes (see OSDS Area)	D
Lakes - Manmade (see Landscaping)	O
Landscaping	O
Lifts (part of Conveyance System)	B
Lighting	R
Marine Safety & Assist Facility	O
Mechanical Equipment	S, W
Minor Structures	O
Moving Walkways (part of Conveyance System)	B
OSDS Linear Centrelines	D
Open Spaces	O
Other Network Structures	S
Pathway Centrelines	R
Pathways	R
Pavements - Road	R
Piles	O
Pipes - Stormwater	D
Pipes – Stormwater Miscellaneous Text	D
Pits - Stormwater for Swales	D
Platforms	W
Playground and Exercise Equipment	O
Playgrounds	O
Playing Fields	O
Plumbing Equipment	B
Plumbing Lines	B
Poles	O
Ponds (like Basins see OSDS Area)	D
Pram Ramps (see Pathways)	R
Pressure Pipes – PROPOSED FUTURE UPDATE	D
Pressure Pipes – PROPOSED FUTURE UPDATES for 'D'	D, S, W
Problems with matching to existing data	B,D,O,R,S,W
Property Connections	D, S
Public Art / Memorials	O
Public Toilets	B
Pump Station Sites – PROPOSED FUTURE UPDATES for 'D'	D, S, W
Pump Station Sites - PROPOSED FUTURE UPDATE	D
Pumping Stations – PROPOSED FUTURE UPDATES for 'D'	D, S, W
Pump Stations- PROPOSED FUTURE UPDATE	D
Pumps – PROPOSED FUTURE UPDATES for 'D'	D, S, W
Pumps - PROPOSED FUTURE UPDATE	D
Rain Gardens (see OSDS Linear)	D
Recreation Reserves (see Open Space)	O
Reservoirs	W

Asset Type	Specification to Refer to
Retaining Walls	O
Road Reserves	R
Road Safety Barriers	R
Seals / Surfaces – Road Surface (Sea)l	R
Security Equipment	B
Services (Linear)	O
Services (Point)	O
Sewer Fittings	S
Sewer Pumps	S
Sewer Pumping Stations	S
Sewer Rising Mains / Pressure Mains	S
Sewer Valves	S
Shelters	R
Signs	B, R
Stairs	B
Stairwells (part of Conveyance System)	B
Steps (see Pathway)	R
Stormwater Fittings - PROPOSED FUTURE UPDATE	D
Stormwater Pumps - PROPOSED FUTURE UPDATE	D
Stormwater Pumping Stations - PROPOSED FUTURE UPDATE	D
Sumps (see OSDS Area)	D
Support Structures	S, W
Surface (Seal) Centrelines	R
Swales (as an area see OSDS Area)	D
Swales (as a conveyance system see OSDS Linear)	D
Table Drains	R
Tactile Ground Surface Indicators	R
Tanks (see Water Harvesting Device)	D
Tanks	W
Toilets in Buildings (see Building Space)	B
Traffic Management Devices – Areas	R
Traffic Management Devices – Lines	R
Traffic Management Devices – Points	R
Traffic Signals	R
Treatment Plant Site- PROPOSED FUTURE UPDATE	S, W
Trees	R
Tunnels - PROPOSED FUTURE UPDATE	R
Underground Conduit Pits–Telecommunications	D
Underground Conduits –Telecommunications	D
Utility Tunnels - PROPOSED FUTURE UPDATE	TBC
Vehicle Crossings (Driveways)	R
Walls (see Fence/Walls)	R
Water Fittings	W
Water Harvesting Devices	D
Water Hydrants	W
Water Meters	W

Asset Type	Specification to Refer to
Water Pressure Mains	W
Water Service Mains	W
Water Valves	W
Wetlands (see OSDS Area)	D
Other to be specified	
Other to be specified	
Other to be specified	
Other to be specified	

This table will be updated from time to time so please do not hesitate to contact GISSA International on +61 3 9877 6972 or refer to the website on www.a-specstandards.com.au.

1.3.2 Asset & Asset Data Handover Checklist

The following table represents a list of all the assets that are included in A-SPEC. Using this as a “checklist” during the planning and finalisation phases will ensure that all parties will confirm what asset data is expected to be delivered at Practical Completion of capital works projects and subdivision developments prior to the Handover phase.

Project Type:
(Please tick the applicable checkbox)

☐ Capital Works

☐ Subdivision Development (gifted)

☐ Community Handover

☐ Other _____

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Abutments	R	<input type="checkbox"/>	<input type="checkbox"/>
Access Points / Manholes / Pits	D, S, W	<input type="checkbox"/>	<input type="checkbox"/>
Amenities	O	<input type="checkbox"/>	<input type="checkbox"/>
Area of Work Extent	B,D,O,R,S,W	<input type="checkbox"/>	<input type="checkbox"/>
Bar Tables & Stools (see Amenities)	O	<input type="checkbox"/>	<input type="checkbox"/>
Basins (see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
BBQ (see Amenities)	O	<input type="checkbox"/>	<input type="checkbox"/>
Bins	O	<input type="checkbox"/>	<input type="checkbox"/>
Bio retention Swale / Swale (linear) (see OSDS Linear)	D	<input type="checkbox"/>	<input type="checkbox"/>
Boardwalks	O	<input type="checkbox"/>	<input type="checkbox"/>
Boat Ramps	O	<input type="checkbox"/>	<input type="checkbox"/>
Bollards (see Traffic Management Device – point)	R	<input type="checkbox"/>	<input type="checkbox"/>
Breakwaters	O	<input type="checkbox"/>	<input type="checkbox"/>
Bridge / Major Culvert	R	<input type="checkbox"/>	<input type="checkbox"/>
Bridge / Major Culvert Component	R	<input type="checkbox"/>	<input type="checkbox"/>
Buffer Strips (see OSDS Linear)	D	<input type="checkbox"/>	<input type="checkbox"/>
Building Floor Plan	B	<input type="checkbox"/>	<input type="checkbox"/>
Building Footprint	B	<input type="checkbox"/>	<input type="checkbox"/>
Building Space	B	<input type="checkbox"/>	<input type="checkbox"/>
Bund (see Tank)	W	<input type="checkbox"/>	<input type="checkbox"/>
Channel Drain (see Pipes)	D	<input type="checkbox"/>	<input type="checkbox"/>

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Parking	R	<input type="checkbox"/>	<input type="checkbox"/>
Cathodic Protection	W	<input type="checkbox"/>	<input type="checkbox"/>
Cathodic Protection Sites - PROPOSED FUTURE UPDATE	W	<input type="checkbox"/>	<input type="checkbox"/>
Collection pipes for swales - Stormwater	D	<input type="checkbox"/>	<input type="checkbox"/>
Communication and Data Equipment	B	<input type="checkbox"/>	<input type="checkbox"/>
Communication and Data Cabling	B	<input type="checkbox"/>	<input type="checkbox"/>
Conduits	B, S, W	<input type="checkbox"/>	<input type="checkbox"/>
Conveyance Systems	B	<input type="checkbox"/>	<input type="checkbox"/>
Conveyance Paths	B	<input type="checkbox"/>	<input type="checkbox"/>
Detention Chambers	D	<input type="checkbox"/>	<input type="checkbox"/>
Doors & Windows	B	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Cabling	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Equipment	B, S, W	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Markers Linear	O	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Markers Point	O	<input type="checkbox"/>	<input type="checkbox"/>
Escalators (part of Conveyance System)	B	<input type="checkbox"/>	<input type="checkbox"/>
Fences/Walls	O	<input type="checkbox"/>	<input type="checkbox"/>
Fire Protection Equipment	B	<input type="checkbox"/>	<input type="checkbox"/>
Fire Protection Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Fittings & Fixtures – Areas	B	<input type="checkbox"/>	<input type="checkbox"/>
Fittings & Fixtures – Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Floor Plan Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Gates	O	<input type="checkbox"/>	<input type="checkbox"/>
Grandstands (see Building Envelope)	B	<input type="checkbox"/>	<input type="checkbox"/>
Gravity Pipes	S	<input type="checkbox"/>	<input type="checkbox"/>
Gravity Pipe Miscellaneous Text	S	<input type="checkbox"/>	<input type="checkbox"/>
Gross Pollutant Traps (see Pits)	D	<input type="checkbox"/>	<input type="checkbox"/>
Ground Water Bores	O	<input type="checkbox"/>	<input type="checkbox"/>
Hard Stands	R	<input type="checkbox"/>	<input type="checkbox"/>

