هيئة كفاءة الإنفاق والمشروعات الحكومية
Expenditure Efficiency & Projects Authority

EXPRO National Manual of Assets and Facilities Management

Volume 2, Chapter 2

Asset Register

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1.0 PURPOSE

An Asset Register (AR) is a list of Entity assets containing relevant data such as, asset value, physical location, operating cost, condition, utilization, and all other details necessary, to optimally manage the asset throughout its lifecycle.

Establishing and maintaining an accurate AR featuring relevant interfaces (as outlined within Section 6.2 of this document), holds several benefits for the Entity, for example:

- Improves effectiveness of maintenance management
- Supports Financial decision through keeping track of the asset history
- Permits accurate tracking of spare parts
- Supports in the control of Operational Expenditure (OPEX), by avoiding duplication
- Enables accurate planning and reporting, based on the knowledge that the AR is a true reflection of reality
- Promotes a consistent approach to asset tagging, and location terminology

Development and maintenance of an AR is critical to the successful deployment of an Asset Management System.

Furthermore, a well-developed AR, combined with a robust Asset Registration Process (i.e. means by which to capture assets in the AR) as described herein, shall support the successful achievement of the Entity's Asset Management (AM) Objectives.

The purpose of this document is to guide each Entity in establishing and successfully deploying its own AR.

2.0 SCOPE

This document describes the basis upon which the Entity shall develop the AR, including the following pre-requisites to AR development:

- Asset Classification
- Data Gathering and Uploading
- Physical Asset Validation
- Asset Hierarchy

The document also offers guidance pertaining to the successful deployment of the AR, (including data collection and data validation).

Asset Register interfaces are also described herein, for attention of the most mature Entities that are maintaining the most comprehensive Asset Management Systems, such that those Entities can realize the full benefits of the AR.

Crucially, this document describes the link between the AR and the Asset Management Software (AMS). Such information is relevant to all Entities, irrespective of the size of the Entity's operations, or the sector(s) in which it operates.

3.0 DEFINITIONS

Term	Definition
Asset Classification	An asset class is a term used to refer to a group of assets having a similar nature or function and which, for purposes of disclosure, are shown as a single item. Refer to the asset classification template NPM-ZA0-TP-000001
Asset Data Policy	This mandates the asset data structure and the asset class metadata rules, to be adopted across the asset lifecycle, from concept to disposal.
Asset Lifecycle	The phases an asset transitions through, from planning to disposal.
Asset Management	The coordinated activity of an organization to realize the full potential of any asset.
Asset Management Policy	A short statement that sets out the principles by which the organization intends to apply the Asset Management System, to achieve its organizational objectives.
Asset Management Objective	Derived as part of the SAMP are the aligned activities set by the Entity, and consistent with Organizational Objectives and Asset Management Policy, to achieve specific, measurable results. It provides the essential link between the organizational objectives, and the Asset Management Plan (AMP) that describes how those objectives are to be achieved.
Asset Management System	Set of interrelated or interacting elements to establish Asset Management Policy, Asset Management Objectives and processes to achieve those objectives. (i.e. management systems for the management of assets).
Abbreviations	
ADCD	Asset Data Capture Device
AMP	Asset Management Plan – Documented information that specifies the activities, resources and timescales required, for an individual asset or a grouping of assets to achieve the organization's Asset Management Objectives, in the short to medium term.
AMS	Asset Management Software – Also known as an asset management tool or solution, is a dedicated application that is used to record and track an asset throughout its lifecycle, from procurement to disposal.
AR	Asset Register – A list of all assets containing relevant data such as: asset value, physical location, operating cost, condition, utilization, and all other details necessary to better manage the asset.
CA	Condition Assessment – The process of periodic physical inspections, assessments, measurements and interpretation of the resultant data to indicate the condition of a specific asset
FM	Facilities Management
MDT	Master Data Team
RACI	Responsible, Accountable, Consulted, Informed
SAMP	Strategic Asset Management Plan – Documented information which defines: • How organizational objectives are to be converted into Asset Management Objectives • The approach for developing Asset Management Plans • The role of the Asset Management System, in supporting the achievement of long-term Asset Management Objectives
SLA	Service Level Agreement – Performance Contract signed between the Entity and Service Providers

