national highways

NATIONAL HIGHWAYS
Asset Management Development Group

ASSET DATA MANAGEMENT MANUAL

Part 2 – Requirements and Additional Information

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

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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 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 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 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.](mailto:AssetInformationQueries@highwaysengland.co.uk)

Part 2 – Requirements and Additional Information

Part 2 – Requirements and Additional Information consists of two parts which detail the requirements for asset data which have been defined to fulfil the Company's strategic objectives.

Part 2.1 - Generic Asset Data Requirements

The **generic asset data requirements** outline data requirements that apply to all asset data unless specific exceptions are stated elsewhere in the ADMM. In particular:

- Asset Data Lifecycle requirements, which relate to the over-arching activity of asset data management.
  - Information about Asset Data Systems; including ownership, scope and contacts.
  - Methodology for transferring data into and out of Asset Data Systems.
  - Additional advice on working asset data operationally (Section 6) and in major schemes (Section 7).
  - Requirements for the approved network model (Section 4). The network model is an information asset which generates value in the same way as other physical infrastructure assets.

Part 2.2 - Asset Class Specific Requirements

Asset class specific requirements provide further guidance of each asset class. Specifically, the hierarchal structure for each asset class, references to any related Requirements and Advice Documents (RADs) and further guidance relating to the Asset Data Categories.

PART 2.1 – GENERIC ASSET DATA REQUIREMENTS

1 Overarching Data Requirements

The following requirements relate to the over-arching activity of asset data management. These are the default Company requirements which apply unless modified for specific purposes by other elements of the ADMM or a replacement requirement is stated as an exception.

1.1 Spatial Referencing

For each asset where co-ordinates are required, the Easting and Northing (XY) coordinates are referenced to the OSGB36 (Ordnance Survey Great Britain 1936) datum. The Company requires the accuracy level for locating assets to be within 3m on average, with an error of no more than 5m for individual assets.

1.2 Format

Data will be provided in the appropriate format as required in the ADMM or by reference to the relevant Requirements and Advice Documents (RAD's). Where no format is specified in either source, the format of the data must be agreed with the Information Custodian.

1.3 Currency

All data created by an activity will be loaded into the relevant asset data system within three months of completion on site of the activity or within the timescales listed for the specific activities:

Hard Surfaces, Carriageway Inventory and Network Inspections	30 days
Structures Inspections	90 days
Drainage Inspections	30 days
Geotechnical Inspections	90 days
Recording of flood events	7 days
Closure of the flood event	28 days
Other Surveys	60 days

Table 1-1 – Currency of data upload.

1.4 Completeness

All asset data which is changed by an activity is updated in the relevant prime asset data system in its entirety.

1.5 Accuracy

The asset data which is changed by an activity shall be updated accurately into the relevant master asset data system.

1.6 Asset Data Systems

The Company is responsible for the provision of several systems which enable it to meet the need to store and retrieve asset data to fulfil this asset data life cycle requirement. The current types of asset data management systems are listed and detailed in Section 2.

The Information Steward is responsible for ensuring that an initial population of data is available in these systems to enable the creation, update and use of data as required.

1.7 Governance

An Information Custodian will not release asset data without the prior approval of the Information Steward or their named representatives.

Appropriate care should be given to the distribution of asset data as without proper context it can be easily misinterpreted causing reputational damage to the Company and its partners.

2 Asset Data Systems

2.1 The Company's Asset Data Systems

The Company has the following asset data management systems for recording inventory, construction, condition, and maintenance data.

Future systems may be developed which provide broadly equivalent functionality to the systems listed below:

- Routine and Planned Maintenance System
- Pavement Data Management System
- Carriageway Inventory Data Management System
- Structures Data Management System
- Geotechnical Data Management System
- Drainage Data Management System
- Environmental Data Management System
- Technology Data Management Service

The following table illustrates which systems are used for the management of each asset class.

Asset Class		Data Category	Primary Asset Data System
Pavement		Inventory	HAPMS
		Construction	
		Condition	
		Operational	Confirm
Structures		Inventory	IAM-IS
		Condition	
		Operational	
Drainage		Inventory	HADDMS
		Condition	
		Operational	Confirm
Geotechnical		Inventory	HAGDMS
		Condition	
		Operational	
Environmental		Inventory	EnvIS
		Condition	
		Operational	Confirm
Carriageway Inventory[2]	Ancillary	Inventory	Confirm
		Operational	
	Carriageway Control	Inventory	Confirm
		Operational	
	Lighting	Inventory	Confirm

		Operational	
	Road Restraint	Inventory	Confirm
		Operational	

Figure 2-1 – The Company's Prime Asset Data Systems.

