HIGHWAYS ENGLAND
Asset Information Group

ASSET DATA MANAGEMENT MANUAL

Part 1 – Data Principles and Governance

October 2019

Version: *10.0*

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Revision Sheet

For revisions across all ADMM documents: see external Revision Log: ADMM_Revision_Log.xls

Version	Date Issued
3.0	April 2016
4.0	September 2016
5.0	March 2017
6.0	September 2017
7.0	March 2018
8.0	October 2018
9.0	April 2019
10.0	October 2019

Asset Data Management Manual Custodian

While asset data management as an activity is the responsibility of all stakeholders carrying out business functions in Highways England, the overall process of asset data management is the responsibility of the Asset Information Group, it follows that the ADMM documents is owned by this group.

The ADMM Custodian (see section 2.3.2) is responsible for the day-to-day maintenance of the ADMM documents. Currently the custodian is as follows:

Name: Stuart Collins, Asset Information Group

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Comments, questions, and feedback should be directed to the generic AIG email box which is: AssetInformationQueries@highwaysengland.co.uk

Contents

Foreword

The Asset Data Management Manual (ADMM) sets out Highways England's (the Company's) asset data requirements to achieve both its corporate objectives as well as its asset management objectives. It brings clarity and consistency to reflect Highways England's asset data needs and is revised every six months to accommodate changes and expansion to the business needs.

The ADMM contains the company's asset data requirements to ensure the company collects and maintains the asset data it needs to operate safely and efficiently. It is for use by anyone creating, maintaining or using data on behalf of or within Highways England.

What are its components?

- **Part 1 – Data Principles and Governance**, which introduces the asset data management concept and defines how this is structured and governed within Highways England. Additionally, further guidance surrounding the purpose and of the ADMM is provided.

- **Part 2 – Requirements and Additional Information**, which includes Highways England's requirements for asset data management and provides supporting guidance for each asset class.

- **Part 3 – Data Dictionary,** which defines the asset data requirements, hierarchy, and rules for individual assets and attributes.

- **Part 4 – Asset Inventory Selector**, which includes a tool to assist in identifying and recording specific assets.

Additionally, a Revision Log and Change Request Submission Form are provided with each iteration of the ADMM:

- **Revision Log:** provides a full listing of all changes made between versions.

- **Change Request Submission Form**: provides instructions for submitting a change request. An overview of the change process is detailed in Part 1 – Data Principles and Governance document under Section 3.6 "Change Management".

How is it structured?

The ADMM is structured into core requirements and local requirements. The core requirements, which are mandatory under any type of contract, provide the asset data requirements and are described in a way which is independent of any organisational relationship or systems within which work is undertaken. The local requirements provide additional requirements linked to particular organisational contexts. This may be a contract, a system, or an organisational structure.

Differing operational models are employed by Operations Directorate's regions and areas. The table below lists the current operating models are the regions or areas where they are in operation and is correct at the time of issue.

Operating Model	Region or Area
Asset Support Contract (ASC)	Area's 4 and 12
Asset Delivery (AD)	South West (1 + 2), 6, 7, 8, 10, 13 and 14
Progressive Asset Delivery (PAD)	3 and 9

Within this document, local requirements are included in text boxes, as shown below.

LOCAL REQUIREMENTS: Asset Delivery (AD)

For Asset Delivery contracts the term:

- Employer shall mean *Employer* or *Client* as defined under the contract,

- Contractor shall mean the *Contractor* as defined under the contract

LOCAL REQUIREMENTS: Asset Support Contract (ASC) and Progressive Asset Delivery (PAD)

For the purposes of Progressive Asset Delivery Areas, the ASC Local Requirements will generally prevail. Any variation in the role of the *Provider* will be agreed on an Area by Area basis.

For Asset Support Contracts and Progressive Asset Delivery contracts, the term:

- Employer shall mean *Employer* as defined under the contract

- Provider shall mean the *Provider* as defined under the contract

LOCAL REQUIREMENTS: Major Projects

For Major Projects, where specific roles and responsibilities are referred to, these shall be as defined within the prevailing contract.

Part 1 - Data Principles and Governance

The Part 1 - Data Principles and Governance defines the Company's approach to asset data management.

- Section 1 introduces asset data management and describes the different stages and activities of the Asset Data Lifecycle.

- Section 2 defines how asset data management is structured within Highways England's business, detailing the Asset Information Principles, roles and responsibilities, and governance arrangements.

- Section 3 outlines the purpose of the ADMM, specifically its scope, components, asset data structure (hierarchy and categories), and the change management process used to amend the ADMM.

1 Introduction to Asset Data Management

1.1 What is Asset Data Management?

An asset is anything that can be used to create value or benefit for an organisation. Asset data management is the system of managing the data which describes the asset. This system needs to be sufficient for asset owners to understand how their asset delivers value and benefits for the organisation. This understanding enables:

- The organisation to communicate the current performance of the asset,

- customers to better comprehend the service that they are receiving, and

- the organisation to make appropriate decisions on asset management activities to deliver its strategic objectives.

The successful deployment of asset data management could result in:

- Reducing costs through more effective surveys, better operation, eliminating waste, and increased transparency of maintenance costs.

- Reducing risks and improved reliability for journeys through minimising disruptions and early identification of performance issues.

- Asset improvement, increasing asset performance and improved quality of future assets through better understanding of current performance and its determinants.

1.2 Asset Data and Asset Management Activities

Asset data is utilised by an organisation throughout the different activities and stages of the asset's life cycle. These activities and stages in the life cycle are:

Governance

- Legislative Requirements – data management compliance.

- Contract Management – data to support and evidence contractual obligations.

Management

- Internal process data metrics and external asset performance metrics, including: indicator specification, indicator hierarchy, data requirements, indicator reporting.

- Asset inventory and condition data is used to derive the value of the Company's assets.

- Asset data is used to inform reports produced by the Company on a wide variety of subjects. Asset Data is also requested by members of the public and also by elected members of political bodies from Parish Councils to Parliament.

- Asset data is shared with other government and non-government organisations to aid them in their operations. The Company and the Environment Agency have a memorandum of understanding that includes provision for the sharing of asset data.

Planning – Business Case and Design

- Modelling Inputs and Outputs.

Create or acquire

- Constructing or installing new assets.
- Transferring ownership from third parties (adoption).

Operate and maintain – Ensuring that the asset functions as intended including:

- Assuring maintenance operations are carried out appropriately.
- Defect reporting – recording and responding to asset defects.
- Maintenance management.
- The processes, systems, and information on the occurrence, effectiveness, and costs of the various regimes of maintenance applied to the infrastructure assets.

Renew or replace – As asset value is consumed through use, an appropriate strategy can be used to restore the asset function at different stages. In each of these stages, the optimum outcome is sought which maximises the value of the asset. To achieve this outcome, good decision making is essential and therefore the best evidence should be available supported by asset data.

Dispose – At the end of life, adopt an appropriate strategy to restore the asset function.

- Disposal of the asset could be achieved by transferring ownership to a third party, it may also occur when the asset is obsolete. The activity of disposal must consider both the retention of asset benefits and risks.

