# QCS Asset Information Requirements – July 2021 Update

OFFICIAL:PUBLIC

# Revision History

| Rev. | Date | Description | Author |
|---|---|---|---|
| 0 | 8th September 2020 | First Draft | SB (DBMV) |
| 1 | 16th October 2020 | Second Draft for QCS Review | SB (DBMV) |
| 2 | 30th October 2020 | Final Draft for Milestone Delivery – Contract Close-out | SB (DBMV) |
| 3 | 5th July 2021 | Update into new QCS templates; edits; preparation for DSDLGIP / WoG. | DB (QCS) |



The original version of this document, including Plain Language Questions (PLQs) and the Asset Data Dictionary, was completed by DBM Vircon for QCS, who are duly acknowledged.

# Contents

# Introduction

Queensland Corrective Services (QCS) are committed to support the application of Digital Engineering (DE) for the delivery, operations and management of their facilities. To enable this, QCS are implementing industry best-practice procedures whilst implementing guidelines stated in government protocols as well as industry standards, both locally and globally, where value can be derived for their assets. This implementation is backed by the Department of Energy and Public Works (DEPW) application of the Queensland Government BIM mandate as highlighted in the ***Digital Enablement for Queensland infrastructure – Principles for BIM Implementation*** where the following principles are applied to:

- All Queensland Government departments, agencies and statutory authorities;
- the design, delivery and asset management of all new major construction projects including those with an estimated capital cost of $50 million or more which commence a detailed business case from 1 July 2019, and those involving significant alterations, extensions, renovations and repurposing of existing assets; and
- projects where government departments, agencies and statutory authorities see the value in BIM to manage existing assets or projects with an estimated capital value below $50 million.

The QCS Asset Information Requirements (AIR) and its supporting information have been developed in order to progressively define and capture the changing and evolving information requirements, to achieve its planned digital objectives and outcomes.

The QCS AIR specifies QCS's expectations in relation to the creation, management, storage and update of asset data/information required to support the operation and maintenance of QCS's assets. In relation to individual projects, the AIR shall be interpreted as a component of the overarching project brief. As such, when applied to a project, the AIR specifies QCS's requirements for modelled and existing asset information.

## BACKGROUND

As industry matures and leverages a range of approaches to improved management of information, various suites of Standards, Strategies and Policies are created by Asset Owners to better enable asset operations and maintenance. These standards are increasingly highlighting the value of informing Asset Management through Digital Engineering approaches, such as Building Information Modelling (BIM) and Geographic Information Systems (GIS). They include:

- **International Standards and Guidelines:**
    - ***AS ISO 55000:2014*** *- Asset Management – Overview, Principles and Terminology;*
    - ***ISO 19650-1:2018*** *- Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 1: Concepts and principles;*
    - ***ISO 19650-2:2018*** *- Organisation and digitisation of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 2: Delivery phase of the assets;*
    - ***ISO 19650-3:2020*** *- Organization and digitisation of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 3: Operational phase of the assets;*
    - ***ISO 19650-5:2020*** *- Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) — Information management using building information modelling — Part 5: Security-minded approach to information management;*
    - ***BS 1192-4:2014*** *- Collaborative Production of Information (Part 4);*
    - ***BS 8536-1:2015*** *- Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure);*

- ***BIM Forum Level of Development (LOD) Specification Part 1 and Commentary (2019)*** - *For Building Information Models and Data;*
- ***Centre for the Protection of National Infrastructure (CPNI)(UK)*** - *Plain Language Questions;* and
- ***Uniclass 2015 Classification*** *(NBS).*

- **National Guidelines:**
  - ***Australasian BIM Advisory Board (ABAB) Asset Information Requirements (AIR) Guide;*** and
  - ***Virtual Building Information System (VBIS) Classification.***
- **Client Strategies and Guidelines:**
  - ***Corrections 2030;***
  - ***QCS Strategic Plan;***
  - ***QCS Strategic Asset Management Plan;***
  - ***QCS Electronic Security Standards;*** and
  - ***QCS BIM Implementation Plan.***