1 Operational data includes data to support routine maintenance management.

2 Carriageway Inventory is defined in Section 2.1 of Part 1 – Data Principles and Governance.

2.1.1 Confirm Routine and Planned Maintenance

Support:

IT Service Helpdesk (ITServiceDesk@highwaysengland.co.uk)

Scope of data:

The Routine and Planned Maintenance System includes the following functionality:

1. The ability to capture, store and report asset inventory and defect data for carriageway inventory assets.
2. Works ordering to manage routine and planned maintenance for carriageway inventory assets.
3. Customer enquiry management.
4. The ability to import and export data.

The Routine and Planned Maintenance System does not provide:

1. Mobile hardware.
2. An incident management system.
3. Enterprise resource or finance management capabilities.

2.1.2 Pavement Data Management System (HAPMS)

Support:

HAPMS Support Team (HAST) (ICTServiceDesk@highwaysengland.co.uk).

Note: non-NH users, please forward queries via your NH project sponsor, who will be able to log your support call appropriately.

Associated documents:

- HAPMS Documentation Index - http://hawacphap013/hapms/ (available through National Highways extranet)
- CS 228, Skidding Resistance
- CS 229, Data for Pavement Assessment
- CS 230, Pavement Maintenance Assessment

- Various standards for carriageway inventory data as referenced in the ADMM sub processes in this document.

Scope of data:

To provide core data on the pavement asset in support of corporate governance and to provide a pavement management tool. To provide information for forwarding to the public on planned road works and incidents.

Facilities within the HAPMS software are provided to update and maintain the following information:

- Construction: HAPMS contains the definitive record of the physical construction of the carriageway asset.

- Skidding Resistance Investigatory Level: HAPMS contains the definitive record of Skidding Resistance Investigatory Levels for the Strategic Road Network.

- Speed Limits: NTIS contains the definitive record of speed limits on the Strategic Road Network.

- Lane Geometry: HAPMS contains records of lane geometry, including widths, within the XSP Detail section attribute.

Carriageway Construction

HAPMS contains the record of pavement construction for the Approved Network Model. The pavement record is stored against each half lane width (wheel track) and is to be updated from as-built records following all new construction / maintenance actions.

Skidding Resistance Investigatory Levels (IL)

The skidding resistance investigatory levels are set in accordance with the Company policy as defined in CS 228.

Speed Limits

The legal speed limit is stored against each section or parts therein, where speed limits differ over the length of the section.

Machine Survey Pre-processor (MSP)

MSP is a stand-alone software application for the validation, route-fitting and pre-processing of data collected during machine pavement condition surveys.

The MSP is owned by the Company and a license is not required to use it on the trunk road network only.

Network Occupancy Management System (NOMS)

The Network Occupancy Management System (NOMS) is used for the recording of lane closures on the Network. It ensures that all works on the Strategic Road Network have a minimal impact on customers.

Accident Data

The Company is committed to improving safety on its network and to contribute to achieving the Department for Transport's casualty reduction targets. Under the Company's safety strategy, the 'operational folder - operational guide to the safety

strategic plan' sets out guidance for managing safety, provides injury accident data at both national and local levels, and offers information and advice on data analysis. This advice includes suggestions for extending traditional problem identification, analysis and prioritisation techniques and reflecting changes in accident patterns across the Network.

With the inclusion of accident data within the HAPMS database, those individuals working in the fields of road safety and maintenance on the trunk road network will have desktop access to data on injury and fatal accidents.

Accident data available within HAPMS

The accident data in HAPMS relates only to reported injury accidents (no damage-only data is included). The current policy is to accept only validated data into the HAPMS system. This validation exercise is undertaken annually, and the data made available between June and August of the following calendar year. The earliest year that data is available for is 1994.

Accessing accident data using HAPMS

To obtain access to this newly available data, users are directed in the first instance to the Contact ICT Service Desk with details of your requirements. (Note the data is automatically available to existing HAPMS users).

Source of the accident data

The data is from the national STATS19 injury accident database. This is a database held by the Department for Transport and contains all the objective information recorded by the police when a road traffic accident is reported. The STATS19 form consists of attendant circumstances, a vehicle record for each accident-involved vehicle and a casualty record for each casualty and can be found on the DfT website.