1.3 The Asset Data Lifecycle

As well as the management of the asset, the management of its data can also be considered within a life cycle (see figure 1-1). Good asset data management can be achieved when there is a clear strategy for the control of each stage of the life cycle.
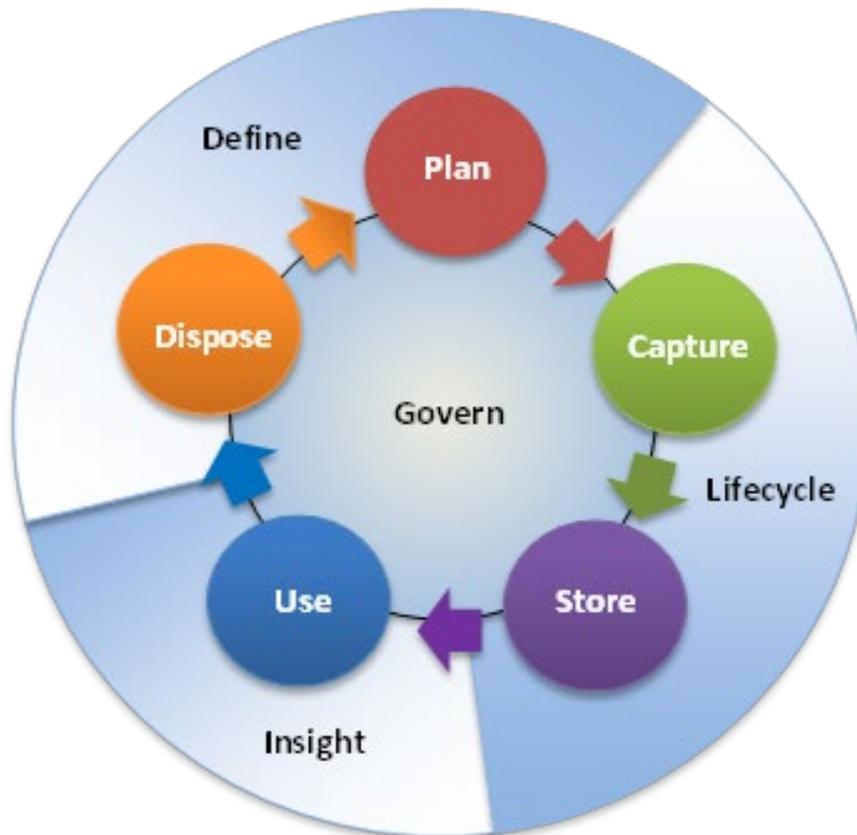
Figure 1-1 - The Asset Data Lifecycle.

Plan - Prior to the capture of data it is important to identify the actions that will be made to secure the data throughout its life cycle. Questions that need to be considered in the planning stage include:

- What resources are required to successfully manage the data through its life cycle? This can include funding as well as identification of technical and staff resources.

- What systems are required to store and manipulate the data?

- How will the data be managed so that it is not inappropriately used when superseded, obsolete or redundant?

Capture - Create or update involves collection and augmentation of asset data sets. There are four methods of capturing asset data:

- Collecting new data through a survey or records.

- Converting/transforming existing asset data.

- Sharing/exchanging data with partners.

- Purchasing data from a third-party supplier.

Store - This involves the actions and procedures to ensure that the data is stored in the right place, appropriate measures are taken to minimise the risk of data loss and there is a clear policy for its disposal.

Use - The ability to prepare and issue, or disseminate, quality data to stakeholders is an important part of the life cycle process. Data needs to be used but with controls to protect against organisation, legislative and commercial risk and to preserve the integrity of the data itself. Asset data should not be used unless it is accompanied by appropriate and relevant metadata.

Dispose - Only asset data that is generating value needs to be retained. Disposal includes archiving of historical information or deleting of redundant information. Appropriate disposal procedures reduce the organisation risk by eliminating superseded, obsolete or redundant data.

2 Asset Data Management at Highways England

2.1 The Business Function

Asset data management enables the organisation to make appropriate decisions to reach its objectives. All sections and partners within the organisation have a role in forming the organisation's asset knowledge as they do in helping meet the Company objectives.

Asset data is consumed by business functions in the foundations of the journey from planning, decision making and action towards meeting the Company objectives. As work in these functions progresses it is equally as important that the feedback and updates to the asset data is made by the business function to ensure that future work is accurate.

In order to maximise the value of asset data, the business function must fulfil the asset data management requirements which surround it. In doing so, the integrity of the asset data will be preserved as business functions carry out each of the stages of the asset data life cycle. This is the essence of asset data management as documented in this ADMM.
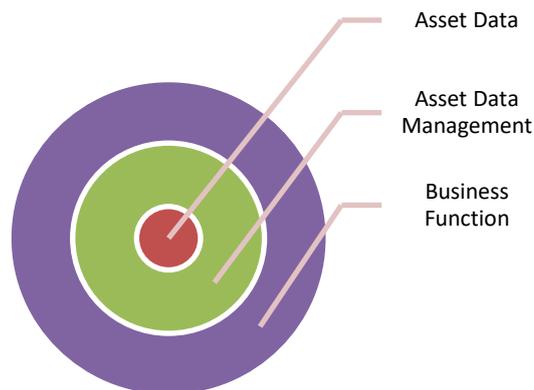
Figure 2-1 - How Asset Data Management supports business functions.

Asset data management also supports the Company's vision for asset knowledge. The asset data lifecycle shown in Figure 1-1 has been overlaid onto the four strategic outcomes of the vision:

- Define - clear understanding of what is required from asset information.

- Govern - accountability for asset data improvement activities.

- Lifecycle - capabilities and technologies to capture and access to asset data.

- Insight - information on asset condition and knowledge of asset performance.

2.2 Asset Information Principles

The Asset Information Principles outline the requirements for all asset information within Highways England; they are our 'rules' for asset information. The Asset Information Principles ensure a consistent approach to all asset information including business as usual (BAU) and change (improvement) functions. The Asset Information Principles cover all asset data categories and all asset classes, are system agnostic and apply to current and future systems.

We will manage our asset information according to the following principles:

1. We will formalise the governance of asset information management activities & improvement initiatives.

2. We will define our requirements for asset information including responsibilities for its completeness & accuracy.

3. We will collect and update appropriate asset information in a timely and efficient manner.

4. We will store asset information in a master repository & make information accessible to relevant parties cognisant of any security requirements.

5. We will enable the use of asset information to inform intelligent decision making and operation of physical infrastructure assets.

6. We will develop our staff & stakeholders to have the capability to engage with all stages of the asset information process and use information appropriately.
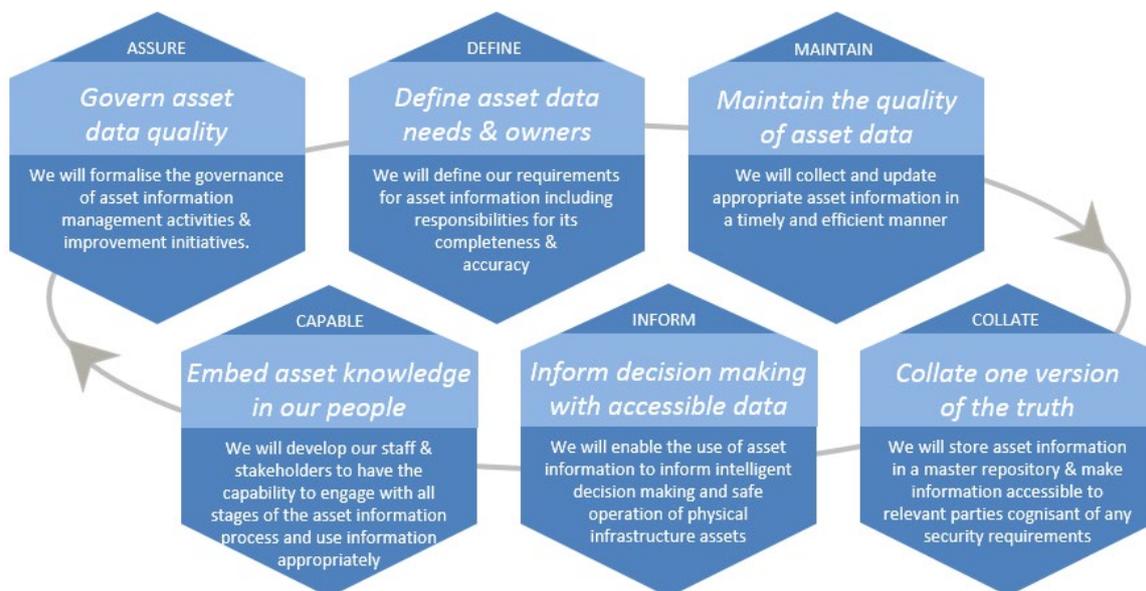

Figure 2-2 - Highways England Asset Information Principles.

This section provides further details of the Asset Information Principles, in the form of the individual contributing sub-principles. The sub-principles are based on best practice data management. The sub-principles represent the ultimate asset information ambition of the Company. The sub-principles should be applied where appropriate, where not in conflict with existing documentation or contractual obligations.

Assure

1.1 The strategy for improving the quality of our asset information is aligned to the organisation-wide strategic objectives which is communicated to the business.