Table 1: Definitions

4.0 REFERENCES

- American Society for Testing and Materials (ASTM) E1557:09(2015) – Standard Classification for Building Elements and Related Site-work – UNIFORMAT II
- Construction Specifications Institute (CSI) – MasterFormat 2018
- International Standards Organization (ISO) 55000:2014 – Asset Management, Overview, Principles and Terminology
- ISO 14224:2016 – Petroleum, Petrochemical and Natural Gas Industries – Collection and Exchange of Reliability and Maintenance Data For Equipment
- ISO 28219:2017, Packaging — Labelling and Direct Product Marking with Linear Bar Code and Two-dimensional Symbols
- ISO 41001:2018 – Facility Management, Management Systems — Requirements with Guidance for Use
- ISO 55001:2014 – Asset Management, Management Systems – Requirements
- ISO 55002:2014 – Asset Management, Management Systems – Guidelines for the application of ISO 55001
- ISO 9000:2015 – Quality Management Systems
- ISO/TS 55010:2019 Asset Management – Guidance on the Alignment of Financial and Non-Financial Functions in Asset Management
- National Manual of Assets and Facilities Management (NMA&FM), Volume 2, Chapter 2 – Asset Management Software (EOM-ZA0-PR-000005)

5.0 RESPONSIBILITIES

Role	Description
Asset Manager	• Responsible for the acceptance of new data into the AMS. • Responsible for giving the authority for the maintenance of new assets. • Technical validation of the AR template to ensure correct and sufficient data has been provided by the project team or contractor. • Initiates and approves new assets, and planned corrective maintenance activities. • Providing bar-coding requirements, and unique bar code number ranges for new assets. • Ensuring assets that have been removed are formally decommissioned, and archived in the AR. • Validates that asset tags reflect the AR. • Shares the scope with relevant stakeholders. • Plans the delivery of asset data. • Oversees the completion of the asset template with all new, modified and removed assets, to enable them to be updated into the AR • Ensures that assets are physically tagged according to standard, and reflect tags in the AR. • Responsible to ensure AR is aligned to Asser Data Policy
Asset Management Function	A function within the Entity, and mandated by Entity Leadership, to develop and implement an effective Asset Management System for the Entity. Responsibilities undertaken by the Entity include, but are not limited to: • Developing, deploying, and monitoring the Asset Management System. • Establishing standards and performance measures for the Asset Management System. • Develop the Asset class strategy

	• Suitably identifying, controlling, and mitigating hazards which affect the Asset Management System.
	• Establishing the impact of future requirements on the Asset Management System
	• Planning and managing a program of Condition Assessments (CA) as necessary, and in line with the guidelines laid out within National Manual for Assets and Facilities Management (NMA&FM) – Volume 3.
	  o Managing the compilation of an Asset Condition Assessment Report;
	  o Managing the establishment of an Asset Hierarchy, including criticality of assets;
	  o Planning and implementing recommendations established by the Condition Assessment Report.
	• Sourcing appropriate Asset Management practitioners to formulate the Entity's Asset Management team.
	• Training and briefing of personnel as applicable, such that the Asset Management System can be successfully developed, deployed, and maintained.
	• Managing data quality such that information derived from the data is used to inform the Asset Management Strategy, and support intelligent decision-making, regarding the Entity's assets.

MDT (Master Data Team)	Responsible for: • Validating asset data prior to upload. • Validate the business rules applicable for data migration • Setting the rules for data migration. • Uploading new data into the AMS. • Archiving of decommissioned assets. • Delivery of data-related project scope. • Initial validation of data. • Collection and processing of data. • Tagging of assets. • Asset registration process until handover to operation. • Liaising with operations and projects to ensure the template is correctly completed. • Loading data into AR from the template provided by projects through to operations • Decommission assets in the AR that have been removed and identified on the template. • Providing projects with a download of the Asset Register to identify assets to decommission, or update.
Service Providers	Responsibilities which are likely to be outsourced to Service Providers are as follows: • Collaborate with the Entity to develop an Asset Management Policy. • Develop Asset Management System requirements. • Develop the Entity's Asset Management System such that it meets the Entity's existing, and future needs. • Successfully undertake Change Management such that Entity operations are not negatively impacted by change processes. • Train Entity personnel to support the implementation of the Asset Management System. • Effectively Manage Risk (i.e. through Risk Assessments and Method Statements – RAMS). • Deliver a program of Condition Assessments (CA), including:

	o Compilation of an Asset Condition Assessment Report o Establishing an Asset Hierarchy (showing criticality of assets based on data provided by the Entity)

Table 2: Responsibilities

Responsibilities have been consolidated into the 'Responsible, Accountable, Communicated, Informed' (RACI) Matrix contained within Table 3 (below). Collaboration and effective communication, is key to successful AR implementation and maintenance.

