![National Highways logo](national highways)

NATIONAL HIGHWAYS
Asset Management Development Group

ASSET DATA MANAGEMENT MANUAL

Part 1 – Data Principles and Governance

October 2021

Version: *13.0*

Revision Sheet

For revisions across all ADMM documents see the Revision Log available on Standards for Highways:
http://www.standardsforhighways.co.uk/ha/standards/admm/index.htm

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
11.0	April 2020
12.0	October 2020
13.0	October 2021

Asset Data Management Manual Custodian

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

The ADMM Custodian (see section 2.2) is responsible for the day-to-day maintenance of the ADMM documents. Currently the custodian is as follows:

Name: Stuart Collins, Asset Management Development Group

Email: AssetInformationQueries@highwaysengland.co.uk

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

Contents

List of Figures

Foreword

The Asset Data Management Manual (ADMM) sets out National Highways (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 National Highways asset data needs and is revised annually 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 National Highways.

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 National Highways. Additionally, further guidance surrounding the purpose of the ADMM is provided.

- **Part 2 – Requirements and Additional Information**, which includes National Highways 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 Reference Catalogue**, 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 2.4 "Change Management".

Due to the upcoming expiry of Asset Support Contract's any related requirements have been removed from the ADMM. Access to these requirements is only permitted via earlier versions of the ADMM. If access is required please contact AssetInformationQueries@highwaysengland.co.uk.

Part 1 - Data Principles and Governance

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

Section 1 introduces asset data management and defines how asset data management is structured within National Highways business.

Section 2 outlines the purpose of the ADMM, specifically its scope, roles and responsibilities, 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 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

Part 1 - Data Principles and Governance

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 Asset Data Management at National Highways

The Company's Asset Management Policy explains the value of asset management in delivering their vision, and their approach to asset management. The Asset Management Strategy describes how the asset management approach will be delivered in the six areas set out in the Asset Management Policy. One of these areas, 'Using our asset knowledge to manage risk', specifies the need to establish clear requirements for asset data, now and in the future. 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.

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.

1.4 Asset Data Management and BIM

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

- The ADMM should be the principal source of asset information requirements (AIR) for all National Highways 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 ISO 19650:1 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 ISO 19650:1) 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)

2 The Asset Data Management Manual

2.1 Scope of the ADMM

The ADMM is intended to support National Highways 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. For the Company to effectively manage its assets, it must have the correct data; this depends on several interrelating factors. The ADMM covers the scope of the Requirement; defining the Company's data needs (Figure 2-1).
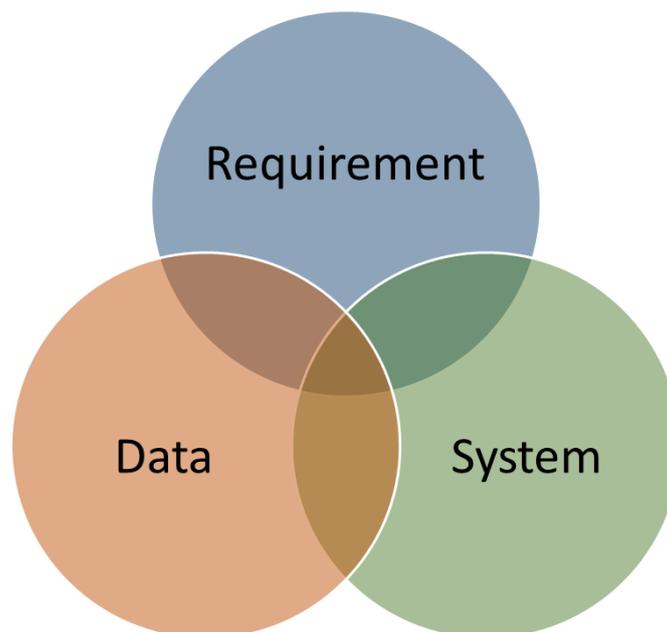

Figure 2-1 – Context of the Company's Asset Data Requirement.

A governance structure, which is described in this document, is in place to make these decisions about the content of the document (see section 2.4).