1.2 There will be a programme of asset information improvement initiatives which is communicated to the business as appropriate.

1.3 Asset information improvement projects are evaluated using a defined process against business needs, with particular consideration to health and safety objectives.

1.4 Asset information improvement projects are designed to support broader business improvement initiatives.

1.5 Asset information improvements are managed - all asset information improvement initiatives are governed and assured.

1.6 The organisation supports and promotes developments that build upon previous successful investments, e.g. by developing new technology from existing ones, and makes use of lessons learned to inform the development approach.

1.7 Asset information improvement initiatives are not progressed in siloes, but are rolled out to the business.

1.8 The business is required to manage asset information quality, in a consistent way, aligned to national approach to provide one version of the truth.

1.9 The achieved level of quality will be measured and evaluated, against formally defined requirements.

1.10 The prime asset information repositories must be regularly reviewed for effectiveness and alignment with organisational objectives with changes implemented where required.

Define

2.1 The business requirements for asset information are formalised and documented. Asset information will be defined (format, quality) for operational decision making and predictive modelling to ensure a safe and serviceable network.

2.2 Asset information requirements are derived in consultation with relevant business stakeholders, including commercial and technical representatives

2.3 Asset information standards list all attributes that are a mandatory requirement for a specific dataset.

2.4 Asset information requirements must be information system agnostic

2.5 Asset information requirements, standards and specifications are easily available to the business.

2.6 The quality of our asset information datasets is defined using a methodology which considers both data quality and process quality.

2.7 Asset datasets have defined goals for data quality and process quality that are appropriate to their business use.

2.8 There are defined, named individuals with responsibilities for the quality of information within specific asset dataset(s) and information systems

2.9 Where asset information responsibilities are shared with our supply chain, there is an agreed accountability for the quality of our asset information within our contracts.

Maintain

3.1 The quantity and level of detail of asset data shall be collected, updated and maintained in line with defined requirements, processes and procedures reflecting business requirements.

3.2 Asset data capture processes and techniques are designed around data requirements, not system requirements/limitations.

3.3 Where possible, the capture of asset information should utilise safer technologies (e.g. remote capture) to enable a safer network and working environment.

3.4 Where possible, data should be reused by considering existing datasets which may be suitable, maximising efficiencies while reducing operational road exposure.

3.5 Data is captured, collected and updated in a timely manner into the prime asset information repository, reflecting changes to the network and business requirements.

3.6 Asset information is validated as part of data capture and processing to ensure it is complete and accurate.

Collate

4.1 Asset Information Primacy Policy sets out the requirements with respect to data primacy.

4.2 Primacy of asset information is communicated to the business and widely understood.

4.3 All asset information is collated and maintained in prime asset information repositories to retain one version of the truth.

4.4 Asset data is stored in an appropriate reusable format.

4.5 Appropriate technology is employed to collate asset information and provide access to relevant parties geared towards maximising the ability to discover, access and use the business' asset data.

4.6 The security of asset information is managed in accordance with business requirements.

4.7 Asset data is validated before storage.

4.8 Where asset information is migrated or exchanged between asset information systems, protocols and validation activities must be defined and agreed to retain one version of the truth.

4.9 The prime asset information repository must be regularly reviewed for effectiveness and alignment with business requirements (such as health and safety requirements) with changes implemented where required.

Part 1 - Data Principles and Governance

Inform

5.1 Asset information made available to the business shall be applicable (relevant, timely and be of sufficient quality) as appropriate to the asset management decisions and activities it supports.

5.2 Asset information use by the business is in accordance with established processes / national approach.

5.3 Asset information reporting by the Company is in accordance with established processes / national approach.

5.4 Frequency of reporting will be driven by the need to balance the need for regular monitoring, the costs and ease of creating reports and the time for changes to take effect.

5.5 All external reporting of asset information is subject to senior management approval. All reporting of asset information is subject to relevant approvals.

5.6 Asset performance indicators are developed and reported to provide understanding and assurance of our asset lifecycle management and performance (including safety and serviceability) to the business and stakeholders.

Capable

6.1 The business promotes the importance of good quality asset information reinforcing the message that all staff have responsibilities in this regard.

6.2 The business will identify and monitor its level of asset information management capability in the organisation.

6.3 The organisation will review staff competencies in line with roles and responsibilities to the use of data within business processes in operating a safe and serviceable network.

6.4 Key work objectives relating to asset information will be assigned to staff through individual appraisal processes.

6.5 Development of infrastructure to build staff capability, including self-service, formal training and guidance is easily accessible to all relevant parties

6.6 Arrangements will be established to periodically evaluate the training provision and adapt to respond to changing needs.

6.7 Weaknesses identified in reviews relating to asset information will be addressed, where appropriate, through training.

The preceding sub-principles should be read in accordance with the guidance note, at the beginning of this section. The sub-principles should be applied where appropriate, where not in conflict with existing documentation or contractual obligations.

2.3 Roles and Responsibilities

2.3.1 Asset Information / Management Roles

These roles define and govern national asset management requirements, provide asset management support, assurance and improvement; and monitor both the performance of the Framework and improvement of asset information in the business.

Asset Management Principal / Asset Information Custodian (Asset Information Group):

National role with overall accountability for a) defining and assuring asset information for business purposes and b) defining the Asset Management Framework for Highways England.

- Gather Framework improvements.
- Communicate strategic level asset management policy, strategy, etc.
- Define and govern Framework reviews.
- Monitor Framework performance.
- Provide asset management training and ongoing support.
- Provide feedback to Senior Management from Asset Steward Reviews, Audits and updates on progress towards pre-defined Strategic Asset Management Objectives.
- Liaise with Internal and External Stakeholders.
- Document and govern asset information requirements including the ADMM.
- Monitor and assure quality of national asset information.
- Facilitate delivery of continuous improvement of asset information requirements.

Asset Steward / Asset Information Owner (Regional Director):

The Asset Steward / Asset Information Owner is accountable for all assets and asset information, including:

- Taking full accountability for both the governance and performance against pre-defined business objectives/targets.
- Ensuring all relevant Asset Management Policies, Procedures, Standards and Processes are adopted within their Region.
- Provide necessary resources to enable all required asset management activities to be conducted effectively.
- Ensure asset information policy is implemented e.g. primacy, access and update cycles.
- Ensure national and local asset information management processes are implemented, resourced and are operationally effective.

Part 1 - Data Principles and Governance

Asset Type Specialist / Asset Information Specialist:

Asset Type Specialist / Asset Information Specialist is a specialist role responsible for setting asset strategy, supporting the business and assuring complete, valid and accurate asset information:

- Support Operations and Major Projects with engineering and technical queries

- Own the respective Asset Group Strategy for each asset type

- Identify asset information gaps and opportunities in their area of specialism and collaborate with Asset Data Custodian on improvements to asset information requirements

- Support Engineering Team Managers' requirements from designated asset management information systems

- Support regional teams and supply chain to achieve compliance with asset information requirements and the ADMM, as-built and asset information processes

- Ensure that local and central asset information management systems are aligned.

2.3.2 ADMM Roles

ADMM Custodian

The ADMM Custodian is responsible for the day-to-day maintenance of the ADMM document.

The Asset Information Group owns and manages change to the ADMM, in line with Section 3.6 of this document; but is not responsible for generating the Company's asset data requirement.

ADMM Review Panel

Membership for the ADMM Review Panel is comprised of a range of stakeholders throughout the business; this includes users of the ADMM in the Company and supply chain, Specialist Chapter Owners (SCOs), regional asset managers, and a range of other subject matter experts who provide support across the business.

It should be noted that the ADMM Review Panel is dynamic, consisting of a rotating selection from this wider pool of individuals, chosen based on the nature of the change under review by the ADMM Custodian. This also allows for situations where a member of the pool was an originator of the change request (i.e. the originator may not be the reviewer).

To ensure full involvement of all stakeholders before change is final; once all changes approved by the Review Panel are written into the draft ADMM version, the final draft is distributed to all teams to be reviewed as appropriate. An ADMM Revision Log is also circulated to assist in identifying all changed items for review.

Only after this final review is the draft finalised and passed to the business for publication.