Activities	Responsible	Accountable	Communicated	Informed
Define Scope of Works	Asset Manager	Entity	FM	Master Data Team
Execution and Delivery	Project Manager / Contractor	Asset Manager	Master Data Team	FM
Collecting and Compiling Asset Information in Template or Device	Project Manager/ Contractor	Asset Manager	NA	Master Data Team
Asset Information Validation – Initial	Asset Manager	Entity	Project Manager	Master Data Team
AR Data Validation	Master Data Team	Asset Manager	Project Manager	FM

Table 3: RACI Matrix

6.0 PROCESS

Figure 1 (below), outlines a simplified version of the Asset Lifecycle.

Figure 1: Asset Lifecycle

The Entity shall maintain the AR such that it continuously and accurately represents the actual status of assets, throughout the Asset Lifecycle.

While the Entity shall ensure that existing assets are captured within the AR (by means of the Asset Registration Process detailed within Section 6.3), the Entity shall also ensure that requirements of the AR are considered during specification and procurement of new assets, and that new assets are captured within the AR, during asset commissioning.

6.1 Prerequisites to Developing the Asset Register

Figure 2 (below), outlines the prerequisite steps which shall be taken, prior to reaching a finalized AR specification.

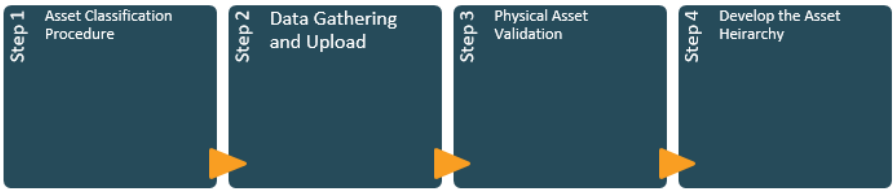

Figure 2: Prerequisites to Developing an Asset Register

6.1.1 Developing an Asset Classification Procedure

An Asset Class is group of assets which deliver the same function. The Entity shall establish an Asset Classification Procedure to support the process of consistently tagging assets, and

capturing high-quality asset data. Entities should determine Asset Class by means of a unique functional reference in line with Expro Asset Classification Document (NPM-ZA0-TP-00001).

While MasterFormat is a material-based organization of building content, UniFormat is a systems-based organization of building content. Formulating the AR in line with Uniformat and MasterFormat, shall enable the Entity to consistently search and report upon assets at the highest or lowest level of detail within the AMS, dependent on the requirement.

The extent to which entities comply with the above-mentioned standards, shall be dependent on factors such as:

- Complexity of Entity Operations
- Scale of Entity Operations
- Complexity of the Entity Asset Hierarchy

Irrespective of the level of detail permitted by the Entity's own AR, all ARs shall enable tracking of asset location at each point of the Asset Lifecycle (i.e. from store to service, from one system or location to another, and through to decommissioning).

6.1.2 Data Gathering & Uploading

In addition to assigning an asset class to each asset, the Entity shall maximize the data which it gathers regarding each asset. For example, the Asset Record associated with an escalator within a facility building should include the following:

- Manufacturer Name
- Model Number
- Serial Numbers
- Warranty Details
- Operating Voltage
- Power Rating

Each Entity shall establish a Data Upload Procedure applicable to data gathered, both at the 'desktop' and in the field.

Guidance pertaining to data capture in the field, is contained within Section 6.3 of this document.

6.1.3 Physical Asset Validation

All data gathered, shall be subject to validation by means of visual condition assessment. Guidance regarding asset validation, is set out within NMA&FM Volume 3 – Condition Assessment.