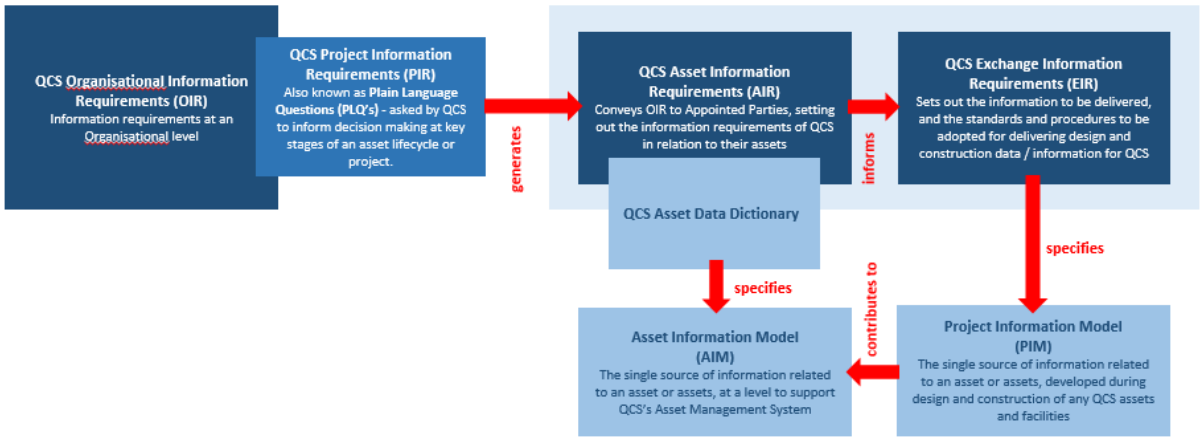
***Uniclass 2015*** and ***VBIS*** shall be implemented as the classification system as specified by QCS.

## PURPOSE

This document lays out QCS's Asset Information Requirements (AIR) in line with the process covered in ***ISO 19650-2:2018*** and ***ISO 19650-3:2020*** as a sub-set of the Organisational Information Requirements (OIR).

**Figure 1** below shows the relationship between all of QCS's current and future Information Requirements as well as outputs from these in the form of Asset and Project Information Models (AIM and PIM respectively):

*Figure 1. QCS Information Requirements relationships (adapted from ISO 19650-3:2020)*




The QCS AIR sets out the requirements for information to meet the needs of QCS and their Stakeholder's chosen Asset Management Systems with considerations made for other organisational functional requirements. The AIM shall be used by the Asset Management teams to operate and maintain QCS's assets.

The purpose of the AIM is to be the single source of approved and validated information related to the assets. This includes data and geometry describing the assets and the items associated with it, data about the performance of the assets, supporting information about the assets including:

- Specifications;
- Operation and Maintenance manuals;
- Health and Safety information;
- Financial information;
- Lifecycle information; and
- Risk information.

Data and information stored within a discrete information model should take place within the context of an Asset Management System, including the preparation of plans, Organisational Information Requirements (OIR) and Plain Language Questions (PLQs) relating to QCS's data and information requirements covered in the AIR.

For use on projects, this document is to be read in conjunction with the latest update to the QCS Asset Data Dictionary.

## ASSUMPTIONS

The QCS Asset Information Requirements (AIR) have been informed by the high-level requirements established through the development of QCS's Organisational Information Requirements (OIR).

Through the establishment and categorisation of the information requirements, the needs of QCS are achieved along with those of their Stakeholder's Asset Management Systems and other organisational functional and system requirements through the continual development and implementation of the QCS AIR.

It is imperative that input is received from all Stakeholders, in particular from those involved in the strategic decision making associated with the asset portfolio and asset systems, through response to Plain Language Questions (PLQs) derived from the following Industry standards and guidelines (Refer **Section 2.1**):

- ***ISO 19650-3:2020;***
- ***ISO 19650-5:2020;***
- ***BS 1192-4:2014;***
- ***BS 8536-1:2015;***
- ***Australasian BIM Advisory Board (ABAB) - Asset Information Requirements (AIR) Guide;*** and
- ***Centre for the Protection of National Infrastructure (CPNI)(UK)*** - *Plain Language Questions.*

These responses have been captured and have been taken into consideration for the development of the AIR.

QCS have developed and published a business case through the development of their OIR, identifying the potential benefits of creating a digital information model through the following activities as defined in ***ISO 19650-3:2020***:

- optimizing the asset management strategy and optimizing/prioritizing its asset management plan(s);
- assessing the financial benefits of planned improvement activities;

- modelling the asset to support operational decision making;
- determining the operational and financial impact of asset unavailability or failure;
- making life cycle cost comparisons of alternative capital investments;
- identifying expiry of warranty periods;
- determining the end of an asset's economic life, e.g. when the asset related expenditure exceeds the associated income;
- determining the cost of specific activities (activity-based costing), e.g. the total cost of maintaining a specific asset(s)/asset system;
- obtaining / calculating asset replacement values;
- undertaking financial analysis of planned income and expenditure;
- obtaining / calculating the financial and resource impact of deviating from plans that might result in a change in asset availability or performance (e.g. what is the financial impact of deferring the maintenance of a specific asset);
- assessing its overall financial performance; and
- undertaking the on-going identification, assessment and control of asset related risks.