LOCAL REQUIREMENTS: Asset Delivery (AD)

A. Roles

The role of Asset Data Custodian, with responsibilities equivalent to those detailed in section B.2.2 below, will be appointed in accordance with local operating arrangements.

Further operational roles for Asset Delivery areas are currently being finalised by the Business, and are planned for inclusion in a future iteration of the ADMM.

LOCAL REQUIREMENTS: Asset Support Contract (ASC) and Progressive Asset Delivery (PAD)

B. Roles

B.1 The *Employer*'s and *Provider*'s General Roles

B.1.1 The *Employer*'s Role Overview

The *Employer*'s responsibilities in the Asset Data Management process are to;

- Provide the following asset data systems, or other future systems that may provide broadly equivalent functionality, for the retention of and access to asset data to enable the *Provider* to fulfil their contractual duties to maintain the asset data in a complete, current and accurate state:
    - Integrated Asset Management Information System (Routine and Planned Maintenance)
    - Pavement Data Management System
    - Structures Data Management System
    - Geotechnical Data Management System
    - Drainage Data Management System

- Provide the initial population of asset data available at the beginning of the contract through the above systems for the *Provider* to maintain, update and report on as per their contractual obligations.

The current systems are detailed in the Annex 6 of the *Provider's* contract and Part 2 – Requirements and Additional Information. Please note the Employer also provides other asset data systems that are not currently in the scope of the ADMM.

B.1.2 Provider's Role Overview

The full value of asset data to the *Provider* and the data owner (the *Employer*) can only be realised when data is substantially correct, current and complete.

The *Provider* is responsible for ensuring that the *Employer*'s asset data is up to date and accurate during the contract period (to the required quality as defined by their respective contract).

The *Provider* has a responsibility to report asset data in an accurate manner ensuring that there can be no misinterpretation caused by their analysis or reporting methods.

The *Provider* is responsible for maintaining data required for the operational management of the asset. Where the current systems defined in the contract (both *Employer*'s and *Provider*'s) do not provide a means through which to capture, retain or analyse an asset data type, the *Provider* must provide a medium through which to achieve this on behalf of the *Employer*. This means must be agreed by the Service Manager.

The *Provider* must comply with this document or obtain agreement to depart from it in accordance with the contract requirements set out in Service Information Annex 25.

B.2 Delegated Asset Custodian Responsibilities

The *Provider* is responsible for ensuring that the *Employer*'s asset data is up to date and accurate. To assure that they are meeting this requirement the *Provider* will implement the following asset data governance roles. These roles are not mutually exclusive and one individual in the *Provider's* organisation may carry out more than one role.

B.2.1 Quality Plan Core Process Executive Owner - Establish Network Needs

In addition to the responsibilities set out in the contract, the Executive Owner of the Quality Plan Core Process "Establish Network Needs", incorporating the Sub Process "Manage Asset Data", will deliver the following responsibilities;

The Quality Plan Core Process Executive Owner will;

- Provide sponsorship of the Asset Data Management processes in the supply chain organisation

- Take strategic responsibility for the asset data quality in the supply chain organisation

- Appoint and assign the appropriate roles within their organisation to discharge their asset data responsibilities assuring high quality data (e.g. Asset Data Custodian)

- Ensure that the appropriate processes are in place in their organisation to deliver high quality data

- Communicate the processes and raise awareness of them throughout their organisation

- Act as the senior point of contact with the Service Manager in relation to asset data management.

B.2.2 Asset Data Custodians

- The *Provider* will appoint a number of asset data custodians to control quality and ensure custodial care of asset data in the *Provider*'s organisation. The roles of these asset data custodians are not mutually exclusive and one individual in the *Provider*'s organisation may carry out more than one role.

- In accordance with the Asset Data Ownership section (2.3.1) of this document, the asset data custodians will ensure that all relevant asset data is:

  o complete;

  o correct;

  o accurate;

  o current

  o integral from point of capture to point of load into the relevant primary asset data system;

  o compliant with the relevant standards;

  o available in the relevant asset data system in a timely manner; and

  o referenced using the metadata as defined in the relevant asset data management system.

B.2.3 Network Referencing Manager (NRM) and Deputy

The *Provider* must designate a member of their staff, the NRM and a deputy. The *Employer* maintains a schedule of nominated NRMs and their deputies.

Any changes to the *Provider*'s NRM or deputy must be notified to the Service Manager within 10 working days. The new NRM and/or deputy must be fully apprised of the Approved Network maintenance procedures. The NRM and deputy must have attended the NRM course run by the *Employer* or other persons authorised by the *Employer*.

The NRM:

- Is responsible for the accuracy, completeness and timeliness of the updates to the Approved Network Model in their Contract; and

- Is responsible for liaison with the *Employer*'s Network Auditor (see B.2.13) regarding section referencing when necessary.

B.2.4 Pavement Data Custodian

This role is responsible for controlling the quality of pavement asset data in the *Employer*'s Pavement Data Management System.

The Pavement Data Custodian will:

- Ensure compliance with all data management specifications relevant to managing the pavement asset;

- Act as focal point to receive any communications regarding development changes to *Employer*'s Pavement Data Management System and redistribute to all relevant personnel within the Provider's organisation;

- Act as focal point to receive any communications regarding changes to the specifications for data management related to pavement asset management data and redistribute to all relevant personnel within the *Provider*'s organisation;

- Be first point of contact for providing access to the *Employer*'s Pavement Data Management System for the *Provider*'s Team; and

- Manage access rights to the *Employer*'s Pavement Data Management System for the *Provider*'s Team.

B.2.5 Structures Data Custodian

This role is responsible for controlling the quality of structures asset data in the *Employer*'s Structures Data Management System.

The Structures Data Custodian will:

- Ensure compliance with all data management specifications relevant to managing the structures asset;

- Act as focal point to receive any communications regarding development changes to *Employer*'s Structures Data Management System and redistribute to all relevant personnel within the *Provider*'s organisation;

- Act as focal point to receive any communications regarding changes to the specifications for data management related to structures asset management data and redistribute to all relevant personnel within the *Provider*'s organisation;

- Be first point of contact for providing access to the *Employer*'s Structures Data Management System for the *Provider*'s Team; and

- Manage access rights to the *Employer*'s Structures Data Management System for the *Provider*'s Team.

B.2.6 Geotechnical Maintenance Liaison Engineer (GMLE)

The *Provider*'s GMLE is appointed to be responsible for all geotechnical matters carried out by the *Provider*, including geotechnical asset data. The appointment of the *Provider*'s GMLE is defined in HD 41 and associated guidance.

The GMLE will:

- Liaise with the *Employer*'s Geotechnical Advisor as required;

- Ensure compliance with all data management specifications relevant to managing the geotechnical asset;

- Act as focal point to receive any communications regarding development changes to the *Employer*'s Geotechnical Data Management System and redistribute to all relevant personnel within the *Provider*'s organisation;

- Act as focal point to receive any communications regarding changes to the specifications for data management related to geotechnical asset management data and redistribute to all relevant personnel within the *Provider*'s organisation;

- Be first point of contact for providing access to the *Employer*'s Geotechnical Data Management System for the *Provider*'s Team; and

- Manage access rights to the Employer's Geotechnical Data Management System for the *Provider*'s Team.

B.2.7 Drainage Liaison Engineer (DLE)

The *Provider*'s DLE is appointed to be responsible for all drainage surveys, maintenance and renewals. The appointment of the DLE is defined in the AMOR document.

The DLE will:

- Ensure compliance with all data management specifications relevant to managing the drainage asset in accordance with CD 535 and CS 551;

- Act as the focal point to receive any communications regarding development changes to the *Employer's* Drainage Data Management System and redistribute to all relevant personnel within the *Provider*'s organisation;

- Act as the focal point to receive any communications regarding changes to the specifications for data management related to drainage asset management data and redistribute to all relevant personnel within the *Provider*'s organisation;

- Be the first point of contact for providing access to the *Employer*'s Drainage Data Management System for the *Provider*'s Team; and

- Manage access rights to the *Employer*'s Drainage Data Management System for the *Provider*'s Team.

B.2.8 Flooding Champion

This role is responsible for the integration and coordination of flood risk management within their contract. This role may be carried out by the DLE as defined in AMOR document.