Advice on data usage

Note: National Highways are unable to assure the quality of this data, provided by a third-party.

This is contained in the operational folder which can be found on the DfT website.

Other sources of trunk road accident information

For additional accident information please continue to use:

- Summaries of the injury accident data relating to the motorway and trunk road network available in the operational folder (which can be found on the Employer web site).

2.1.3 IAM-IS Structures

Support:

- Engineering Issues and Access Support
  (IAMIS_Structures@highwaysengland.co.uk)

Associated documents:

- CG 302, As-Built, Operational and Maintenance Records for Highways Structures.
- CS 450, Inspection of Highway Structures

Scope of data:

To provide core data on the structure's assets in support of corporate governance, and to provide a structures management tool.

Provides the functionality to schedule and record routine and planned maintenance activities for Structures assets.

<u>Associated Structure Keys</u>

An Associated Structure Key is a cross-reference between two individual structure keys.

Individual structure keys must be Associated if structures or parts of structures are either structurally or operationally dependent.

In addition, they should be Associated if structures or parts of structures have a structural or operational relationship.

It is normally intended that Associated Structure Keys are used for structures that are in relatively close physical proximity to each other.

Examples where Structure Keys must be Associated include:

- Separate neighbouring structures carrying related vehicle traffic route(s).
- Neighbouring Structure Keys of large structures or viaducts split over multiple Structure Keys, i.e. associate only adjoining Structure Keys, 2 or 3 in total, rather than all sections of a viaduct.
- Neighbouring Structure Keys crossing one another, i.e. total number of levels at grade separated junctions.
- Structure Keys where a structure is mounted on another structure with a separate Structure Key or part thereof.

Examples where Structure Keys should be Associated include:

- Existing separate neighbouring bridges within a junction.
- Existing separate neighbouring bridges carrying related vehicle and pedestrian traffic route(s).
- Demolished and replacement structures at the same location.
- Gantries with digital enforcement camera system(s) (HADECS3) and accompanying external aspect verification (EAV) mast(s).

New widening and other extensions to structures must be recorded as part of the inventory of the original structure key.

Historically existing widened or otherwise extended structures with multiple structure keys should be combined such that they become part of the inventory of the original structure key.

2.1.4 Geotechnical Data Management System (HAGDMS)

Support:

HADDMS and HAGDMS Support Team (support@hagdms.com).

Associated documents:

- CS 641, Managing the Maintenance of Highways Geotechnical Assets.
- CD 622, Managing Geotechnical Risk.
- HAGDMS/HADDMS User Manual.
- Handover of Geotechnical As-Built Data Guidance Document.

Scope of Data:

HAGDMS contains the master data set for geotechnical asset management consisting of inventory and condition data as defined in CS 641 and associated guidance.

It includes data relating to inspections, approvals, defects, investigations, and geotechnical events. Geotechnical As-Built data can be held in HAGDMS, and the process for achieving this is set out in the Handover of Geotechnical As-Built Data Guidance Document.

2.1.5 Drainage Data Management System (HADDMS)

Support:

HADDMS and HAGDMS Support Team (support@haddms.com)

Associated documents:

- CD 535, Drainage Asset Data and Risk Management.
- CD 535, England National Application Annex to Drainage Asset Data and Risk Management.
- CS 551, Drainage Surveys.
- LA 113, Road Drainage and the Water Environment.

Supporting documents from the HADDMS downloads page:

- HAGDMS/HADDMS User Manual
- Guidance on the assessment of flooding hotspots, priority culverts, priority outfalls and priority soakaways.
- HADDMS as-built records, attached documents and data packaging requirements.

Scope of Data:

HADDMS is the primary national repository of the Company drainage asset inventory and its current condition, which supports 'joined-up' processes for the management of the Strategic Road Network.

HADDMS is not to be used for recording routine inspections or maintenance activities.

2.1.6 Environmental Information Systems (EnvIS)

Support:

EnvIS Management Team (EMT) (EnvIS_Support@highwaysengland.co.uk).

Scope of Data:

EnvIS is a system for defining and categorising the man-made or natural assets within and surrounding the Strategic Road Network. EnvIS contains environmental data and is displayed in the Highways Agency Geographical Information System (HAGIS). The data within EnvIS identifies the asset, location, condition, and broad management requirements.