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Head/End Walls	D	<input type="checkbox"/>	<input type="checkbox"/>
HVAC Mechanical Systems	B	<input type="checkbox"/>	<input type="checkbox"/>
HVAC Equipment	B	<input type="checkbox"/>	<input type="checkbox"/>
HVAC Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Infiltration Chambers (see Water Harvesting Device)	D	<input type="checkbox"/>	<input type="checkbox"/>
Instrumentation	S, W	<input type="checkbox"/>	<input type="checkbox"/>
ITS (Intelligent Transport Systems) – Lines	R	<input type="checkbox"/>	<input type="checkbox"/>
ITS (Intelligent Transport Systems) – Points	R	<input type="checkbox"/>	<input type="checkbox"/>
ITS (Intelligent Transport Systems) – Polygon	R	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation (Linear)	O	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation (Point)	O	<input type="checkbox"/>	<input type="checkbox"/>
Jetties, Piers and Marinas	O	<input type="checkbox"/>	<input type="checkbox"/>
Kerbs / Kerbs & Channel and Shoulders	R	<input type="checkbox"/>	<input type="checkbox"/>
Lakes (see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
Lakes - Manmade (see Landscaping)	O	<input type="checkbox"/>	<input type="checkbox"/>
Landscaping	O	<input type="checkbox"/>	<input type="checkbox"/>
Lifts (part of Conveyance System)	B	<input type="checkbox"/>	<input type="checkbox"/>
Lighting	R	<input type="checkbox"/>	<input type="checkbox"/>
Marine Safety & Assist Facility	O	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical Equipment	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Minor Structures	O	<input type="checkbox"/>	<input type="checkbox"/>
Moving Walkways (part of Conveyance System)	B	<input type="checkbox"/>	<input type="checkbox"/>
OSDS Linear Centrelines	D	<input type="checkbox"/>	<input type="checkbox"/>
Open Spaces	O	<input type="checkbox"/>	<input type="checkbox"/>
Other Network Structures	S	<input type="checkbox"/>	<input type="checkbox"/>
Pathway Centrelines	R	<input type="checkbox"/>	<input type="checkbox"/>
Pathways	R	<input type="checkbox"/>	<input type="checkbox"/>
Pavements - Road	R	<input type="checkbox"/>	<input type="checkbox"/>
Piles	O	<input type="checkbox"/>	<input type="checkbox"/>
Pipes - Stormwater	D	<input type="checkbox"/>	<input type="checkbox"/>

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Pipes – Stormwater Miscellaneous Text	D	<input type="checkbox"/>	<input type="checkbox"/>
Pits - Stormwater for Swales	D	<input type="checkbox"/>	<input type="checkbox"/>
Platforms	W	<input type="checkbox"/>	<input type="checkbox"/>
Playground and Exercise Equipment	O	<input type="checkbox"/>	<input type="checkbox"/>
Playgrounds	O	<input type="checkbox"/>	<input type="checkbox"/>
Playing Fields	O	<input type="checkbox"/>	<input type="checkbox"/>
Plumbing Equipment	B	<input type="checkbox"/>	<input type="checkbox"/>
Plumbing Lines	B	<input type="checkbox"/>	<input type="checkbox"/>
Poles	O	<input type="checkbox"/>	<input type="checkbox"/>
Ponds (like Basins see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
Pram Ramps (see Pathways)	R	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Pipes- PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Pipes	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Problems with matching to existing data	B,D,O,R,S,W	<input type="checkbox"/>	<input type="checkbox"/>
Property Connections	D, S	<input type="checkbox"/>	<input type="checkbox"/>
Public Art / Memorials	O	<input type="checkbox"/>	<input type="checkbox"/>
Public Toilets	B	<input type="checkbox"/>	<input type="checkbox"/>
Pump Station Sites- PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Pump Station Sites	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Pumping Stations- PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Pumping Stations	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Pumps- PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Pumps	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Rain Gardens (see OSDS Linear)	D	<input type="checkbox"/>	<input type="checkbox"/>
Recreation Reserves (see Open Space)	O	<input type="checkbox"/>	<input type="checkbox"/>
Reservoirs	W	<input type="checkbox"/>	<input type="checkbox"/>
Retaining Walls	O	<input type="checkbox"/>	<input type="checkbox"/>
Road Reserves	R	<input type="checkbox"/>	<input type="checkbox"/>
Road Safety Barriers	R	<input type="checkbox"/>	<input type="checkbox"/>
Seals / Surfaces – Road Surface (Sea)	R	<input type="checkbox"/>	<input type="checkbox"/>

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Security Equipment	B	<input type="checkbox"/>	<input type="checkbox"/>
Services (Linear)	O	<input type="checkbox"/>	<input type="checkbox"/>
Services (Point)	O	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Fittings	S	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Pumps	S	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Pumping Stations	S	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Rising Mains / Pressure Mains	S	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Valves	S	<input type="checkbox"/>	<input type="checkbox"/>
Shelters	R	<input type="checkbox"/>	<input type="checkbox"/>
Signs	B, R	<input type="checkbox"/>	<input type="checkbox"/>
Stairs	B	<input type="checkbox"/>	<input type="checkbox"/>
Stairwells (part of Conveyance System)	B	<input type="checkbox"/>	<input type="checkbox"/>
Steps (see Pathway)	R	<input type="checkbox"/>	<input type="checkbox"/>
Stormwater Fittings - PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Stormwater Pumps - PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Stormwater Pumping Stations - PROPOSED FUTURE UPDATE	D	<input type="checkbox"/>	<input type="checkbox"/>
Sumps (see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
Support Structures	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Surface (Seal) Centrelines	R	<input type="checkbox"/>	<input type="checkbox"/>
Swales (as an area see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
Swales (as a conveyance system see OSDS Linear)	D	<input type="checkbox"/>	<input type="checkbox"/>
Table Drains	R	<input type="checkbox"/>	<input type="checkbox"/>
Tactile Ground Surface Indicators	R	<input type="checkbox"/>	<input type="checkbox"/>
Tanks (see Water Harvesting Device)	D	<input type="checkbox"/>	<input type="checkbox"/>
Tanks	W	<input type="checkbox"/>	<input type="checkbox"/>
Toilets in Buildings (see Building Space)	B	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Management Devices – Areas	R	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Management Devices – Lines	R	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Management Devices – Points	R	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Signals	R	<input type="checkbox"/>	<input type="checkbox"/>

Asset Type	Specification to Refer to	Asset Owner Check	Developer / Consultant Check
Treatment Plant Site - PROPOSED FUTURE UPDATE	S, W	<input type="checkbox"/>	<input type="checkbox"/>
Trees	R	<input type="checkbox"/>	<input type="checkbox"/>
Tunnels - PROPOSED FUTURE UPDATE	R	<input type="checkbox"/>	<input type="checkbox"/>
Underground Conduit Pits–Telecommunications	D	<input type="checkbox"/>	<input type="checkbox"/>
Underground Conduits –Telecommunications	D	<input type="checkbox"/>	<input type="checkbox"/>
Utility Tunnels - PROPOSED FUTURE UPDATE	TBC	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle Crossings (Driveways)	R	<input type="checkbox"/>	<input type="checkbox"/>
Walls (see Fence/Walls)	R	<input type="checkbox"/>	<input type="checkbox"/>
Water Fittings	W	<input type="checkbox"/>	<input type="checkbox"/>
Water Harvesting Devices	D	<input type="checkbox"/>	<input type="checkbox"/>
Water Hydrants	W	<input type="checkbox"/>	<input type="checkbox"/>
Water Meters	W	<input type="checkbox"/>	<input type="checkbox"/>
Water Pressure Mains	W	<input type="checkbox"/>	<input type="checkbox"/>
Water Service Mains	W	<input type="checkbox"/>	<input type="checkbox"/>
Water Valves	W	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands (see OSDS Area)	D	<input type="checkbox"/>	<input type="checkbox"/>
Other to be specified	TBS	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

Consultant's Representative - Signature

Authority's Representative Signature

Consultant's Representative Name

Authority's Representative Signature

Date

Date

1.4 Graphical Data Construction Principles

This section details the graphical data construction principles that consultant must adhere to for all linework, polygons and points provided. Where practicable, the alignment of all data; whether “As Constructed Measurements” in Victoria or Survey Enhanced “As Constructed Measurements” data in Western Australia and **Works as Executed Asset data in New South Wales**, must be related to the title/property boundaries abutting the road reserve.