6.1.4 Developing the Asset Hierarchy

An Asset Hierarchy defines the relationship between assets (i.e. a hierarchical breakdown of each Asset Class). Each Entity shall implement an Asset Hierarchy such that the AR can be used by Facilities Management (FM) personnel when:

- Planning Maintenance
- Fault Reporting
- Performance Reporting
- Identifying and Describing assets down to the lowest maintainable level
- Recording Asset Data
- Recording Asset Location

Figure 3 (below) has been designed to support the Entity when establishing its own Asset Hierarchy showing, asset "Parent" and "Child" relationships. Depending on the Entity, the facility, system and sub system can be considered as assets.

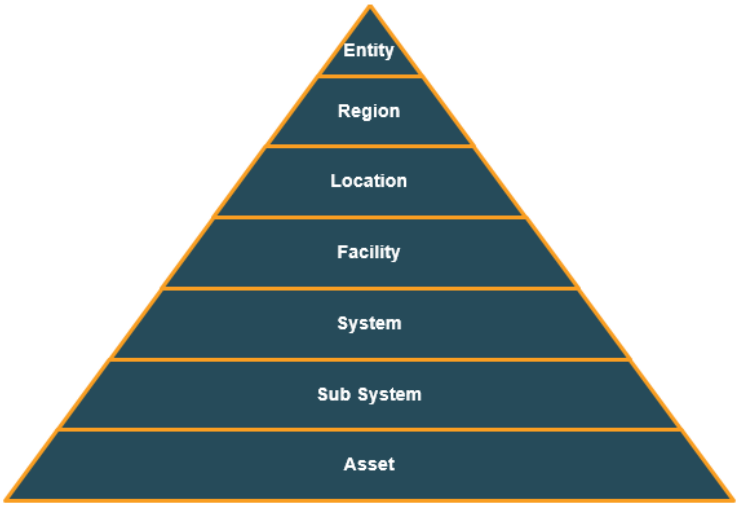

Figure 3: Asset Hierarchy

6.2 Selecting Asset Attributes

Asset attributes describe which data are selected to be included within the Asset Register for a given asset. Maximizing attributes captured, holds several benefits including:

- Increased evidence upon which to make decisions
- Higher accuracy of reporting
- Improved ability to trend data (i.e. establishing trends between interconnected systems)

Table 4 (below) outlines minimum attributes, which should be captured for each asset.

Required Data		Description	**Condition** Mandatory Attributes Indicated by (X)
General Information			
1.	Entity	Provide the Entities name	x
2.	Region	Provide the Region within KSA	x
3.	Asset Name/Number	Provide Asset name and number	x
4.	Asset Functional Code	Provide the asset code based on the coding structure	x
5.	Asset Owner	Provide the entity current owner	x
6.	Asset Description	Provide a brief description of the asset including the material type of the asset for facilities and infrastructure	x
7.	Asset Classification	Assign asset class as per Expro Asset Classification document (NPM-ZA0-TP-000001)	x
8.	Utilization Purpose	Define the reasons for utilization of Asset/facility/building (i.e. Administration, industrial, educational, health, accommodation, storage, others.)	x
9.	Ownership Certificate Number	Provide the ownership certificate number	If the asset is of real estate nature
10.	Ownership Certificate Type	Updated or Not Updated	If the asset is of real estate nature
11.	Rental Period	Provide the starting and ending date of the rental duration	If the asset is rental
12.	Yearly Rental Cost	Provide the yearly cost of rental (including breakout laws, if applicable)	If the asset is rental
13.	Reasons for Rental	Provide justification for rental (i.e. space requirements, temporary due to renovation, etc.)	If the asset is rental