# Governance

Through the establishment of QCS's Organisational Information Requirements (OIR), definition of the Program's Asset Information Requirements (AIR) and the Project Information Requirements (PIR / PLQs) will be achieved along with informing the future Exchange Information Requirements (EIR). This is enabled through the capture of expected Asset Management capabilities; at high level to capture organisational requirements, as well as to assist in developing the relationships between the information requirements and the relevant functional needs.

## PLAIN LANGUAGE QUESTIONS (PLQ)

Project Information Requirements (PIR), also known as Plain Language Questions (PLQs), articulate information requirements in simple, "lay-person's" terms and enable information exchange between key project/asset stakeholders throughout the entire lifecycle of an asset and / or facility.

It is imperative to ensure that questions can be asked by those defining Asset Information Requirements (AIR), prompting them to think not only about the information they require, but also to assess its relative importance.

Following Industry best-practice, various approaches have been proposed and utilised through workshops with key Stakeholders to achieve the above benefits. These can be seen in the following sections.

## DATA PURPOSE APPROACH

Plain Language Questions (PLQs) were defined to outline how thinking about the purposes for which data is needed, can assist in defining Asset Information Requirements (AIR). These PLQs provide guidance to internal stakeholders, prompting them to not only think of the information required for delivery relevant to their function(s), but also to assess its importance to ensure informed decision-making is enabled at key stages of each Project.

These PLQs have taken into consideration Industry best practice and are as highlighted within the following Industry Digital Engineering / BIM Standards and Guidelines:

- ***BS 1192-4:2014;*** *and*
- ***Australasian BIM Advisory Board (ABAB) Asset Information Requirements Guide: Information required for the operation and maintenance of an asset.***

## SECURITY-MINDED APPROACH

Due to the nature of QCS's facilities, security of data / information has been taken into serious consideration. Plain Language questions (PLQs) as specified by the following Industry Standards, Guidelines and ***QCS Electronic Security Standards*** have been taken into account:

- ***Centre for the Protection of National Infrastructure (CPNI);*** and
- ***ISO 19650-5:2020.***

This approach follows a "soft-landing" approach to ensure resultant Asset Information Models (AIMs) are compliant to the needs of a Project at each data exchange in accordance to QCS's Stage Gate requirements.

# Appendix A Asset Data Dictionary Protocols

Please note: the QCS Asset Data Dictionary is a living document (spreadsheet) being implemented as part of an initial major capital project. Please refer to QCS for the latest update for reference requirements.

## CLASSIFICATION

*Figure 2 Hybrid Classification System – Uniclass 2015 and VBIS (Virtual Buildings Information System)*

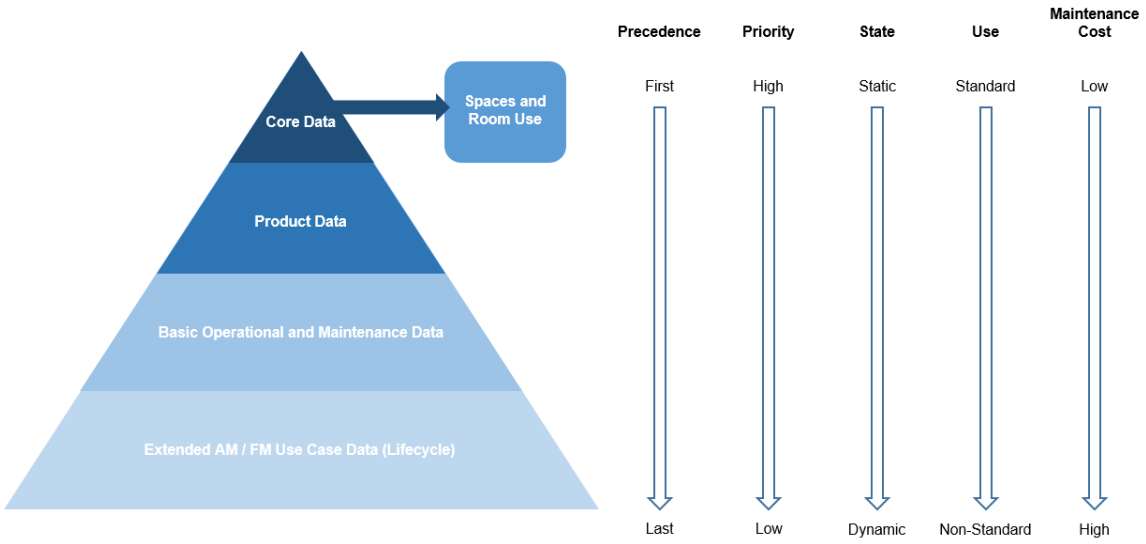
| Hybrid Classification System | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| UNICLASS (Pr-Products) | | | | | | VBIS | | | | |
| Code | Group | Sub-Group | Section | Object | Title | VBIS Discipline | VBIS Product | VBIS Sub-Type | VBIS Sub-Sub-Type | VBIS Code |