Please use sound CAD practices when recording data, such as snapping to lines and closing polygons.

1.4.1 Text & Miscellaneous Graphics

- All Text provided in the graphics files will generally be used for cartographic representation only. This may also include offsets to show relativity to property boundaries.
- If offset distances are provided to assist with the location of the asset, they are to be quoted to two decimal places of a metre.
 - Please note that only licensed surveyors are authorized to establish the location of a title boundary

1.4.2 Area of Work Extent

This feature is to represent either the extents of the sub divisional development **or** area of work undertaken on a capital works project. It will be used specifically to identify where works have been or are intended to be.

Consultants are to supply the “**Area of Work**” as a polygon on a separate layer.

The objective of this boundary is to provide the **A-SPEC** Consortium members an overview of the area being developed.

This will also assist the **A-SPEC** Consortium members monitoring progress of staged development.

To ensure that all assets are linked to the area being developed or project being undertaken, an Area of Works Unique Identifier (AOW_ID) is required to be recorded against each asset.

The image below depicts a boundary where all work has been completed within a subdivision development. Ideally the boundary should be placed around the properties (i.e. using the property boundaries as a reference).

Please note: Where work is carried out through Capital Works or Renewal programs, then a similar boundary is to be provided showing the extent of the work.

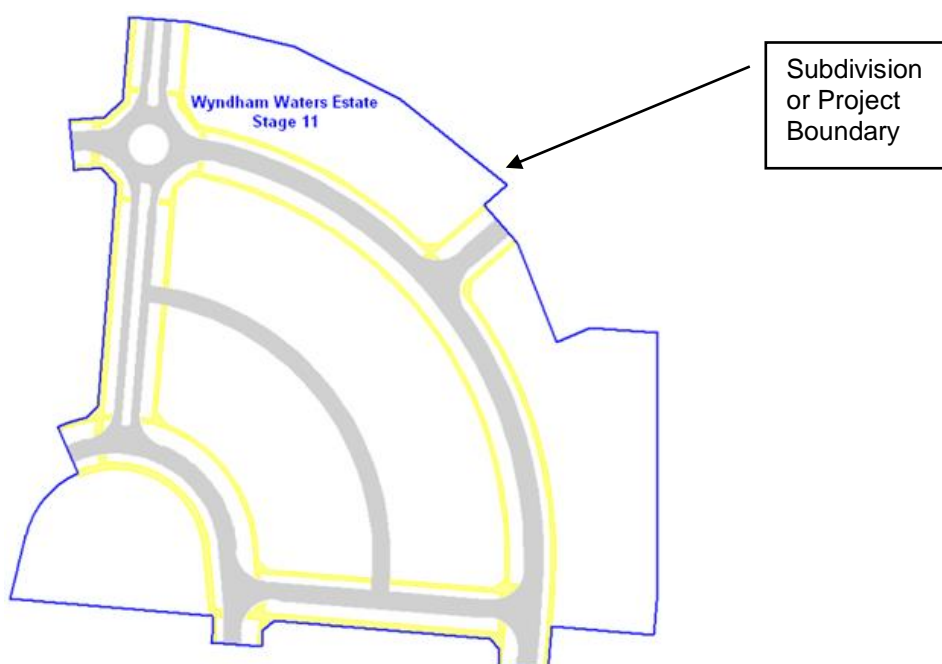


Figure 4 - Area of Work Extent

1.5 Graphical Representation Principles

Each Specification outlines the requirements for how the graphics for each asset is to be provided. The specific detail can be found in Section 1.3 – Theme/Layer Structure in each specification. As mentioned in the previous section all data that is provided is to be a:

- Point
- Line (Polyline where multiple vertices are required) or a
- Polygon

When reading the specifications, we request that you become aware of Relationship between Features as these exist in all the specifications.

The following examples are some of the instances created.

e.g. swales and swale centrelines; surfaces and surface centrelines, building spaces and buildings, water fittings and pressure mains, wastewater pumping station sites and pumping stations etc.

These relationships are tested for during validation and verifications processes. Tests are also undertaken to address if any overlaps exist between features.

e.g. pathways that overlap with swales.

1.5.1 Definition of Geometries

A-SPEC fully supports the Simple Features Access standard, developed by the Open Geospatial Consortium (OGC). This standard provides a common framework for representing and accessing geospatial data.

Due to the exact nature of the asset classes within A-SPEC, all A-SPEC class geometries must comply with Simple Features Geometry Primitives such as points, lines and polygons. In general, there can be no multipart geometries unless specifically allowed.

For a gentle overview of the geometry primitives, go to this page:

https://en.wikipedia.org/wiki/Well-known_text_representation_of_geometry

For more detail about the standard, go to this page:

<https://www.ogc.org/standard/sfa/>

1.6 Acceptance Testing

All graphical information will be checked against in conjunction with the Certification Form and the data provided in the Attribute files/tables. Please refer to **Section 2 – Attribute & Validation File Format Instructions**. This section is designed to assist Consultants when collating the necessary data for a submission.

It is mandatory that each Consultant implement checks to ensure that their plans and data conform to the specification and that they run these checks prior to the submission of data to an **A-SPEC** Consortium member. Members will undertake random in-house testing to ensure compliance.

Following the acceptance of the digital data, the relevant Certificates will be issued and the ownership of the digital data reverts to the **A-SPEC** Consortium member.

1.6.1 Noting Deviation from Design

It is acknowledged that it is inevitable that changes occur due to local conditions and decisions may be made on site to alter from the agreed design issued for construction.

Where this occurs the table in **Attachment 1: Quality Report** is to be completed and submitted as part of the digital As Constructed data submission.

The purpose of completing this form is to record **“the exceptions to the rule”**. That is, record details of which assets have been affected.

What does that mean?

That means, that variations that have occurred during the construction are to be noted indicating that the change in works has been signed off by the relevant authority. This includes assets:-

- a. Built outside of the acceptable positional tolerances
- b. Modified from original scope
- c. Built in addition to or removed from the initial signed off construction drawings

Please Note:

1. It is not within the scope of the A-SPEC specification to determine if these changes are appropriate or not.
2. From a recording perspective it is incumbent upon the developer or their representative to ensure that the **“As Constructed Information”** provided is in accordance with these guidelines.
3. **Attachment 1 – Quality Report** refers to the recording of variations that have occurred during the construction phase so they can be confirmed that they are included in the data submitted.

1.6.2 Asset Recording Accuracy & Precision Principles

The accuracy of the ‘where’ element of information, needs to be considered at the following three levels.

- **Spatial accuracy** refers to how well the point is located. **Precision** refers to the level of recording of the point, for example, nearest metre or nearest centimetre.
- **Absolute accuracy** refers to how close the record of a location is to its true spatial location.
- **Relative accuracy** refers to how an object’s location is stored in terms of its relationship with nearby objects.

Accuracy and Precision requirements vary for differing asset types and are also influenced by asset hierarchy. For example, Accuracy and Precision requirements for road surface are justifiably higher than those for the centreline of a walking track through a recreation reserve.

While the supply of ‘where’ information may appear to be simple, it can be problematic when considering the integration of highly accurate data with existing data of a lesser accuracy.