Required Data		Description	Condition Mandatory Attributes Indicated by (X)
14.	Rental Area	Provide exact area (in m2) covered by rental agreements including number of rooms, floors, assets, etc.	If the asset is rental
15.	Number of Employees	Provide the number of occupants assigned to the rented area	If the asset is a facility/building
16.	Plan to Terminate the Rental Contract	Provide the plan to vacate the rented area to an owned facility/building/asset	If the asset is rental
17.	Number of Contracts Assigned to the Asset	Provide numbers and details of all contracts associated with the asset including costs of the contracts i.e. (O&M, services, manpower, etc.)	x
18.	Utilization Period	Define if the utilization/rental will continue, or there is a plan to relocated to owned facility/building, or move to e-government approach	If the asset is rental
19.	Level or Floor	Provide the total number of floors (if the asset is a facility) and the actual location of the assets – Grid info if available	If the asset is a facility/building with multi-floors
20.	Chianage (Segment)	Provide chainage or segment for linear assets	Applies only on liner assets
21.	Google Maps Link	Provide a link of google map of the location of the facility/building	x
22.	X - Coordinates	Provide the actual X-Coordinates GPS location of the asset	x
23.	Y - Coordinates	Provide the actual Y – Coordinates GPS location of the assets	x
24.	Priority number (Based on impact to entity)	Assets will be assigned a Priority based on the following: • **Priority 1:** Asset is critical to the public's health, safety, security or environment • **Priority 2:** Asset is critical to the Entity's mission • **Priority 3:** Asset provides a support function to the Entity's mission • **Priority 4:** Asset does not meet criteria for priorities 1 through 3	x
Value/Cost			
25.	GL String (Account Number)	Provide the General ledger information assigned to the asset in accordance to Ministry of Finance/Accrual Accounting Center regulations	x
26.	Original Cost	Provide the original asset cost in accordance to Ministry of Finance/Accrual Accounting Center regulations	x
27.	Current Value	Provide the current asset value in accordance to Ministry of Finance/Accrual Accounting Center regulations	x
28.	Replacement cost	Provide estimated cost to replace the asset in accordance to Ministry of Finance/Accrual Accounting Center regulations	x
Technical Information			
29.	Asset Size	Provide the dimensions (Area, length, measurement. etc.) as applicable	x
30.	Asset rating/capacity	Provide the rating of electrical or mechanical, e.g. electrical KW, KVA, AMP/ KV/MVA, Mechanical: Loading (KG) Compressed Air and pressure vessels – PSI/Bars (Eg. Most electrical, mechanical, water system and pressurized system etc. will have a manufacturer rating/capacity)	x

Required Data		Description	Condition Mandatory Attributes Indicated by (X)
		Design Capacity of linear asset, occupants for facilities, volume capacity of non-linear asset, etc. as applicable.	
31.	Date of Installation	Provide date when asset was installed	x
32.	Date of Commissioning	Provide the date when the asset was commissioned	x
33.	Warranty start/end date	Provide date when warranty starts/ends	If warranty terms are applicable
34.	Drawings	Provide a link to the drawings associated with the asset	x
35.	Manufacturer	Provide details of manufacture	Applicable on Assets of equipment nature
36.	Model	Provide details of model	Applicable on Assets of equipment nature
37.	Manufacturer Serial Number	Provide details of asset or part serial number (E.g .Name plate number)	Applicable on Assets of equipment nature
38.	Maintainer	Provide details of maintainer – internal team or external Contractor	x
39.	Manuals	Provide a link to the manuals associated with the asset	x
40.	Maintenance Record	Provide a link to the maintenance record associated with the asset	x
41.	Running Cost	Provide the cost of running the asset starting from commissioning date (O&M)	If available otherwise the average yearly running cost
42.	Asset Performance	Provide current performance indicator of the asset regardless of the design by the following method: • **Adequate:** Asset is fully capable of performing its current mission, meets applicable health, safety, security and environmental (HSSE) requirements, meets the objectives or goals, and has only minor deficiencies that can be corrected within normal operating maintenance activities • **Substandard:** Asset has deficiencies that limit performance of the mission, or poses added HSSE risk. Asset requires refurbishment to bring it back to adequate condition • **Inadequate:** Asset has major deficiencies that significantly impact or put performance of the mission at risk, or poses significant HSSE risk. Asset requires major refurbishment or replacement to bring it up back to an adequate condition	x
43.	Asset Utilization	Asset utilization is an objective review to determine the portion of the asset currently in use. This is independent of the status of an asset or space assignment. It is a measure of how an asset is being used in relation to its capacity. Designation levels such as over-utilized, utilized, under-utilized and unutilized are used to identify an asset's utilization. Consider using the following levels: • **Unutilized:** Asset, with or without improvements, is not occupied or occupied in caretaker status only. • **Under-utilized:** Asset, with or without improvements, is used at irregular periods or	x