## LEVEL OF INFORMATION

### ASSET PROPERTY TYPES

*Figure 3 Asset Property Types*

***Reference**: ABAB Asset Information Requirements Guide: Information required for the operation and maintenance of an asset.*




### ASSET PROPERTY TYPES AND NUMBERING

*Table 3 Asset Property Types and Numbering*

| Item No. / Asset Data Type | Item Number Sequence | Property Type |
|---|---|---|
| **1000 Core Data** | 1000 | General Identification / Description |
| | 1100 | Location |
| | 1200 | Classification or Category |

| | | |
|---|---|---|
| **2000**<br>**Product Data** | 2000 | Manufacture and Supply |
| | 2100 | Specifications |
| | 2200 | Geometry |
| | 2300 | Warranties |
| | 2400 | External References |
| **3000**<br>**Basic Operation and Maintenance Data** | 3000 | Certification / Compliance / Insurance |
| | 3100 | Lifecycle and Maintenance |
| | 3200 | O&M External References |
| **4000**<br>**Extended AM / FM Use Case Data (Lifecycle)** | 4000 | Condition |
| | 4100 | Risk |
| | 4200 | Financial |
| **5000**<br>**Spaces and Room Use** | 5000 | Space Characteristics |
| | 5100 | Spatial Relationships |
| | 5200 | Space Requirements |

## PARAMETER TYPES

*Table 4 Parameter Types and Definitions*

| Parameter Types | Definition |
|---|---|
| Short Text | Less than 256 characters |
| Long Text | Text that can be greater than 256 characters if need be. |
| ID / Code | Unique identifier for that item type as per the associated conventions in the BMP. |

| | |
|---|---|
| Logic (Y / N) | Y / N or TRUE / FALSE options only |
| Linked ID (Text) | ID from an associated Item |
| Hyperlink / URL | A web URL / hyperlink |
| Currency | In AU$ unless noted otherwise |
| Number | Numerical format only, units as per LOI specifications |
| Date | Short Australian date format (mm/dd/yyyy) |
| Area | Defined in m² unless noted otherwise |
| Volume | Defined in m³ |
| Length | Defined in mm unless noted otherwise |

## TERMS

*Table 5 Terms and Definitions*

| Term | Definition |
|---|---|
| Item | A database Item with associated parameters (includes Objects as they form an item in a database, but also data only items such as Levels) |
| Item Type | A group of Items with identical parameters |
| Object | A model Object or group of Objects (geometry) with associated parameters |
| Type | A group of elements with the same parameters |
| Instance | Individual instances or occurrences of parameters whose values can vary by instance. |
| Assemblies | A group of varying object instances with a common ID |
| Parameter | A field of a particular type associated with an Item |
| Value | The data entered into a parameter |
| ID | Item Identification typically following a specified convention - value must be unique across all Items of that type |
| FM Critical | Parameter required to be populated and the value correct for transfer into FM database |
| Common Parameters | Parameters that are common universally across particular Item types |
| Specific Parameters | Parameters that are only required over certain Items within Item Types |

| | |
|---|---|
| List | A group of set Values for a particular parameter, typically displayed as a drop down |
| Systems | The System Names and associated information for services systems |
| System Assets | Assets that form part of a services system |
| Spaces | All areas (rooms / zones / spaces) within the project |

## ASSET MANAGEMENT STANDARDS, INDEX AND RATINGS

### ASBESTOS SCORING

The BEMIR (Built Environment Materials Information Register) score takes into account the form of the ACM (Asbestos Containing Material), its physical state, and its likelihood of disturbance between inspections.