2.1.7 ServiceNow

Support:

Scope of data:

ServiceNow is an asset management tool containing a central register of inventory information, together with maintenance records, condition, and fault information, for all Technology Systems, including electrical equipment and roadside infrastructure.

The Roadside Operational Technology section of Part 3 – Data Dictionary articulates the existing technology asset requirement and does not make any change to contractual use of ServiceNow or the way data is handled at present.

3   Transfer of Asset Data

This section refers to the generic transfer file format for assets, as detailed in the Part 3 - Data Dictionary; for purposes other than those defined by the individual systems for the management of those assets.

3.1 General Data Transfer Requirements

The data transfer requirements for individual systems will be as agreed with the system owners as detailed in Section 2 of this document.

3.2 File Naming Convention

Two versions of the file naming convention are defined for use in the ADMM:

- the extended naming convention (Section 3.2.1) which has been defined in accordance with the PAS 1192-3 2014.

- the short naming convention (Section 3.2.2) which may be used where there is no requirement to follow the standard above.

Names should be composed using characters A to Z, a to z, 0 to 9, and the _ underscore character. The following characters should not be used in names: ,. ! " £ $ % ^ & * ( ) { }[ ] + = < > ? | \ / @ ' ~ #¬ ` '

The name should use _ underscore character as the delimiter.

3.2.1 Extended naming convention

All relevant asset files must adhere to the following naming convention:

NH-Originator	ADMM Asset Code	Date	Number Extension	File type
Originator is a unique abbreviation for the contract, it shall be 2 to 6 characters long.	ADMM Feature Code is a four-character code.	Date is formed as CCYYMMDD.	The Number need have no significance, other than to give a unique file name. It shall be 2 characters and contain leading zeros. The default value will be 01.	The file name should reflect its format using the appropriate extension (i.e. .csv)
Example: HE_09_ SABO_20150713_01.csv				

Table 3-1 – Extended name convention.

3.2.2 Short naming convention

All asset files must adhere to the following naming convention:

ADMM Asset Code	Date	File type
ADMM Feature Code is a four-character code.	Date is formed as CCYYMMDD.	The file name should reflect its format using the appropriate extension (i.e. .csv)
Example: SABO_20150713.csv		

Table 3-2 – Short name convention.

3.3 Permitted Types of File Format for the use in Data Transfer Files

The following data file types should be used where applicable and unless otherwise specified.

- **Non-geometric data:** csv – comma separated text file
- **Geometric data:** shapefile – a file containing geometric data and attributes.

3.3.1 Guidance for the use of Shape Files

A shapefile must comprise at least the following four files:

- a shape format file (*.shp)
- a shape index file (*.shx)
- a shape attribute file (*.dbf)
- a shape projection file (*.prj)

All shapefiles shall be projected to the Ordnance Survey Great Britain 1936 (OSGB1936) datum.

The purpose of storing asset data in a shape file format is to enable an asset to be spatially referenced against other topographical features. In fulfilling this purpose, the digitised feature must provide an adequate representation of the shape, position, or form of the asset such as defined in the Topographical Asset Referencing section.

The first row in the shapefile shall contain the column headings in database-ready form. This will include a different heading with alphanumeric characters and underscores only. Part 3 – Data Dictionary provides truncated column headings for attributes from the following asset classes:

- Ancillary
- Carriageway Control
- Drainage
- Environmental
- Geotechnical
- Lighting
- Road Restraint

The column field name must not exceed 10 characters and shall be composed from the start of the given words, separated by underscores, to remove any ambiguity.

4 Approved Network Model

The Company requires an accurate Approved Network Model that can be used as a master data set to reference asset data in multiple asset data systems.

This is a modelling system which maps the position of the Strategic Road Network, facilitating:

- Geospatial location of assets/objects.
- Linear referencing in relation to the carriageway.

The master data set is maintained in the Pavement Management System; this forms the definitive record of the network. The data set must be complete, current, and correct.

Complete means that all changes as a result of adoptions or stopping up orders are reflected in the model, where deficiencies are discovered, the network must be amended.

Current means either by the date of the adoption or stopping up order, or within 30 days of identifying and validating the change due to a deficiency.

Correct means that the model and changes to the model are made in line with the requirements set out in this section.

4.1 Section Referencing Principles

Section referencing divides the Network into sections, each having fixed start and end positions and road alignment. Each section also has certain constant characteristics along its length, for example, the number of permanent lanes and environment (rural/urban).