Required Data		Description	Condition Mandatory Attributes Indicated by (X)
		intermittently by the accountable Entity for current program purposes, or is partially occupied. • **Utilized:** Asset is currently in use as designed by the Entity for current program purposes. • **Over-utilized:** Asset is in use at a capacity greater than its intended design by the Entity for current program purposes.	
Lifecycle			
44.	Useful Life	Provide the asset recommended asset life	x
45.	Life Remaining	Provide the estimated remaining asset life	x
46.	Expected Disposal Date	Provide the future disposal date	x
47.	Current Life Cycle Stage	Provide the current life cycle stage of the asset (Plan, Acquire, O&M and Disposal)	x
Other			
48.	Asset Photos	Provide current photo(s) of the asset in its current location & condition	x
49.	Site Entry Permit Access Required	Confirm access requirements to the asset (Permits, Entry, etc.)	x
50.	Maintenance Access Requirements	Confirm if specialized tools/equipment required for access to asset (Ladder, mobile platform, scaffold, etc.)	x

Table 4: Asset Register Attributes

Other attributes, in addition to those listed within Table 4 (above), should be collected depending on factors such as complexity of Entity operations, asset data structure, asset class and complexity of Entity Asset Hierarchy.

Each Entity shall be responsible for defining the minimum attributes which shall be reflected on the AR. Table 5 (below), is an example of data which would result from the collection of selected attributes.

Entity	Region	Location	Building	Floor	Room	Unit Code	System	Asset	Component	Asset Number	Make	Serial No.
MOH	RYD	ITCC	CSO1	01	101	01EC 061	HVAC	FCU	xxx	xx1234	OTIS	AH 234H

Table 5: Asset Register Attributes

6.3 Populating the Asset Register

This section describes data capture, specifically associated with field work. Information associated with 'desktop' data capture is contained within Section 6.1.2.
Figure 4 (below) is the process by which the Entity should capture assets within the AR.

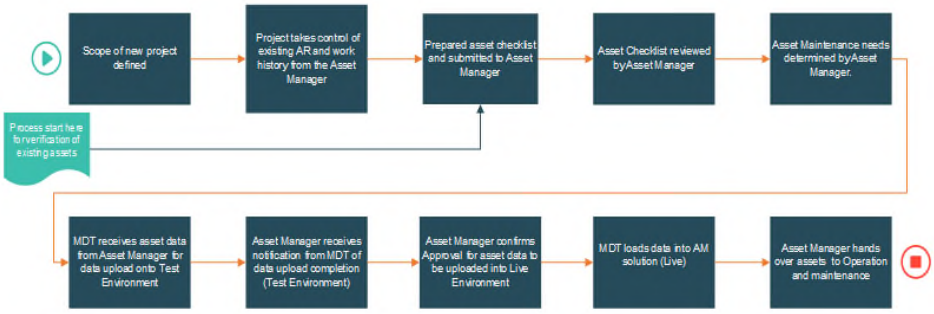

Figure 4: Asset Registration Process

Outputs from the Asset Registration Process include, but are not limited to, the following:

- Assurance that data reflected within the AR is consistent with reality
- Clarity regarding asset status (i.e. online, offline, decommissioned)
- Identification of unknown assets
- Opportunity to assign a unique asset tag to assets which were previously without a tag
- Establish accurate asset location data

6.3.1 Prerequisites to Initiating Data Capture Projects

Prior to undertaking the Asset Registration Process, the project team (Entity staff, or Service Providers) shall have in place the following:

- A well-defined project scope, i.e.
  - Facility/Facilities to be assessed
  - Project Duration
  - Asset Class
  - Asset Quantity falling under the scope (with predefined tolerance)
- The extent to which the project will affect other projects, maintenance activities and mitigation measures, which have been established (i.e. Risk Register)
- A clear understanding by all Entity stakeholders, of expected project outcomes
- Approved data collection checklists in place
- Suitably qualified and competent resources to undertake data capture and data processing
- Safety and security measures in place, i.e.:
  - Safe access, movement within the facility, and egress arrangements agreed
  - Risk Assessment and Method Statement
  - Site Induction
  - Access Passes
  - Entity Supervision assigned to Service Providers
- Appropriate technology in place with permission for its use (e.g. permission to take photographs using Asset Data Capture Devices – ADCDs)
- The correct number of ADCDs in place pre-loaded with:
  - Existing Verified Asset Data (without errors), determined through 'desktop' analysis
  - Software Applications (as appropriate)
  - Data Collection Checklists
- A robust Quality Assurance Process agreed in advance, to ensure quality data is captured