Mixing data of different accuracies needs careful and considered management to meet requirements for relative accuracy.

Contemporary surveying techniques, such as satellite positioning, are providing easy access to positioning with good levels of absolute accuracy to satisfy asset management requirements. This volume outlines accuracy requirements for the supply of “as-constructed / as-built” data.

This section has been included in every specification as a guide to address the Horizontal & Vertical Accuracy & Precision for each asset type. **Table 3 - Precision Codes** represent the requirements as codes. These codes are noted against specific assets to reflect the requirements.

Please note that in areas of flat terrain the tolerances for asset capture of levels is critical and may be required to be at a higher accuracy. It is the consultant’s responsibility to confirm with the A-SPEC consortium member their specific requirements.

Table 3 - Precision Codes

Code	Horizontal Precision	Vertical Precision
A	±15 mm	±10 mm
B	±20 mm	±15 mm
C	±50 mm	±20 mm
D	±100 mm	±30 mm
E	±200 mm	±40 mm
F	±500 mm	±50 mm
G	> 500 mm	±100 mm

B-Spec – Building Assets to be provided to the following precision codes.

Table 4 - B-Spec – Building Assets Precision Requirements

B - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Area of Work Extent	Polygon	F	N/A
Building Footprint	Polygon	C	C
Building Floor Plan	Polygon	C	D
Building Space	Polygon	C	C
Communication & Data (point)	Point	C	C
Communication & data (Polyline)	Polyline	C	C
Conduits	Polyline	D	D
Conveyance System	Polygon	D	D
Doors & Windows	Polyline	C	C
Electrical Equipment	Point	C	C
Electrical Lines	Polyline	C	C
Fire Protection Equipment	Point	C	C
Fire Protection Lines	Polyline	D	C
Fixtures & Fittings Areas	Polygon	C	C
Fixtures & Fittings Lines	Polyline	D	N/A
Floor Plan Lines	Polyline	D	N/A
HVAC Equipment	Point	C	C
HVAC Lines	Polyline	C	C
HVAC Mechanical Systems	Point	C	C
Matching to Existing Infrastructure - Problems	Polygon	NA	NA
Plumbing Equipment	Point	D	D
Plumbing Lines	Polyline	D	D
Public Toilets	Polygon	D	D
Security Equipment	Point	C	C
Signs	Point	D	D
Stairs	Polygon	C	C

D-Spec – Stormwater Drainage Assets to be provided to the following precision codes.

Table 5 - D-Spec – Stormwater Assets Precision Requirements

D - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Area of Work Extent	Polygon	F	NA
Head/End Walls	Polygon	D	D
Matching to Existing Infrastructure - Problems	Polygon	NA	NA
OSDS-Linear	Polyline	E	E
OSDS-Linear Centreline	Polyline	E	NA
OSDS-Area (Onsite Stormwater Detention System-Area)	Polygon	E	F
Pipe	Polyline	D	D
Pipe Miscellaneous text	Text	NA	NA
Collection Pipes for swales	Polyline	D	D
Pits	Polygon	D	D
Pits for Swales	Polygon	D	D
Property Connection	Polyline	D	D
Underground Conduits	Polyline	D	F
Underground Conduit Pits	Polygon	D	E
Water Harvesting Devices ("WHD")	Polygon	D	D

O-Spec – Assets within Open Space and Recreation Reserves to be provided to the following precision codes.

Table 6 - O-Spec – Open Space Assets Precision Requirements

O - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Amenities	Point	E	D
Area of Work Extent	Polygon	F	NA
Bins	Point	E	D
Boardwalks	Polygon	E	D
Boat Ramps	Polygon	E	D
Bore/Ground Water	Point	E	D
Breakwater	Polygon	E	D
Emergency Markers (Point)	Point	E	D
Emergency Markers (Linear)	Line / Polyline	E	D
Fences/Walls	Line / Polyline	D	D
Gates	Point	E	D
Irrigation (Point)	Point	E	D
Irrigation (Linear)	Line / Polyline	E	D
Jetties, Piers and Marinas	Polygon	E	D
Landscaping	Polygon	E	D
Marine Safety and Assist Facility	Point	E	D
Matching to Existing Infrastructure - Problems	Polygon	NA	NA
Minor Structures	Polygon	D	D
Open Spaces	Polygon	D	D
Piles	Point	E	D
Playing Fields	Polygon	D	D
Playgrounds	Polygon	D	D
Playground and Exercise Equipment	Point	E	D
Poles	Point	E	D
Public Art/Memorial	Point	E	D
Retaining Walls	Line / Polyline	D	D
Services (Point)	Point	E	D
Services (Linear)	Line / Polyline	E	D

R-Spec – Assets in Road Reserve to be provided to the following precision codes.

Table 7 - R-Spec – Assets in Road Reserve Precision Requirements

R - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Abutments	Polygon	E	N/A
Area of Work Extent	Polygon	F	N/A
Bridge / Major Culvert	Polygon	C	N/A
Bridge / Major Culvert Component	No spatial elements	D (dimensions of components)	N/A
ITS (Point)	Point	E	E
ITS (Lines)	Polyline	E	E
ITS (Polygon)	Polygon	D	N/A
Kerb / Kerb & Channel and Shoulder	Polyline	C	N/A
Lighting	Point	E	E
Line Marking – Polygon	Polygon	D	N/A
Line Marking – Polyline	Polyline	D	N/A
Line Marking – Points	Point	D	N/A
M & E (Point)	Point	E	E
M & E (Lines)	Polyline	E	E
Parking	Polygon	E	N/A
Pathways	Polygon	C	B
Pathway Centreline	Polyline	D	N/A
Pavement	Polygon	C	A
Road Barriers	Polyline	E	E
Road Reserve	Polygon	N/A	N/A
Shelters	Polygon	E	N/A
Signs	Point	E	E
Structures	Polygon	E	E
Surface (Seal)	Polygon	C	A
Surface Centreline	Polyline	E	N/A
Table Drain	Polygon	E	D
Tactile Paving	Polygon	D	N/A

R - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Text & Miscellaneous Graphics	Text	N/A	N/A
Traffic Management Devices – Area Polygons	Polygon	C	N/A
Traffic Management Devices – Points	Point	E	N/A
Traffic Signals	Point	E	E
Trees	Point	E	F
Vehicle Crossing	Polygon	E	N/A
Matching to Existing Infrastructure - Problems	Polygon	F	N/A

S-Spec – Wastewater Assets to be provided to the following precision codes.

Table 8 - S-Spec – Wastewater Assets Precision Requirements

S – Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Area of Works	Polygon	F	N/A
Access Point	Point	D	C
Access Point	Polygon	D	C
Conduits	Polyline	D	D
Electrical Cabling	Polyline	D	D
Electrical Equipment	Point	D	D
Wastewater Fitting	Point	D	D
Gravity Wastewater Pipe	Polyline	D	C
Gravity pipe Miscellaneous Text	Text	N/A	N/A
Instrumentation	Point	D	D
Matching to Existing Infrastructure - Problems	Polygon	N/A	N/A
Mechanical Equipment	Point	D	D
Other Network Structure	Polygon	E	E
Pressure Main Pipe	Polyline	D	C
Pressure pipe Miscellaneous Text	Text	N/A	N/A
Property Connection	Polyline	D	C
Wastewater Pump	Point	D	D
Pumping Station	Polygon	D	D

S – Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Pumping Station Site	Polygon	D	D
Support Structure	Polygon	D	D
Wastewater Valve	Point	D	D

W-Spec – Water Assets to be provided to the following precision codes.