The Flooding Champion will:

- Ensure compliance with all data management specifications relevant to managing the flood hotspots in accordance with CD 535;

- Act as the focal point to receive any communications regarding development changes to the *Employe*r's Drainage Data Management System in relation to flooding data and redistribute to all relevant personnel within the *Provider*'s organisation; and

- Act as the focal point to receive any communications regarding changes to the specifications for data management related to flooding data and redistribute to all relevant personnel within the *Provider*'s organisation.

B.2.9 ICT Account Liaison Officer (ALO)

The *Provider*'s ALO is responsible for protecting the integrity of the asset data held in the *Employer*'s Information Systems by ensuring that only authorised users have access to the systems. This role is fully documented within the contract but must be understood as a data governance role as well.

The ALO will:

- Ensure that all users of the Employer's system(s) comply with the requirements set out in the documents comprising the Application for External Access (available from the Service Manager);

- Liaise directly with ICT with responsibility for managing *Provider* user accounts and any issues arising as a result thereof;

- Arrange access via ICT to *Provider* staff required to use *Employer* information systems; and

- Liaise with the GMLE and DLE to ensure that there is an accurate single record of which *Provider* Staff have access to which *Employer* information systems.

B.2.10 Carriageway Inventory Data Custodian

This role is responsible for controlling the quality of carriageway inventory asset data (as defined in Part 2 - Requirements and Additional Information) in the *Employer*'s Routine and Planned Maintenance System and the *Provider*'s system(s) for capturing and storing Carriageway Inventory data not held by the *Employer.*

The Carriageway Inventory Data Custodian will:

- Ensure compliance with all data management specifications relevant to managing the Carriageway Inventory;

- Act as focal point to receive any communications regarding development changes to *Employer*'s Routine and Planned Maintenance System and the *Provide*r's system(s) for capturing and storing data not held by the *Employer*, and redistribute to all relevant personnel within the *Provider*'s organisation; and

- Act as focal point to receive any communications regarding changes to the specifications for data management related to the Carriageway Inventory asset management data and redistribute to all relevant personnel within the *Provider*'s organisation.

B.2.11 Lighting Liaison Engineer (LLE)

The *Provider*'s LLE is appointed to ensure the provision of timely and up to date inventory data to meet the requirements of the National Electrical Supply Contract.

The Lighting Liaison Engineer's duties will include:

- The submission of the inventory monthly return to the System Administrator;

- Follow up on error correction of the inventory as advised by the System Administrator or unmetered supplies operator (UMSO); and

- Ensuring that all the equipment is maintained in good working order.

B.2.12 Environmental Liaison Co-ordinator (ELC)

The *Provider*'s ELC is appointed to ensure coordinate and oversee environmental operations to ensure regulatory compliance and permit renewal.

The ELC's duties will include:

- Working with cross-functional teams to maintain environmental management and monitoring programmes as well as developing and encouraging sustainability reporting; and

- Assess potential environmental risks and develop mitigation plans. Follow and enforce environmental health and safety procedures along with CDM regulations.

B.2.13 Employer's Network Auditor

This role is fulfilled by the HAST team.

2.4 Governance

LOCAL REQUIREMENTS: Asset Support Contract (ASC) and Progressive Asset Delivery (PAD)

C. Governance

C.1 Asset Data Management Policy and Standards

The Asset Data Management Policy and Standards Function sets out the obligations of the *Provider* concerning the continual improvement and development of the processes in place for managing asset data within the ASC.

C.1.1 Quality Plan Manage Asset Data Process(s)

The *Provider* will set out how they will manage asset data as part of their Quality Plan (in accordance with the requirements of the contract).

C.1.2 Development of Improved Asset Data Management Methodologies

The *Provider* continually seeks to improve the delivery of asset data management (including but not limited to data capture and analysis) in line with the overarching requirements. Any changes to delivery of asset data management as required by these standards will require an agreement to depart from them in accordance with Annex 25 of the contract.

C.2 Asset Data Audit, Assurance and Compliance

Asset Data Audit, Assurance and Compliance provides check points for the *Employer* and *Provider* to review and ensure the accuracy of Asset Data and efficiency of the Asset Data Management process.

C.2.1 Data Audit

The *Provider* is required under the contract to submit to regular audit of their Quality Management Plan, this will include the audit of the Sub Process Manage Asset Data as defined in Annex 24 of the contract.

C.2.2 Annual Asset Data Review

The *Provider* is responsible for maintaining the asset data in a complete, current and accurate manner. To demonstrate that they are complying with this requirement the *Provider* will regularly review the asset data for completeness, currency and accuracy and identify any deficiencies for correction in section C.3.2.

- The *Provider* will undertake a review of the asset data held in the *Employer*'s and *Provider*'s asset data systems for completeness, currency and correctness 12 months after the access date and every 12 months after that until the end of the contract period.

- The *Provider* will record all deficiencies found through the review.
  - Deficiencies identified that are due to the *Provider*'s non-compliance with the contract and this document will be raised as a Non Conformity Report (NCR).
  - Deficiencies identified that occurred prior to the contract but were not identified by the *Provider* at the beginning of the contract will be notified to the *Employer'*s Service Manager within 5 working days of identification.

- The *Provider*'s responsibilities are;
  - To review all asset data every 12 months starting from access date.
  - To raise deficiencies to the Service Manager within the defined timescales

C.3 Asset Data Management Improvement and Optimisation

The Asset Data Management Improvement and Optimisation Function is structured to ensure that asset data held by the *Employer* and the *Provider* is correct and that processes are in place to regularly monitor and improve asset data and asset data management.

C.3.1 Correction of Asset Data Deficiencies

The *Provider* has a requirement to maintain the *Employer*'s asset data in a complete, current and correct manner throughout the contract period. To ensure they are able to comply with this they must undertake a yearly review. Any deficiencies identified through the annual review, excluding those identified at the beginning of the contract period as defined in Annex 25 of the contract, must then be corrected by the *Provider.*

- The Provider will correct all contractual non-compliance deficiencies in asset data completeness, currency and/or accuracy identified in Section C.2.2, and as specified in the contract within 20 working days of identification.

- Section C.2.2 requires the *Provider* to identify all deficiencies in asset data completeness, currency and accuracy. Where the deficiency occurred prior to the current contract access date and was not identified at the beginning of the contract as required in Annex 25 of the contract, the *Provider* will notify the Service Manager within five working days.

- When directed by Service Manager the Provider will correct the deficiencies in asset data within 20 working days.

- The *Provider* is responsible for:
  - Ensuring all corrections of asset data deficiencies are updated in a timely manner; and

> o   All corrections are complete, current and accurate.
>
> ### C.3.2 Continuous Improvement
>
> - The *Provider* shall continually seek to improve the delivery of asset data management (including but not limited to data capture and analysis) in line with the overarching requirements.
>
> - Improvements may be identified by sub processes in Section C.2.
>
> - Any changes to delivery of asset data management as required by these standards will require an agreement to depart from them in accordance with Annex 25 of the contract.

2.5 Asset Data Management and BIM

The following statements reflect what elements are being introduced into the ADMM that will assist Highways England's stakeholders to be BIM compliant:

- The ADMM should be the principal source of asset information requirements (AIR) for all Highways England's schemes and projects as specified in the PAS 1192-3.

- The ADMM should hold the handover requirements between teams to ensure that the requirement information quality and value is maintained throughout the operational life cycle of the assets.

- The ADMM requirements will feed into the Employers Information Requirements (EIR) as specified in the PAS 1192-2 in the form of AIR.

- For all schemes the Organisational Information Requirements which stem from the Asset Management policy / strategy, generate the AIR and through the ADMM should specify the as-maintained data that needs to be produced.

- The ADMM is aligned to a standard classification system (i.e. Uniclass).

- Designers should use the ADMM in an agile fashion to cover project / scheme specific requirements (i.e. specify only the asset requirements relevant to the project / scheme).

- The ADMM should be used to identify the required Levels of Information for the identified assets.