6.3.2 Asset Data Capturing Device

ADCDs include tablet devices which feature cloud-based mobile applications for data capture. Best-practice dictates that field data should be captured using ADCDs, as indicated in the Section 6.3.1. Benefits of using ADCDs include, but are not limited to, the following:

- Enables bulk transfer of data
- Lowers risk of duplicating asset data capture
- Data quality is consistent and of a higher standard, than that which would be captured through paper-based, database, or spreadsheet-based solutions
- Risk of data loss is reduced compared to conventional methods, due to local and cloud back-up

6.3.3 Asset Tagging

Asset Tagging shall be carried out in conjunction with any data capture activities in the field. Maximizing the opportunity to tag assets shall support the Entity in:

- Locating and Identifying assets
- Reporting of Asset Failures
- Implementing the Asset Hierarchy
- Identifying and removing assets which are no longer in service
-

See 6.2 for functional code, this will be reflected in the AR

Figure 5 that follows, highlights an example of an asset tag which would be assigned to an asset, while in the field.

Figure 5: Sample Asset Tag

The format of the asset tag shall be determined by each Entity, through implementing guidance associated with Asset Classification contained herein.

Physical application of asset tags shall be in accordance with guidance contained within ISO 28219:2017, Packaging — Labelling and Direct Product Marking with a Linear Bar Code, and two-dimensional symbols.

6.3.4 Data Validation

Prior to the AR update, the Master Data Team (MDT) shall be responsible for carrying out quality checks to ensure that:

- Data captured within the AR reflects reality
- No data is missing
- Free-text information is captured, and appropriate action taken (i.e. maintenance needs are identified on the asset)
- Assets captured are within project scope

6.4 Asset Register Interfaces

AR benefits should be maximized by the Entity through interfaces with other aspects of the Asset Management System, as shown in Figure 6 (below).

Figure 6: Asset Register Interfaces

The risk to the Entity of not integrating all components outlined within Figure 6 (above), with the AR as part of the Asset Management System, is the inability of the Entity to continuously and accurately manage asset data.

6.4.1 Asset Register & the Asset Management Software

The Asset Register shall be configured and managed via the Entity's dedicated Asset Management Software (AMS). Further guidance pertaining to the AMS is contained within NMA&FM Volume 2, Chapter 2 (EOM-ZA0-PR-000005).

Components outlined within Figure 6 (above), fall under the AMS. As shown in Figure 7 (below), the Asset Register is an Asset Management Module, used to support other Modules within the AMS.

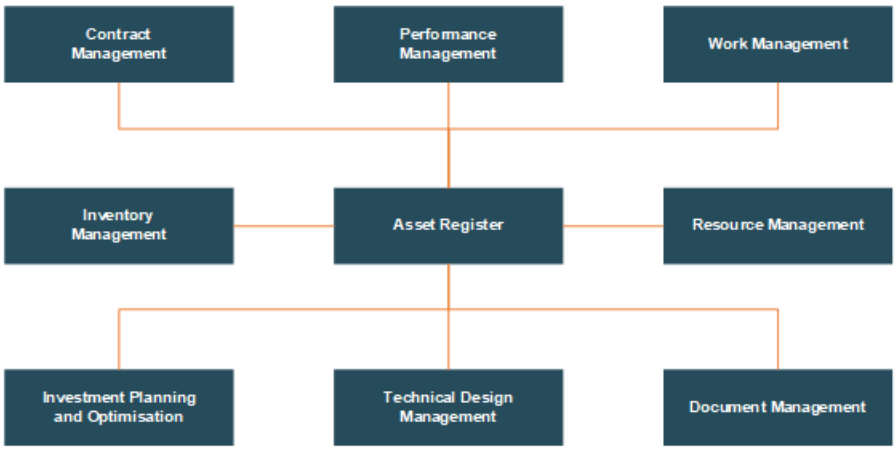

Figure 7: AMS Asset Register Dependency