*Table 6 ACM BEMIR Score*

| ACM BEMIR Score | Definition |
|---|---|
| 1 – 25 | • Can be managed in-situ;<br>• Negligible hazard potential; and<br>• Safe work procedures required if disturbed. |
| 26 – 50 | • Can be managed in-situ;<br>• Low hazard potential; and<br>• Seek advice from competent person if disturbed. |
| 51 – 75 | • May need attention;<br>• Moderate hazard potential; and<br>• Seek advice from competent person if disturbed. |
| 76 - 100 | • Needs attention;<br>• Hazardous; and<br>• Special precautions are required if disturbed. |

### CONDITION STANDARDS

*Table 7 Condition Standard Ratings*

***Reference**: Maintenance Management Framework: Policy for the Maintenance of Queensland Government Buildings.*

| Rating | Functional Purpose | Specific Standard |
|---|---|---|
| S5 | Highly sensitive purpose with critical results (e.g. hospital operating theatre) or high profile public building (e.g. Parliament House). | Building to be in the best possible condition. Only minimal deterioration will be allowed. |

| | | |
|---|---|---|
| S4 | Good public presentation and a high quality working environment are necessary (e.g. modern multi-storey CBD building). | Building to be in good condition operationally and aesthetically, benchmarked against industry standards for the applicable class of asset. |
| S3 | Functionally-focused building (e.g. laboratory). | Building to be in reasonable condition, fully meeting operational requirements. |
| S2 | Ancillary functions only with no critical operational role (e.g. storage) or building has a limited life. | Building to meet minimum operational requirements only. |
| S1 | Building is no longer operational – it is dormant, pending disposal, demolition, etc. | Building can be allowed to deteriorate, however must be marginally maintained to meet minimum statutory requirements. |

***Reference**: Maintenance Management Framework: Policy for the Maintenance of Queensland Government Buildings.*

## CONDITION INDEX

*Table 8 Condition Index Ratings*

| Rating | Status | Definition |
|---|---|---|
| 5 | Excellent | • No defects; and<br>• As new condition and appearance. |
| 4 | Good | • Minor defects;<br>• Superficial wear and tear;<br>• Some deterioration to finishes; and<br>• Major maintenance not required. |
| 3 | Fair | • Average condition;<br>• Significant defects are evident;<br>• Worn finishes require maintenance;<br>• Services are functional but need attention; and<br>• Deferred maintenance work exists. |
| 2 | Poor | • Badly deteriorated;<br>• Potential structural problems;<br>• Inferior appearance;<br>• Major defects; and<br>• Components fail frequently. |
| 1 | Very Poor | • Building has failed;<br>• Not operational; |

| | | |
|---|---|---|
| | | • Not viable;<br>• Unfit for occupancy or normal use; and<br>• Environmental / contamination / pollution issues exist. |

***Reference**: Maintenance Management Framework: Policy for the Maintenance of Queensland Government Buildings.*

## MATRIX DEFINITIONS AND INDEXES

### TERMINOLOGY AND SYMBOLS

*Table 9 Model Element Author*

| MEA | Model Element Author |
|---|---|
| A | Architect |
| C | Civil / Traffic Design Consultant |
| E | Electrical / ICT Design Consultant |
| F | Fire Design Consultant |
| H | Hydraulic Design Consultant |
| ID | Interior Designer |
| M | Mechanical Design Consultant |
| S | Structural Design Consultant |
| SP | Specialist Consultant |
| TC | Trade Contractor |
| V | Vertical Transportation Contractor |

*Table 10 Grade Definition of Model Element Geometry and Linked Information*

| Grade | Model Element Author |
|---|---|
| X | 3D Solids and Non-Graphical Data |
| Y | 2D and Non-Graphical Data |
| Z | 2D Only (Drafting, Line work, Text, and/or part of an assembly |
| # | Original design adjusted for coordination with Shop Models and installation issues. |
| + | Original design adjusted for contract changes and field conditions. |

| | |
|---|---|
| • | Refer to the specific child element for appropriate Grade. (Used for categories that have multiple sub-elements for which varying Grades apply.) |

## GEOMETRIC LEVEL OF DEVELOPMENT (LOD) MATRIX

**Table 3** below outlines the minimum Level of Development (LOD) requirements to be evidenced at the completion of each stage as specified by QCS:

*Table 11 Level of Development (LOD) Matrix*

| Level of Development (LOD) | Definition |
|---|---|
| 100 | The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements. |
| 200 | The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element. |
| 300 | The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element. |
| 350 | The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element. |
| 400 | The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element. |

***Reference**: BIM Forum Level of Development Specification (Part 1) & Commentary - For Building Information Models and Data (April 2019)*