- The ADMM should help stakeholders identify responsibilities against flow of the Level of Information[1] (see PAS 1192-2) as per the data drop[2] requirements of the project/scheme as specified in the BIM Protocol**.**

---

[1] Level of Information measures the non-graphical detail put into the deliverables of a project/scheme.
[2] According to the Institution of Civil Engineers (ICE) "data drops are aligned to project stages, and the information required reflects the level of development that the project should have reached by that stage. This might be considered analogous a stage report on a conventional project." (http://www.designingbuildings.co.uk/wiki/Data_drops_for_BIM)

Part 1 - Data Principles and Governance

3 The Asset Data Management Manual

3.1 Introduction

The Asset Data Management Manual, sets out the Company's asset data requirements to achieve the organisations objectives. The document sets out the deliverables for all individuals and organisations involved with the management of asset data on behalf of the Company.

3.2 Scope of the ADMM

The ADMM is intended to support Highways England's asset management aims and in turn support the Company's strategic business objectives. The ADMM should be sufficient for the Company and its partners to understand how their asset delivers value and benefits for the organisation.

It is impractical for this document to describe every piece of asset data within the Company and therefore some decisions will be required regarding the significance of the asset data in relation to the Company's strategic needs. A governance structure, which is described in this document, is in place to make these decisions about the content of the document (see section 3.6).

The ADMM currently covers infrastructure assets and therefore includes asset data requirements for the following main classes of asset:

- Pavement
- Structures
- Drainage
- Geotechnical
- Technology

The ADMM also includes asset data requirements for the other classes of asset, namely:

- Buildings
- Carriageway Control
- Environmental
- Landscape
- Lighting
- Paved Area
- Road Restraint Systems

The asset classes Building, Carriageway Control, Landscape, Lighting, Paved Area and Road Restraint can also be grouped into a set of assets called Carriageway Inventory. Carriageway Inventory assets refer to those assets which appear on or

alongside the carriageway which are not Pavement, Structures, Drainage, Geotechnical assets or Roadside Operational Technology.

To effectively manage a wide range of data, the ADMM organises data into categories (see section 3.5) throughout the Asset Data Lifecycle. These are potentially within the scope of the ADMM and appropriate content will be developed in line with the overall governance of the document.

The scope includes all data in these categories stored in Company asset data systems (e.g. SMIS) or Supply Chain systems (e.g. in the case of ASC contracts, Pavement category defect data held on Routine and Planned Maintenance systems). The Company owns all asset data about physical assets it owns, plus additional data it may have instructed the capture or maintenance of at any time.

Additionally, the ADMM details a requirement to store data relating to a selection of third-party-owned assets, which cross or are contained within the Strategic Road Network (SRN) boundary; such as those belonging to Statutory Undertakers (i.e. utilities & telecoms), or private land owners. These assets are only detailed in so much as an operational requirement may exist for the Company to know of the presence of such objects. Highways England does not accept responsibility to capture, store, or provide data on behalf of the asset owners.

3.3 Components of the ADMM

3.3.1 Data Principles and Governance

Part 1 - Data Principle and Governance outlines the concept of asset data management and defines how this is structured within Highways England. The last section includes a detailed description of the ADMM's scope, components, structure and change management process.

3.3.2 The Asset Data Dictionary

The Asset Data Dictionary is a collection of information about asset data which describes the:

- meaning and scope of asset data;
- collections and hierarchy within which the data resides;
- format of the data;
- any predefined lookup values for the data; and
- the Company's rules that govern how the data is captured and managed.

Additional guidance on the data formats and terminology is provided in Part 2 – Requirements and Additional Information.

3.3.3 Requirements and Additional Information

Part 2 - Requirements and Additional Information is divided into two main parts:

- Generic Requirements, which span all asset types and are presented against the structure of the Asset Data Lifecycle as shown in Figure 1-1. Further information about Asset Data Systems, the transfer of data in and out of Asset Data Systems and advice on working with asset data in ASC contracts, AD contracts and major schemes is provided.

- Asset Class Specific Requirements, which relate to a particular type of asset are presented in sections for the respective asset class. Where the asset data requirements of more than one asset class are the same, the requirements are presented in one class with a cross reference in the other class(es). Where required, detailed requirements are also presented in associated appendices.

3.4 Asset Data Hierarchy

Highways England's approach to asset data described in the ADMM is to position data elements within a hierarchy. This allows the data requirement to be structured within Part 3 - Data Dictionary, similar to the nature of a database system.

3.4.1 Asset/Component Records & Management Records

To fully understand this hierarchy, it is important to note the distinction between 'Asset/Component records' and 'Item records':

- Asset Records - represent an individual asset in the real world. This includes Inventory data; recording **what** the asset is and **where** it is located.

- Component Records - are data records which do not describe an individual asset. They describe part of an asset (e.g. detailing a sub-component of an asset).

- Management Records – are data records which comprise data relevant to an asset or the business' asset management (e.g. an individual condition inspection record; associated to a single asset).

3.4.2 Data Dictionary Hierarchy

Figure 3-1 shows the Hierarchy of ADMM data to the attribute level – with an example of an Asset Record: "Kerb"; and a linked Management Record: an "Inspection Record" for this specific Kerb asset.
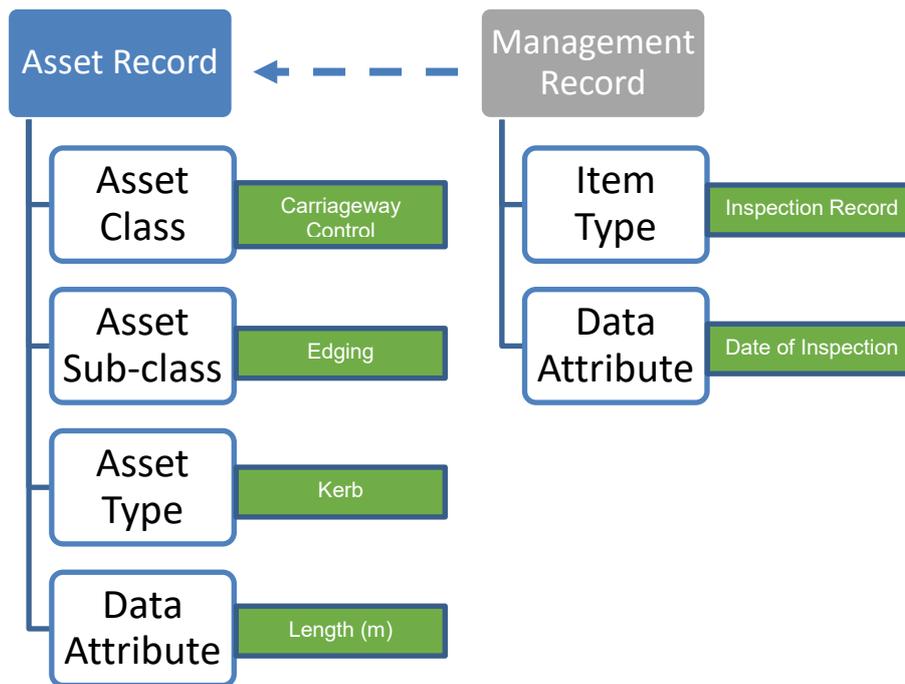
Figure 3-1 – Example of Data Dictionary Hierarchy.

Note:

- Item Records are typically linked to their parent or associated asset using a referential link (i.e. Reference ID). See Part 2 – Requirements and Additional Information for further information.

- In instances where this is not the case (e.g. where an Item Record is more abstract Company meta-data), the item stands alone, and will not include a link.

Part 3 - Data Dictionary is designed for query and filtering based on this hierarchy.

3.5 Asset Data Categories

Continued revisions to the ADMM successfully document increasingly more complex asset data requirements; going beyond physical information on type, location, and attributes of an asset (i.e. 'inventory') to include data on the planning and construction of the asset, its operational management, any maintenance or improvement scheduled or carried out upon it, monitoring of its condition and performance and its eventual retirement from service, as well as any systems or meta data which is required by the business in order to manage data and function effectively.

To effectively organise this range of requirements, an approach has been adopted defining specific "Asset Data Categories". Individual *assets*, *items*, and their requirements (*attributes/domains/rules)* within the ADMM will be allocated to a category; helping to differentiate the origin of data, what purpose it serves, and who is responsible for its population and/or update. This methodology aligns **Asset Data Requirements**, alongside the **Asset Lifecycle**, and the **Asset Data Lifecycle**.