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

- Pavement
- Structures
- Drainage
- Geotechnical
- Roadside Operational Technology

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

- Ancillary

- Carriageway Control

- Environmental

- Lighting

- Road Restraint Systems

The asset classes Ancillary, Carriageway Control, Lighting and Road Restraint can be grouped into a set of assets called Carriageway Inventory. Carriageway Inventory refer to those assets which appear on or alongside the carriageway which are not Pavement, Structures, Drainage, Geotechnical or Roadside Operational Technology assets.

To effectively manage a wide range of data, the ADMM organises data into categories (see section 2.32.2). 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. HADDMS). 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. National Highways does not accept responsibility to capture, store, or provide data on behalf of the asset owners.

2.2 ADMM Roles

ADMM Custodian

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

The Asset Management Development Group owns and manages change to the ADMM, in line with section 2.4 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.

2.3 Asset Data Categories

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.

2.3.1 Asset Data Categories & the Asset Lifecycle

As stated above and shown in Figure 2-2, 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, 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, to ensure it performs effectively.

The two inner rings of the diagram show the Asset Data Categories; data produced and consumed within the corresponding stage of the lifecycle. 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 several data systems concurrently. It should be noted that there is considerable work in maintaining multiple separate systems for asset data; maintaining data primacy 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.
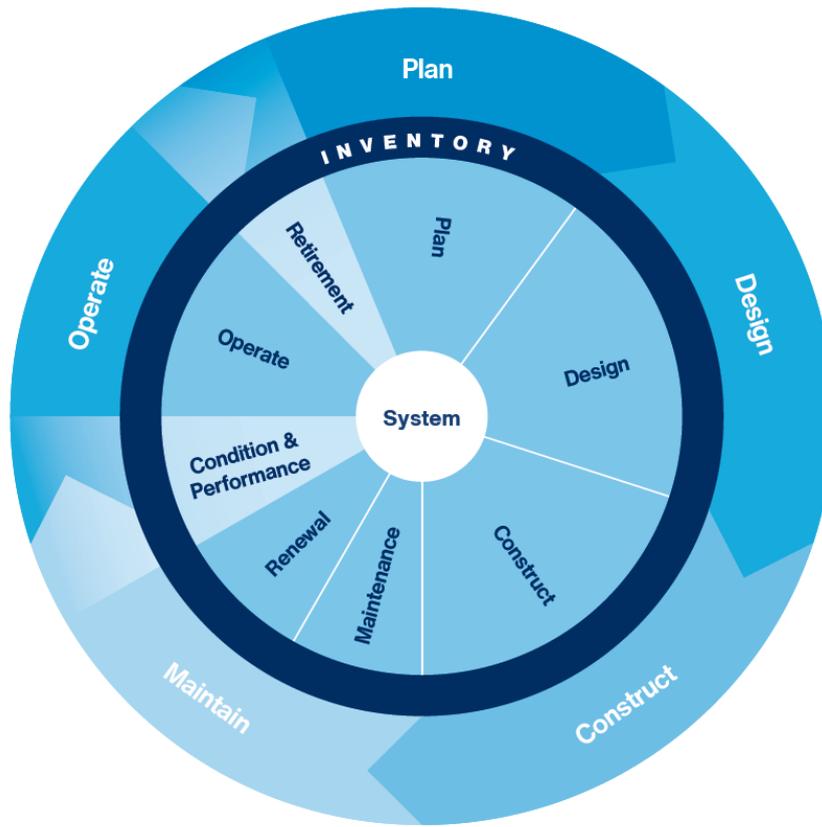
Figure 2-2 - ADMM Asset Data Categories shown in the context of the Asset Lifecycle.

2.3.2 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

Plan / Design:

Data/information regarding the planning/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

Construct:

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

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 & Performance:

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

Data/information regarding the performance of an asset, e.g. is the asset performing as intended.

- Inspection Records e.g. details of inspection, and verdict of asset performance:
    - Who undertook the inspection
    - Date of inspection
    - Performance Grading, e.g. Pass/Fail

Operate:

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

Retirement:

Data regarding the retirement of a National Highways asset; this can happen in several 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 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)

2.3.3 Additional Considerations

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, National Highways 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.