Table 9 - W-Spec – Water Assets Precision Requirements

W - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Area of Works	Polygon	F	N/A
Access Point	Point	D	C
Access Point	Polygon	D	C
Cathodic Protection	Polygon	D	D
Conduits	Polyline	D	D
Electrical Cabling	Polyline	D	D
Electrical Equipment	Point	D	D
Fitting	Point	D	D
Water Hydrant	Point	D	D
Instrumentation	Point	D	D
Matching to Existing Infrastructure - Problems	Polygon	N/A	N/A
Mechanical Equipment	Point	D	D
Meter	Point	D	D
Wastewater Pump	Point	D	D
Platform	Polygon	D	D
Pressure Main	Polyline	D	C
Pumping Station	Polygon	D	D
Pumping Station Site	Polygon	D	D
Reservoirs	Polygon	F	F
Service Main	Polyline	D	C
Support Structure	Polygon	D	D
Tanks	Polygon	F	F

W - Asset Class	Data Type	Horizontal Precision Code	Vertical Precision Code
Area of Works	Polygon	F	N/A
Access Point	Point	D	C
Access Point	Polygon	D	C
Cathodic Protection	Polygon	D	D
Conduits	Polyline	D	D
Electrical Cabling	Polyline	D	D
Electrical Equipment	Point	D	D
Fitting	Point	D	D
Water Hydrant	Point	D	D
Instrumentation	Point	D	D
Matching to Existing Infrastructure - Problems	Polygon	N/A	N/A
Mechanical Equipment	Point	D	D
Valves	Point	D	D

1.7 Match to AS 5488-2022

Preamble

AS5488 has been established as a standards framework for the classification of subsurface utility infrastructure based on the method of detecting underground utility infrastructure. GISSA has reviewed the standard and has determined that it has an impact on specific infrastructure within the following A-SPEC Specifications.

- **D-Spec** – stormwater drainage, typically for pits, pipes and property connections for raw water, harvested water and stormwater.
- **R-Spec** – intelligent transport systems underground assets, cabling and conduits.
- **S-Spec** – wastewater infrastructure, typically access points, pipes and property connections, fittings, valves for collection and treatment of waste water and grey water.
- **W-Spec** – water infrastructure, typically for pipes, service connection for the distribution of potable water, reclaimed/reused/recycled water.

The intention of matching A-SPEC to AS5488 is to identify the data that would be collected via the location and classification of underground infrastructure utilising the AS5488 standard and what if any additional information would need to be provided to comply fully with the A-SPEC requirements.

Our review identified that the requirements outlined in the AS 5488 – 2022 document appear as either fields within our current data model structure or as codes which can be selected to describe characteristics of asset types and related information.

As AS 5488 – 2022 is not intended to prevent or encumber any entity that maps subsurface utilities from using its own symbology in its own systems, this section has been created with the distinct purpose and objective to provide a succinct **ROAD MAP** to comply with the **A-SPEC** requirements.

Previous versions of the specifications referred to a table B1(modified) from AS 5488:2013 and GISSA received permission to reproduce this table to address the alignment with A-SPEC (Reproduced with permission from SAI Global Ltd under Licence 1309-c020). Please note B1 has now been replaced by tables A1 & A2 and B3 has been replaced by Table A4 in AS 5488.2:2022.

Please refer to each of the specifications listed above for more specific information for the Roadmap from AS 5488 to the relevant specification.

The following is an extract from the AS 5488.2:2022 published Standard.

Australian Standard

Classification of Subsurface Utility Information (SUI)

Part 1: Subsurface Utility Information

1 – SCOPE AND GENERAL

1.1 SCOPE

This document provides a framework for the classification of subsurface utility infrastructure based on location (i.e. the act or method of detecting the utility), position (i.e. the spatial information or coordinates of that utility) and attribute information from which specified quality levels are assigned for the management of subsurface utilities.

This document applies to subsurface utilities and associated surface features that facilitate the location, positioning, identification and engineering management of subsurface utility infrastructure.

This document also applies to all existing (including redundant) and under-construction subsurface utility infrastructure.

This document describes common methods for locating (i.e. detecting) subsurface utility infrastructure, but does not provide guidance on specific methods to determine, manage or apply spatial position information.

This focus recognises that physically confirming the presence and identity of infrastructure is historically the primary concern when considering safe access or avoidance.

1.2 APPLICATION

1.2.1 General

This document is intended for users of subsurface utility infrastructure information throughout the lifecycle of the utility, including those that collect, represent, map and manage such infrastructure information.

1.2.2 Representation of subsurface utilities

The representation of subsurface utilities on maps, plans and electronic records, in terms of symbology, line types and colours is the prerogative of the entity that owns or operates the utility. Although this document recommends how this information should be recorded (see Appendix B), it is not intended to prevent or encumber an entity that maps subsurface utilities from using its own symbology, line types and colours to depict and record subsurface utilities in its own geographic information systems, mapping databases, plans, drawings or other records.

This standard provides a framework for consistency through information classification for utility owners, locators and operators for identification of subsurface utilities.

Table-A.1 (modified)

Table 10 - Table A1 (modified) of AS5488 Utility Asset Identifiers and Match to A-SPEC

Attribute Information from AS5488	A-SPEC Coverage
asset identifier	Unique Identifier for each asset object. Varies according to the asset type.
asset type	<p>D-Spec – Stormwater/Raw water; R-Spec – Underground ITS features S-Spec – wastewater/sewerage; W-Spec – Potable water, re-use/recycled.</p> <p>Agnostic of colour and line styles. Therefore can accommodate directly.</p>
asset sub-type	Feature as per Table 1.3 Theme/Layer Structure.
asset owner	Included as an attribute in appropriate tables in every specification
feature code	Coding for all required features are specified in CODELISTS in every specification.
size	Included as an attribute in relevant attribute tables in every specification.
size description	This information can be provided in the 'Comments' field.
status	Included as an attribute in relevant attribute tables in every specification.
material	Included as an attribute in relevant attribute tables in every specification.
configuration	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
quality level	This information can be provided in 'Source' and 'Comments' fields.
source of information	This information can be provided in the 'Comments' field.
date information obtained	This information can be provided in the 'Comments' field.
locating methods	This information can be provided in the 'Comments' field.
asset geometry	As per Graphical Representation for each asset.
position information	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
capacity	Included as an attribute in relevant attribute tables in every specification.
condition	Not part of A-Spec, but, photo feature and comments field could be utilised.
utility install date	Refer to Construction Date in AOW.
comment	This information can be provided in the 'Comments' field.

Table-A.2

Table 11 - Table A2 of AS5488 Location Supplementary Information to be provided by Locator

Attribute Information from AS5488	A-SPEC Coverage
position identifier	Captured as the Unique Identifier.
horizontal datum	Captured in Area of Work extent table and Readme File provided for each project.
easting	Can be derived from GIS.
northing	Can be derived from GIS.
vertical datum	Captured in Area of Work extent.
reduced level	Captured depending on asset feature.
position record type	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
authoritative point name	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
locating methods	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
survey metadata	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
date position determined	This information can be provided in the area of work extent.
indicative position description	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
interpolated position description	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
relative horizontal position description	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
relative vertical position description	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
depth to utility feature	Captured depending on asset feature.
quality level	This information can be provided in 'Source' and 'Comments' fields.
pit report	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
pothole report	Supplementary information to be provided as an addendum to A-SPEC data with Readme File provided for each project.
notes	This information can be provided in the 'Comments' field.

1.7.1 AS5488 Utility Asset Type and Match to A-SPEC Asset Class

The following table represents Utility Asset Types identified in the AS5488.2:2022 document and their match to A-SPEC.

If assets are identified that as 'Other' in the AS5488 documentation please check the relevant A-SPEC Asset Class Type Code List as this will need to be provided in the asset data provided.