Sections must be terminated at the following locations:

- Major road junction
- End of slip road taper (sections on both the slip road and main carriageway must terminate)
- Change from one-way to two-way traffic or vice versa
- Change in the number of permanent lanes (short lengths of additional or reduced lanes at or around junctions may be ignored)
- Rural/urban boundary
- Area/region boundary
- Change of road number (including, for example, a change from A1 to A1M)
- End of Strategic Road Network, e.g. the road becomes a local road

In addition, care should be taken to select practical section lengths because accuracy is essential to all aspects of section referencing. When selecting sections, account

should also be taken of the recommendations on network referencing contained in this document.

Note that:

- Each side of a dual carriageway must be referenced separately

- Lay-bys separated from the main carriageway (known as ox-bow lay-bys) are sections in their own right. It is not necessary to split sections on the main carriageway to form a junction between the main carriageway and the lay-by.

- Roundabouts are referenced as separate sections.

4.1.1 Section Labels

Each section is assigned a section label formulated as follows:

- A four-digit Agent Authority (AA) area code, followed by

- An "A" or "M" character depending on the section's road class, followed by

- The road number of up to four digits, followed by

- An optional "M" character (depending on the road class), followed by

- A forward slash ("/"), followed by

- A section number of up to three digits

The following are all examples of syntactically valid section labels:

- 1900M1/3

- 1900M62/105

- 1900A1M/25

- 1900A1001M/123

- 1900A10/15

- 4720A6120/103

Each section label is individual to that section, irrespective of surrounding sections. There is no requirement to maintain sequential labelling of sections along a road.

4.1.2 Chainage

Chainage forms part of the linear networking system; a count of distance from the section start to the section end, in metres. Chainage corresponds to the direction of referencing. This is used for locating a variety of assets, in addition to operational uses planning and deploying personnel, locating works, etc.

4.1.3 Agent Authority Area Codes

Agent Authority (AA) Area Codes are used for the referencing of sections. In most cases AA area codes correspond to Local Authority areas (Counties and Metropolitan

Authorities) and must be used for the referencing of sections wholly or primarily within those areas. However, each Service Provider is also assigned its own AA area code which may be used, but only with the approval of the Network Auditor.

For the complete list of Company Authority Area Codes refer to the DfT website.

4.1.4 Section Start and End Dates

Each section has a start date, i.e. the date on which it is considered to have become part of the Approved Network.

Initially each section will not have an end date – it will be known as a "Live" section. An end-date will be defined when the section is no longer considered to be part of the Approved Network. This will be either because the length of road no longer exists, has been de-trunked or has been re-referenced.

4.1.5 Section Reference Markers

Section start, and end points are referenced on the ground by one or more pairs of cored thermoplastic markers (Asset = Node Stud (MKNS), Type = Section Reference Marker) positioned in the left-hand lane of dual carriageways or one-way single carriageways and on both sides of two-way single carriageways. The markers are 100mm in diameter and placed 175mm apart. They have a depth of between 10mm and 20mm and the top surface is level with the road surface. The material is a plastic resin with white filler that contains reflective glass particles. It conforms to BS 3262 (1989).

The section reference markers referred to in this section are patented. The *Company* has authority to install them as section reference markers on its carriageways. They cannot be used for any other purpose (e.g. delineating zebra or pelican crossings) or on any other roads without the patent being infringed. The patent number is GB2179385B and is administered by:

> East Midlands Diamond Drilling Ltd., a member of the Vickers Highbank Group Ltd.,
>
> Churchfield House,
>
> 1 Lockwood Close,
>
> Top Valley,
>
> Nottingham
>
> (0115 967 9000).

The section reference markers form the first order of surveying reference for all maintenance assessment surveys (excluding TRACS, TRASS, or Retro-reflectivity surveys). They must be positioned with a longitudinal tolerance of ±0.25m. The centres of the 100mm diameter holes used to form the section reference markers must be 175mm ±5mm apart.

4.1.5.1 Typical On-Carriageway Layouts

Examples of typical use of on-carriageway layouts for Section Node Reference Markers are shown in the figures below.

These notes apply to all Figures in this Section:

- On dual carriageways, section reference markers must be positioned in the centre of the wheel tracks of the left-hand lane.

- On single carriageways section reference markers must be positioned in the centre of the wheel tracks in the left-hand lane in both directions.