3.5.1 Asset Data Categories & the Asset Lifecycle

As stated above and shown in Figure 3-2, the defined Asset Data Categories correspond to stages within the asset lifecycle.

The outer ring of the diagram shows the Asset Lifecycle process; the work undertaken by the business to manage its assets. This cycle can apply throughout the business at varying levels of granularity, for example:

- At the Regional or Area level – to manage a collection of assets, in order to meet the demands of a high-level requirement such as network service delivery or major works schemes.

- At the asset level – to manage an individual asset throughout its life, in order to ensure it performs effectively.

The inner ring of the diagram shows the Asset Data Categories; data produced and consumed within the corresponding stage of the lifecycle.

Finally, the centre of the diagram indicates the need for systems, essential for the effective management of the asset data – connecting Asset Data Categories and providing a pool of information to support all stages of the lifecycle. These systems come in a variety of forms, and at present the business uses a number of data systems concurrently. It should be noted that there is considerable work in maintaining multiple separate systems for asset data; maintaining data primacy (one version of the truth) and accurately transferring data between systems requires strict governance and adhesion to a rigorous logical practice. Deviation or oversight in these practices rapidly impacts the quality of the dataset; as duplicates, errors, and omissions are inherently inevitable.
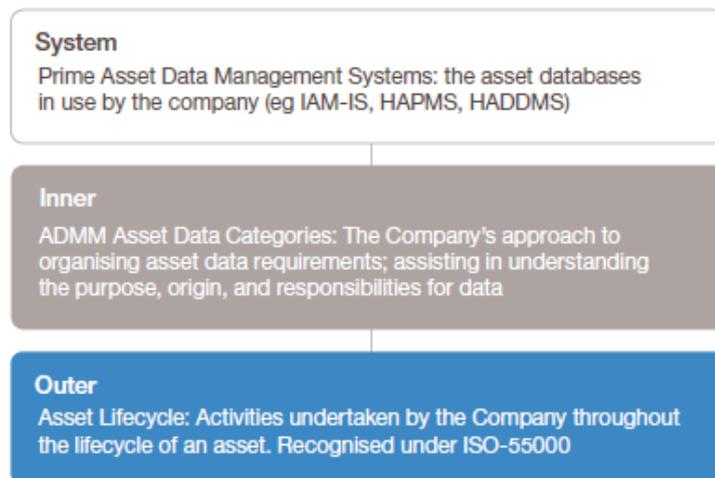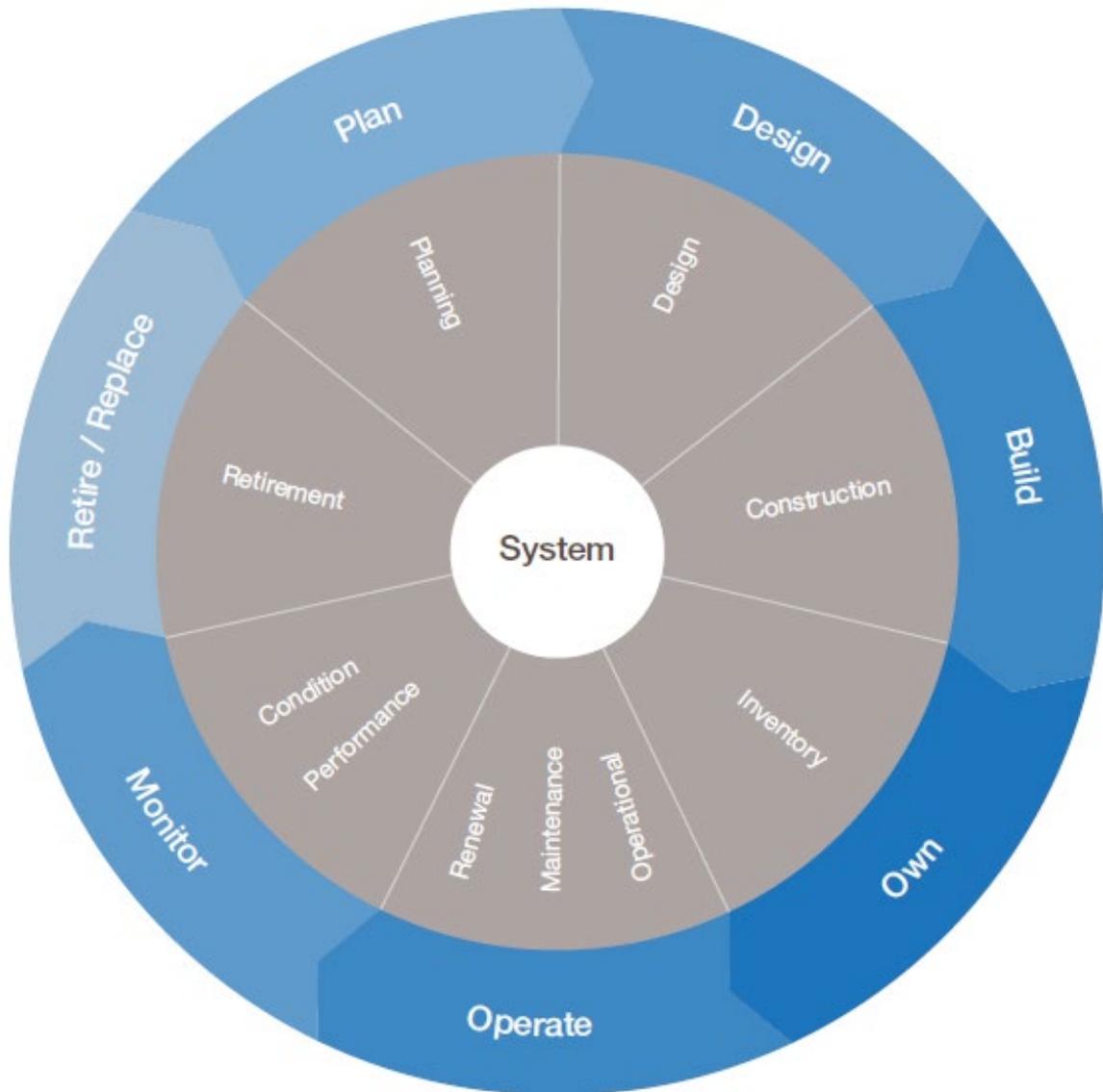
Figure 3-2 - ADMM Asset Data Categories shown in the context of the Asset Lifecycle.

3.5.2 Asset Data Categories – Context & Definitions

Each of the Asset Data Categories are defined in the following sections. Examples are also included (**note:** these are not comprehensive, and merely serve to demonstrate some of the typical items which would be expected in each category).

Inventory:

Highest level of asset data – acting as the parent or 'hook' for other data categories to hang off. Inventory, at its simplest, contains a record of the asset, its type, and location.

- Asset Type
- Location information:
    - Geospatial coordinates
    - Other location reference systems
- Key details of the asset composition/morphology

Design:

Data/information regarding the design of an asset or asset(s). This information also typically (but not exclusively) exists at the scheme level, with records pertaining to a collection of multiple assets required.

- Drawings and design plans:
    - 2D
    - 3D
    - CAD

Construction:

Data/information regarding how an asset was constructed – including information to show the lifespan or history of an object.

- Manufacturer
- Product model/ID/spec
- Dates:
    - Manufacturer
    - Installation
    - Construction
- Information pertaining to the conditions/methods of construction (asset specific):
    - Installation/construction methods

Operational:

Data/information regarding the effective operation of the asset, and planning for any activities to operate, maintain, or improve it.

- Constraints, e.g. access limitations and guidance

- Planning and schedule for routine inspections
- Planned interventions to maintain/improve the asset

Maintenance & Renewal:

Data/information recording history of maintenance interventions against an asset; activity to repair defects and/or restore asset condition.

- Work Records; e.g. details of the work undertaken:
    - Kind of maintenance, materials/components, cost
    - Date undertaken
    - Validation of work undertaken

Condition:

Data/information regarding the condition of an asset.