Table 12 - AS5488 Utility Asset Type and Match to A-SPEC Asset Class

UTILITY ASSET TYPE	Asset SubType	Description	A-SPEC Specification	A-SPEC Asset Class	Notes
Stormwater	Fitting	Joining or flow controlling feature	D		Proposed for future update. More common on pressure pipes not gravity systems.
Stormwater	Pipe	Pipe conveying stormwater	D	Pipes	
Stormwater	Pit	Pit part of the stormwater network	D	Pits	
Stormwater	Property connection	Connection to property	D	Property Connections	
Stormwater	Pump well	Pump well associated with a pump station	D		Proposed for future update. More common on pressure pipes not gravity systems.
Stormwater	Support structure	Such as anchor blocks	D		Proposed for future update. More common on pressure pipes not gravity systems.
Stormwater	Valve	A feature to regulate or control flow	D		Proposed for future update. More common on pressure pipes not gravity systems.
ITS (intelligent transport systems)	Camera	Traffic monitoring	R	ITS Points	
ITS (intelligent transport systems)	Controller	Traffic controller	R	ITS Points	
ITS (intelligent transport systems)	Inductive Loop	Inductive loops for traffic monitoring	R	ITS Polygons	
ITS (intelligent transport systems)	Sensors	Traffic sensors	R	ITS Points	
ITS (intelligent transport systems)	Sensors Loops	Traffic sensor loops	R	ITS Polygons	
ITS (intelligent transport systems)	Signalling	Traffic signalling	R	Traffic Signals	

UTILITY ASSET TYPE	Asset SubType	Description	A-SPEC Specification	A-SPEC Asset Class	Notes
ITS (intelligent transport systems)	Video	Traffic monitoring	R	ITS Points	
Lighting	Decorative Lighting	For decorative purposes	R	Lighting	Only if it is a council asset.
Lighting	Directional Lighting	For illumination specific area	R	Lighting	Only if it is a council asset.
Lighting	Earthing	Earthing cable	R		
Lighting	Flood Lighting	For illumination of large area	R	Lighting	Only if it is a council asset.
Lighting	Pit		R		Future Update.
Lighting	Sports Lighting	For illumination of sports areas	R	Lighting	Only if it is a council asset.
Lighting	Street Light	For street illumination	R	Lighting	Only if it is a council asset.
Electricity	Cabling	An assembly of cables that are used for carrying electricity.	S,W	Electrical Cabling	If part of an asset such as a site, then use this from the specification.
Electricity	Conduit	Protective piping system for electrical assets	S,W	Conduits	If part of an asset such as a site, then use this from the specification.
Electricity	Earthing	Electrical cables	S,W	Electrical Cabling	If part of an asset such as a site, then use this from the specification.
Electricity	Pit	A pit for inspection and distribution	S,W	Access Points	If part of an asset such as a site, then use this from the specification.
Electricity	Cathodic Protection	Electrochemical process to protect assets from corrosion.	W	Cathodic Protection	
Fire	Fitting	Joining or flow controlling feature	W	Fitting	
Fire	Hydrant	Extraction point for water	W	Water Hydrants	
Fire	Tap	Connection point to extract water	W	Fittings	
Fire	Valve	A feature to regulate or control flow	W	Valves	
Water	Fitting	Joining or flow controlling feature	W	Fittings	
Water	Hydrant	Extraction point for water	W	Water Hydrants	
Water	Tap	Tapping to a distribution main	W	Service connection	

UTILITY ASSET TYPE	Asset SubType	Description	A-SPEC Specification	A-SPEC Asset Class	Notes
Water	Valve	A feature to regulate or control flow	W	Valves	
Water	Mains	Primary distribution pipe	W	Pressure Main	Often the same type of asset.
Water	Supply	Primary supply pipe	W	Pressure Main	Often the same type of asset.
Water	Distribution	Regional main pipe	W	Pressure Main	Often the same type of asset.
Water	Service Connection	Connection to a property	W	Service connection	
Wastewater	Fitting	Joining or flow controlling feature	S	Wastewater Fitting	
Wastewater	Inspection hole/point/shaft/maintenance shaft	Access point not accessible only with instruments	S	Access Points	
Wastewater	Access Chamber	Access point accessible by humans	S	Access Points	
Wastewater	Pipe	Pipes or property connections that convey wastewater	S	Gravity Wastewater Pipe or Pressure Main	
Wastewater	Property connection	Connection to property	S	Property Connections	
Wastewater	Pump well	Pump well associated with a pump station	S	Access Points	
Wastewater	Support structure	Such as anchor blocks	S	Support Structure	
Wastewater	Valve	A feature to regulate or control flow	S	Wastewater Valves	
Wastewater	VENT	An above ground asset used to dispel gases and odours	S	Access Points	
Wastewater	Wet well	Wet well associated with a pump station	S	Access Points	

1.8 Matching to Existing Infrastructure

“As Constructed” digital data of the assets are:

1. to be positioned relative to the respective map bases
2. to be positioned relative (i.e. connecting with where practicable) to the existing digital Road Reserve data

The exception to this is when the position of the new assets clearly indicates a discrepancy when compared to the position of the existing assets. When this occurs the consultant is to record this discrepancy as outlined in the table in each document in **Section 1.3 Themes/Layer Structure**.

It is the responsibility of the consultant to ensure the “As Constructed” digital data of the assets are aligned to the current digital data held in the A-SPEC Consortium members’ GIS or as otherwise agreed. If requested and available, the A-SPEC Consortium members will make available an extract of any digital data held in their respective GIS environments covering the specific project area.

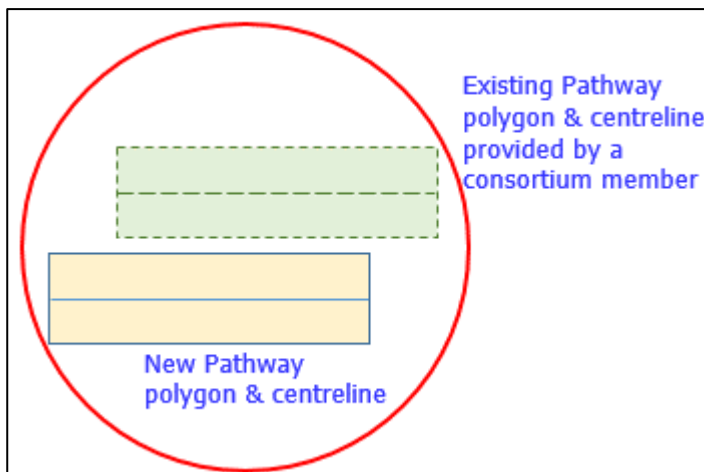
Consultants are to use **Attachment 1: Request for digital data** to obtain this extract.

Should the consultant find any discrepancies in matching to the existing infrastructure data provided by the Consortium member, a problem log must be completed as per the **Problem Attribute & Validation File Format Instructions** seen in **Data Attribute Table 1 & Error! Reference source not found..** This will be used to inform A-SPEC Consortium members of any discrepancies that need to be investigated and rectified by the member.

These measures will ensure that all new assets are recorded relative to the existing data sets to enable:

1. integration into A-SPEC Consortium member’s respective GIS and Asset Management environments.
2. completeness of asset management information within the A-SPEC Consortium members respective AMIS environments.
3. confirmation of the location of the assets.
4. continuous improvement process.

Example: In this example the existing information is identified with the dashed lines.



1.8.1 Problem Attribute & Validation File Format Instructions

Assets with problems matching to existing infrastructure are to have circles of radius 10m around them.

Data Attribute Table 1 - Problem Attribute & Validation File Format Instructions

Problems Attribute File Format Instructions					
Column Name	Data Type	Max Length	Comments	Description	QA Validation
AOW_ID	Alpha / Numeric	100 chars	No commas included	Unique Identifier for the area of work relevant to this project. To be created by the data supplier. The purpose of this identifier is to identify all assets created under this project. The following examples are provided as a guide only: EG:RAPIDSSTG38_20190529 EG:LOT9000REDGATERD_20190501	Field cannot be empty. If a date is to be used, record it using the following format: yyyyymmdd. EG: 29th May 2019 = 20190529 EG: May 2019 = 20190501
Problem_No	Alpha/Numeric	10 chars	No commas included	Problem Number – Unique number to this project	Field cannot be empty.
Asset_Type	Alpha	20 chars	No commas included	Type of asset that has a problem	Field cannot be empty.
Comment1	Alpha/Numeric	250 chars	No commas included	Comments about the problem	Field can be empty.
Comment2	Alpha/Numeric	250 chars	No commas included	Additional comments about the problem	Field can be empty.
Photo_Ref	Alpha/Numeric	100 chars	No commas included	Reference photograph of asset. EG: 12345abcd67ef.jpg	Field cannot be empty. Provide photographic references for all new and existing assets. For existing assets, Default=N/A For additional photos, use the 'Comments' field.
Sub_Name	Alpha/Numeric	100 chars	No commas included	Subdivision or Project Name EG: Rockbank Rise	Field can be used for either a subdivision or capital works project
Stage_No	Alpha/Numeric	10 chars	No commas included	Subdivision or Project Stage Number EG: 7 or 3B	Field can be used for either a subdivision or capital works project. If no number allocated for the work stage, Default=N/A