2.4 Change Management

The asset data requirements, as documented within the ADMM, are subject to continued change – 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:
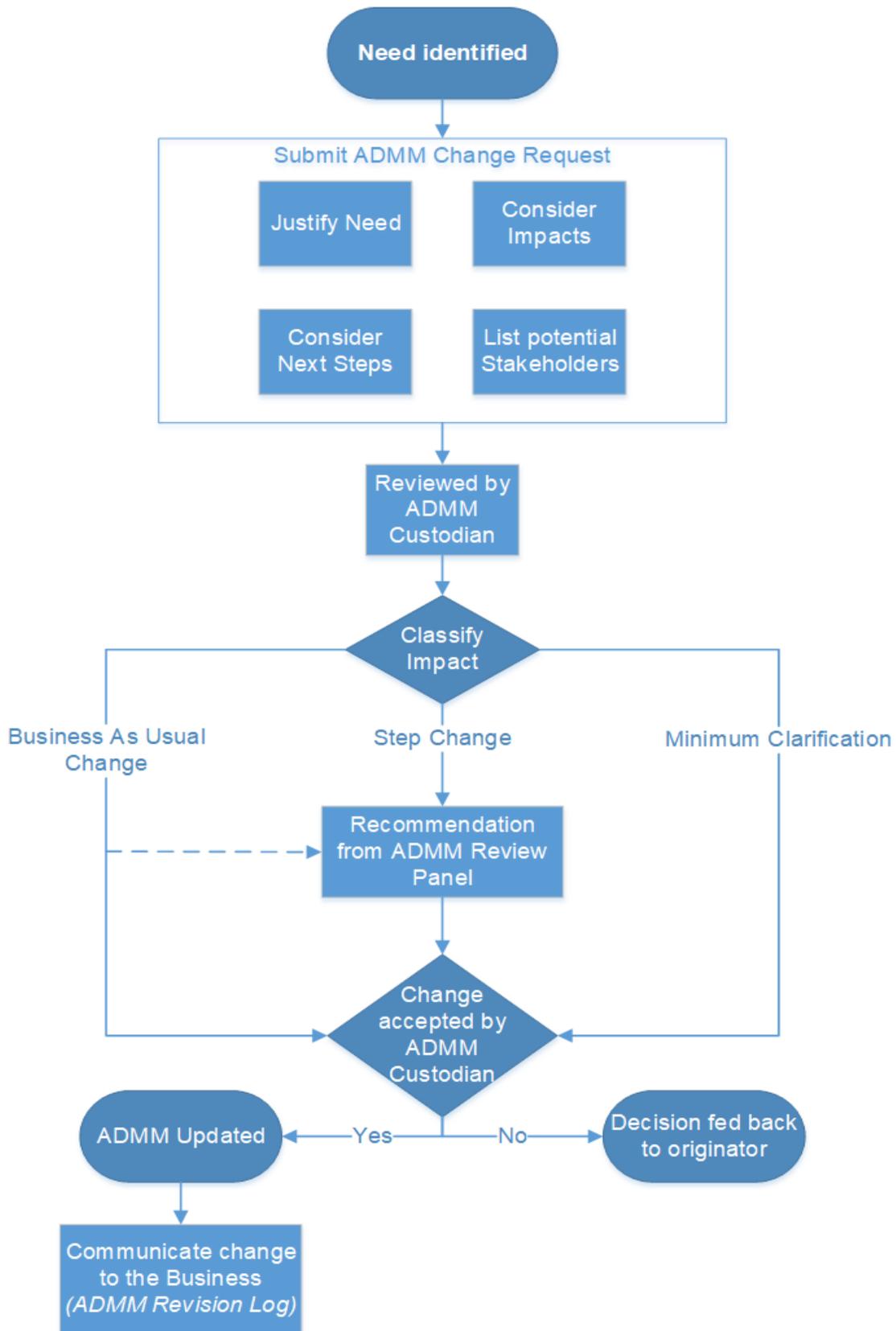
Figure 2-3 - ADMM change governance process.

Part 1 - Data Principles and Governance

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 if the change is NOT implemented – this could involve the potential risk of not undertaking the change

   - Consideration of impact if the change IS implemented – 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 upon review).This should also include any data-related impacts; i.e. which systems will be affected, and how will data be captured/maintained.

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 2.22.2).

   - **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.

Part 1 - Data Principles and Governance

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.