- Inspection Records; e.g. details of inspection, and verdict of the asset condition:
    - Who undertook the inspection
    - Date of inspection
    - Details of the condition of the item (asset/inspection specific)
    - Condition Grading and/or Pass/Fail
- Defect Reports

Retirement:

Data regarding the retirement of a Highways England asset; this can happen in a number of ways:

- De-trunking – passing of the asset and its responsibility to another party (i.e. a local government provider)
- Decommission – the physical removal/destruction of an asset
- End-dating – declaring an asset no longer operational (does not necessitate the physical removal or destruction)

System:

System data is required by the business to support effective data management – it allows the recording, organisation, and relation of asset data. Typically, it composes identifiers within database systems. While the ADMM takes a system-agnostic approach to asset data; it acknowledges that, regardless of specific asset data system, all databases require certain generic requirements in order to function.

- Unique Identifier(s), i.e. "how would a specific asset be queried or tracked?":
    - Business
    - System
    - Real-world
- Reference Identifier(s), i.e. a link to another asset (typically the 'parent' in the hierarchy)

3.5.3 Additional Considerations

The below items are not Asset Data Categories; however they are linked with the Asset/Asset Data Lifecycle.

Information:

The concept of 'information' exists throughout the asset lifecycle. Information is produced where data feeds analysis or computations. Data from any of the Asset Data Categories may be used to inform decisions; both at the asset-level, or the strategic level. This is a critical step in improving asset management practices; both in the short and long-term.

Overall the importance of information emphasises the necessity for an ordered approach to data management, an effective system, and an ability to combine and compare data from different areas within the business.

Safety Considerations:

Safety information can encompass items in any of the other categories – which are directly related to the safety of both users of the asset, and those (potentially) undertaking work on the asset.

- Various Risk assessments
- Health and safety files.

The importance of this approach should be highlighted; that safety considerations transcend all aspects of the business, and are represented throughout the asset data. Furthermore, Highways England's obligation to safety exists at all levels of granularity; both as the data specific requirements mentioned above, and through a permeating ideology within the business process and working.

3.6 Change Management

The Asset Data Requirements, as documented within the ADMM, are subject to continued change – in order to meet the evolving needs of the business. This is governed and controlled under a change management process.
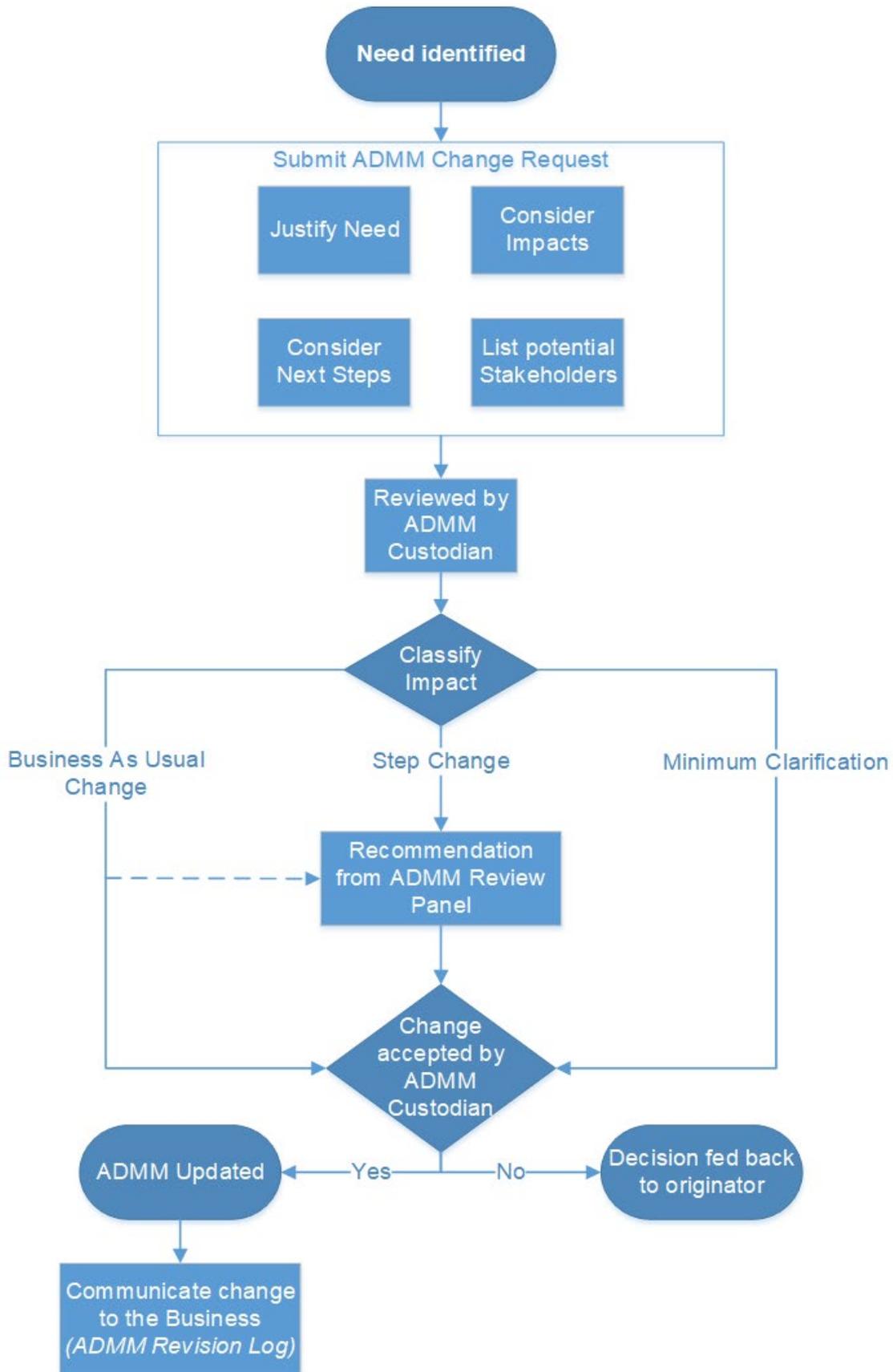
An overview of the process is displayed below:

Figure 3-3 - ADMM change governance process.

Details of the process are as follows:

1. Firstly a need is identified by the business for a change to the documented requirements. Change may arise from the wider business, from specific asset managers, or from continued review of the ADMM.

2. A formal change request is submitted, using the ADMM Change Request Submission Form (available alongside the ADMM, on the Standards for Highways website).

3. The change request includes:

   - Source of the request – who identified the need, and the context of that discovery.

   - Description of the change request.

   - Justification to the business, supporting the need for change – this is to be specific, detailing the requirement, its application, and benefits.

   - Consideration of impact – in parallel with the justification, a consideration of the impact on the business must be formally documented (this may be completed and/or expanded upon by the ADMM Custodian – see section 2.3.2- upon review).

   - Consideration of Data-related impacts; i.e. which systems will be affected, and how will data be captured/maintained.

   - List of relevant stakeholders.

   - Proposed next steps for engagement (where relevant).

4. Upon receipt the ADMM Custodian will organise requests based on their impact and priority. This is done using a graded scoring system, considering the impact to the Company across a range of metrics (e.g. finance, data/system, delivery, safety); the cumulative assessment of which allocates impact into one of three categories:

   - **Minimum Clarification** – an amendment to the document to clarify the existing requirements, including corrections. Typically, these items have clear solutions, and do not require elevation to the ADMM Review Panel (see section 2.3.2).

   - **Business As Usual (BAU) change** – changes to clarify or correct existing requirements which may have a greater impact than Minimum Clarification changes. These items may be escalated to the ADMM Review Panel as required.

     Note: a BAU change may still be referred to the ADMM Review Panel for consultation and advice.

   - **Step Change** – the most significant change to the ADMM. Includes the addition of new requirements, and deletions of existing ones. Step changes are unlikely to have fully formed solutions and therefore consultation with the stakeholder community through the Review Panel is appropriate.

5. Where appropriate, consultation occurs to establish a solution. This is done through the ADMM Review Panel.

6. If the change is agreed then the solution is drafted into the ADMM for release in the next version and the ADMM Revision Log is updated accordingly. If the change is rejected, the decision is fed back to the originator.