Example Problem Log

1.8.2 Example of Completed Problem Log

Table 13 - Example Problem Log

Problem Log - Attribute File Format Instructions		
Column Name	Comments	Description
AOW_ID	RapidsStg3	
Problem_No	No commas included	1
Asset_Type	No commas included	Water Hydrant
Comment1	No commas included	Mismatch to link with existing infrastructure – 2.3m to the south from original location.
Comment2	No commas included	
Photo_Ref	No commas included	N/A
Sub_Name	No commas included	Rockbank Rise
Stage_No	No commas included	3B

2 Attribute File Specifications

This section provides details of the attribute fields and their respective validation requirements for each asset table and includes the following information.

All coordinates will be provided in the preferred datum of each individual **A-SPEC** Consortium member as specified on the **A-SPEC** website www.a-specstandards.com.au or as otherwise agreed to with the respective Consortium member.

2.1 Attribute Data Field Requirements

This section details the attribute field data entry requirements that data providers are to adhere to for all data submissions.

Please note that the Project related data needs to be provided only once in the Area of Works Extent polygon and attributes.

We do acknowledge that the Project related data may be different such as a smaller area of work for the location of tree assets

The following are the key requirements for the structure of the data to be provided in each submission.

- Maximum field widths are specified for Alpha/Numeric and Alpha data.
 - These are to be adhered to.
- For decimal data the number of characters after the decimal point are specified.
- Date fields are to be provided as dd/mm/yyyy – EG: 07/06/2001.
- All fields are to be populated in accordance with the notes supplied for each field.
- All Attribute fields are to use the Column Names and structures set out in **Section 2 – Attribute & Validation File Format Instructions**.
- Validation checks for each data field have also been provided in **Section 2 – Attribute File Format Instructions**.
- A set of CODELISTS are provided to standardise the capture of information in the Attribute files. They can be found in **Section 3 – N-Spec Code Lists** of each specification document.
 - Please note that from time to time, the Code Lists will change
 - The Code List API is now available for use.
 - The **A-SPEC** website will also contain the most current Code Lists.
- If a Code does not exist the new asset feature is to be recorded in the “**Comments**” field and a note sent via the A-SPEC website **ContactUs** form so a new code can be created.
- API notification of changes, additions etc
- All fields that are common to all tables are captured in the Area of Work Extent table
- Please take note of default values for specific fields. These have been provided for the relevant fields.
- Please note that every attribute name is case sensitive. Use the given name format when creating your fields to supply the data.

2.1.1 Existing versus Newly Constructed Assets Attribute Data Field Requirements

There are instances where an asset owner has 'legacy assets' where typically, very little is known about them or they have 'found' assets that they did not previously know existed.

It is at times not practical to collect the full range of data as specified in the various A-SPEC standard specifications. Therefore, to ensure that asset data collected is consistent, each A-SPEC standard specification has a twin tailored capturing data for assets that already exist.

Utilising the A-SPEC Standard Specifications as the foundation elements, the tailored twin was created in parallel and is in harmony with the full version. Readers will observe that in the documents for the Existing Assets, each attribute for each asset type has been categorised according to its importance and its practicality of data capture. **Data Attribute Table 2** below outlines the Categories.

Data Attribute Table 2 - Attribute Categories

Existing Assets Data Requirement	Description
C	Core requirement – data is to be collected in the field to populate the attribute
YR	A required attribute and may need more research possibly through sourcing existing plans in the office
O	Optional field

2.2 Attribute Data Validation Requirements

Please note the column **QA Validation** stipulating the Validation Check to be carried out is provided as a guide to assist Developers/Consultants when putting together information for submission.

There may be one or more rules that must be applied, for example the "Field cannot be empty."

Sometimes a default value will be provided.

Please note that where "Conditional" is stipulated. This highlights that the attribute field is linked to another attribute field and is to be populated conditionally based on another field.

Example: The attribute 'Source' is to be populated in the Area of Work Extent table only if the 'Source' of the information is the same for the whole project. If the asset doesn't meet this condition, then the Code 'REFER', is to be used and each table is to be populated accordingly.

Read attribute descriptions carefully to ensure the conditions are met and fields populated appropriately before submitting asset data.

2.3 Attribute Data Types

This section outlines the different data types used within the specifications.

Name	Technical Specification	Description
Alpha / Numeric	varchar(m)	[a-z], [A-Z],[0-9],[Letters and digits where m is the maximum number of characters allowed, e.g. 10 chars could be "Abcdef_123" but not "Abcdef_1234"
Boolean	boolean	A data type with only two possible values: True or False
Boolean using Alpha	varchar(m)	[a-z],[A-Z],[Alphabetical (letters only), where m is the maximum number of characters allowed. E.g. 1 char "Y"
Date	date	Format DD/MM/YYYY
Decimal	decimal	Please note this may be a negative number especially when dealing with Invert levels of pipes. <i>The total number of digits to be stored is not specified to accommodate different systems.</i>
Integer	integer	Positive whole number (0 to 18,446,744,073,709,551,615)

2.4 Attribute Table Column Explanations

This section defines the purpose for each column in the attribute tables.

Metadata Element Name	Definition
Column Name	An abbreviated name for the attribute field adopting the "underscore_case" structure, e.g. "DS_Pipe_No" The field name is limited to 10 characters to enable the delivery of data in ESRI Shape file format if required.
Data Type	Defines the type of data the field is to hold, for example "Alpha / Numeric". Please refer to Table in section 2.3 Attribute Data Types
Max Length	Where relevant the maximum length of the Data Type is provided, for example "35 chars" (representing 35 characters).
Comment	Additional information provided to fully describe what the data type will consist of, for example "2 decimal places", "No commas included" or "Yes or No field".
Contents	Information to fully describe what the attribute field is for. For example "The current operational state of the asset". Sometimes an example is included as a sample value. "ABN" a value from the Codelist.
QA Validation	Lists one or more rules that must be applied, for example the "Field cannot be empty." Sometimes a default value will be provided.
CODELIST Reference	A list of allowable values to be used. E.g. the list of materials that a Pipe can be described by such as "uPVC". The field is limited to 10 characters.

2.5 Coordinate fields

The key objective of storing this information is to ensure that the practice of collecting the “As Constructed Information” meets the accuracy requirements of the **A-SPEC** Consortium. The accuracy of the information must be relative to the property boundary.

As all new cadastral information in Australia is placed on the MGA (Map Grid of Australia) grid it is an expectation that all data provided by consultants will be representative of this level of accuracy.

Where significant discrepancy occurs between the relevant jurisdiction’s mapbase and the coordinates of the cadastral development as a result of the unavailability of the connection to the MGA grid, then the consultant will notify the consortium member so that steps can be taken to record the adjusted coordinates.

The key objective of having this notification in place is to take into consideration occurrences where the cadastral mapbase exceeds a particular accuracy. This is to ensure that if required the assets can be located via means of a GPS or other distance measurement equipment.

In Australia – All Z coordinates (levels) will be provided in AHD metres in accordance with the jurisdictional requirements.

2.6 Photography Requirements

This section details the requirements for the provision of relevant photographs for assets that data providers are to adhere to for all asset and asset data submissions.

The intention of taking photographs is

- a. Confirm the type of asset constructed or installed
- b. Provide supplementary details not easily captured
- c. Provide a photographic record for the asset owner for each specific asset.

There will be instances for linear assets such as pipes, kerbs, roads etc. where the asset extends over a distance and the data provider needs to determine the optimal location of the photo. By understanding the purpose of the photographs, the data provider will be able to establish where and how many photographs are to be taken.

The intention of the following information is to provide guidance in respect of

1. Number of photographs to be provided
2. Location of the photographs
3. Cataloguing of the photographs

Number of Photographs

As previously mentioned, the number of photographs required will be determined by the type of asset being constructed or installed. There will be instances where there may be only one photograph required, two or more than two required.

For example, a bin or a barbeque typically will only need one photograph. Kerbs, typically will also only need one photograph to show the profile and another at a change of profile or construction.

Signs may require up to two photographs, one to show the overall sign and a second to show any specific detail that would be important for the asset owner to know, such as wording for signs that have multiple panels and multiple wording. For example, an interpretive sign as shown in **Figure 5**.



Figure 5 - Example of Sign requiring multiple photographs

Image Source: The Local Government & Municipal Knowledge Base

Assets that require more than two photographs can include pipes from stormwater, wastewater and water networks and road infrastructure networks.

In the instance of pipes, photographs can include

- a. The pipe itself – to show its profile
- b. A joint between the pipes and
- c. Connection to another asset, such as an access point or a fitting.

3 Code Lists

This section provides details for a set of related Code Lists. Code Lists are used to standardise terminology by providing a range of item descriptions relating to a particular attribute. Please note that a number of attributes specified in the attribute fields may require the input of a code list entry number.

Consultants Readers please note: If a Code does not exist, enter the value 'SeeComment' in the attribute field and the new asset feature is to be recorded in the "Comments" field. We request that a note is sent via the A-SPEC website **Contact Us** form (<https://www.a-specstandards.com.au/contact>) so a new code can be created, ratified and distributed.

If there is 2 or more new values per record, please outline in the comments field what those values relate to.

It is also important to note, that with the creation of the existing specifications there are codes that are not appropriate for the 'DDS' Versions (versions for new assets) that may be appropriate for assets that already exist.

For example in the 'DDS' versions (D-Spec DDS. R-Spec DDS etc) the value **UNKNOWN** ("UNK") is not a valid entry as all values would be known. Whereas in the 'Existing' versions (D-Spec Existing. R-Spec Existing etc) this would be a valid entry.

Code List entries will be constantly be reviewed by GISSA and the A-SPEC Community and additions and amendments made as the need arises.

Refer to the A-SPEC website (www.a-specstandards.com.au) for the up-to-date register or request access to the Code List API.

4 A-SPEC Document Control

Project Name	A-SPEC Introduction for Digital Data Standard Specifications
Document Type	Introduction and accompanying document for all the Standard Specifications
Document Number	AS-2019-0005
File Name	A-SPEC DDS – Introduction & Overview V5 FINAL - 20230904.docx
Version Date	4th September 2023
Written by	Duncan Brooks and George Havakis
Reviewed by	George Havakis & A-SPEC Community
Authorised by	George Havakis

5 Document Revision History

Revision Number	Date	Comments
V1-Draft A	15 February 2015	Draft document to NZ TWG of new format for A-SPEC documents
V1 Draft B	6 January 2017	Updated document for distribution to Australian members
1.0.0	1 March 2017	Updated for NZVD2016 and LINZS25002 (NZ geodetic and vertical datums)
1.0.0	11 April 2017	Updated Bass Coast logo
1.1.0	5 January 2018	Addition of logos for new members and updates following updates to D & R-Specs
2.0.0	10 September 2018	Finalised Asset Types and Specifications, document number, version, and dates Changes adopted and finalised
2.0.1	15 November 2018	Incorporate feedback from members
2.0.5	31 May 2019	Incorporating Addendums and other feedback from members
3		Not applied
4		Not applied
5 Draft	19 January 2023	Incorporating feedback from members, grammatical corrections and additions
5 Final	24 February 2023	Finalised for publication
5 Final	8 March 2023	Updated the roll out date to 1 September 2023
5 Final	24 April 2023	Modification to checklist, addition of Section 1.5.1
5 Final	4 September 2023	Issued Final document

6 Summary of Specification Changes

The following is a summary of changes made to the **A-SPEC Introduction Document** from the last official release – officially released version – Version 2.0.5 in 2019. Please note the reference to the change is a hyperlink.

Item #	Change
	MODIFICATIONS TO THE DOCUMENT
1.	Modification to - A-SPEC Standard
2.	Modification to Use of the Specifications
3.	Modification to In Summary section
4.	Modification to – Industry Consultants Responsibilities section
5.	Modification to – A-SPEC Consortium Member’s Responsibilities section
6.	Modification to - Table 1 - Suite of Specifications linked to this release
7.	Modification to Victoria - Industry Consultants Responsibilities
8.	Modification to - Certification Form - Readme / Metadata File
9.	Modification to 1.3.1- Asset Types and their Relevant Specifications
10.	Modification to 1.6 - Acceptance Testing
11.	Modification to 2.1 - Attribute Data Field Requirements
12.	Modification to 2.2 - Attribute Data Validation Requirements
13.	Modification to 3 - Code Lists
14.	Modification to - Area of Work Extent
15.	Replaced term ‘Sewer’ with ‘Wastewater’
	ADDITIONS TO THE DOCUMENT
16.	Addition of Version Control and Changes in Documents section
17.	Addition of Roll Out of New Versions section
18.	Additional Section added – 1.1.1.3 - Common EPSG Codes - Coordinate Reference Systems – Australia
19.	Additional Section added - 1.1.1.3 - Australian Terrestrial Reference Frame 2014
20.	Additional Section added - 1.1.1.3 - Preparing for Shift to GDA2020 or ATRF 2014
21.	Additional Section added – 1.3.2 – Asset & Asset Data Handover Checklist
22.	Additional Requirement added to 1.4.2 - Area of Work Extent
23.	Additional Section added – Section 1.5.1 - Definition of Geometries
24.	Additional Section added – 1.6.1 - Noting Deviation from Design
25.	Additional Section added – 1.6.2 - Asset Recording Accuracy & Precision Principles
26.	Additional Section added – 1.7 - Match to AS 5488-2022
27.	Additional Section added – 1.7.1 - AS5488 Utility Asset Type and Match to A-SPEC Asset Class
28.	Additional Section added – 1.8 - Matching to Existing Infrastructure
29.	Additional Section added – 2.1.1 - Existing versus Newly Constructed Assets Attribute Data Field Requirements
30.	Additional Section added – 2.6 – Photography Requirements
31.	Inclusion of Attachment 1: Quality Report

Attachment 1: Quality Report

A quality report is to be provided to document the changes where the construction of assets deviates from the design and falls outside of the acceptable tolerances as specified by current jurisdictional construction practices.

Please refer to **Section 1.6.1 – Noting Deviation from Design**.

Project QA Report

Example QA Report to be Submitted

Project Or Subdivision	Boggy Creek Town Hall Precinct
Stage	N/A
A-SPEC Consortium Member	ABC Council
Date Submitted	20 January 2023
Submitted by	GISSA International

Using examples from each specification as a guide. The following table lists some examples of how to complete this form.

Spec	Asset	ID	Attribute	Ascon	Design	Tolerance	Difference	Comments
B	Public Toilet	ABC123	No of WC's	4	3	NA *	+1	Change Agreed to by ABC Council
D	Pit	JP123-A	NA	NA	NA	NA	NA	New pit added. Change Agreed to by ABC Council
O	Exercise Equipment	GHO37	Type	Clatter Bridge	Climbing Frame	NA	NA	Changed Type Agreed to by ABC Council
R	Traffic Mgt Device	ABC123	Type	NA	Bollard	NA	NA	Not installed notified and agreed to by ABC Council
S	Gravity Wastewater	BG-C20 to BG-C21	US_IL	70.65	70.6	0.015-0.020	0.05	Outside tolerance. Change Agreed to by ABC Water Authority
W	Fitting	SEP43	NA	NA	NA	NA	NA	Fitting removed. Change Agreed to by ABC Authority

Please note:

1. If further comments are needed, please include in the 'Comments' field.
2. * NA refers to Not Applicable