- Section reference markers must be installed at staggered crossroads as if it is two separate 'T' junctions.

- The cored thermoplastic markers must be installed on a line perpendicular to the nearside kerb, edge line or projected kerb line passing through the notional position of the end of the sections(s). Markers must be installed clear of all carriageway markings.
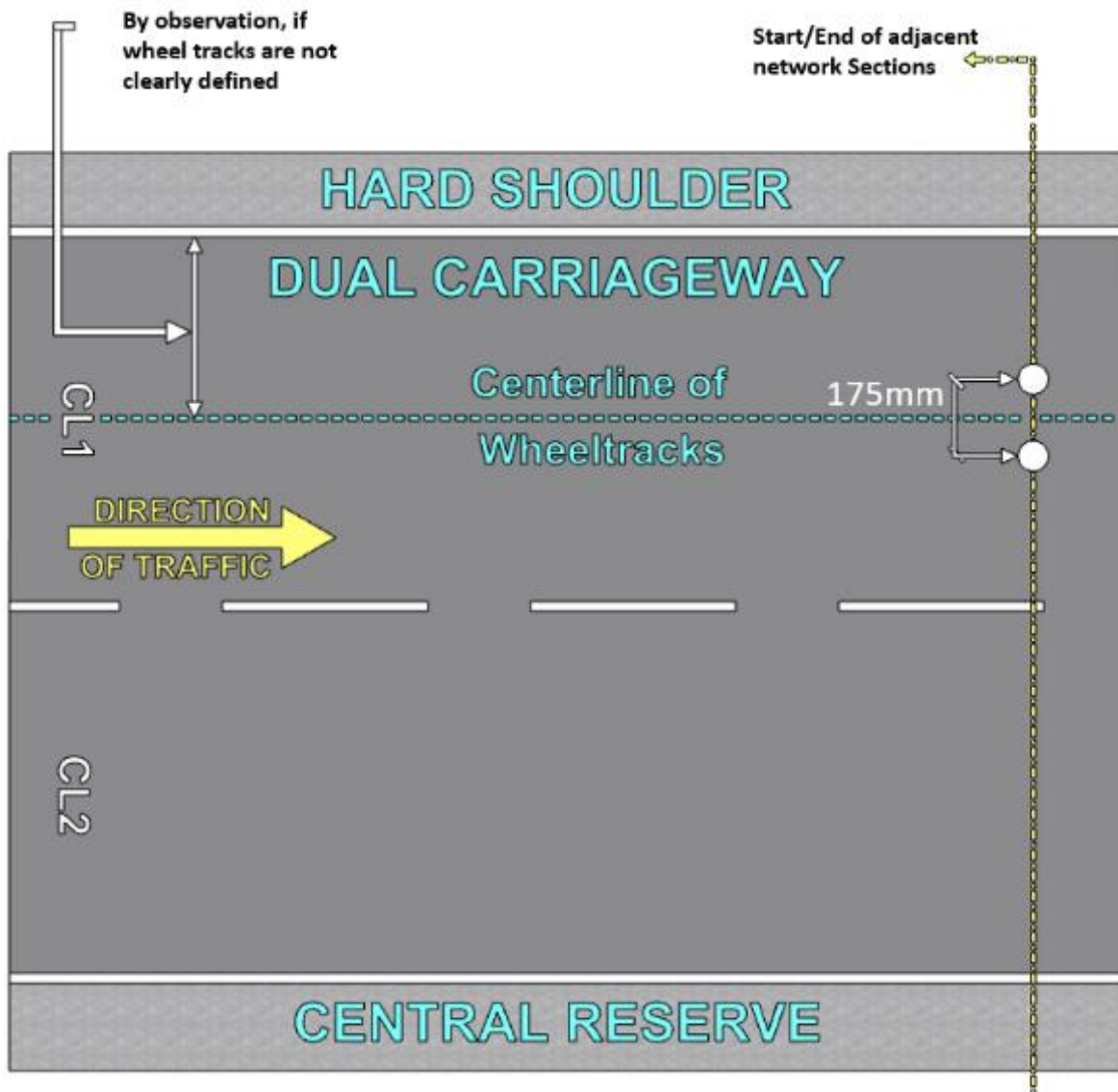
Figure 4-1 - Position of Markers of Two-Lane Dual Carriageway.

Part 2 – Requirements and Additional Information
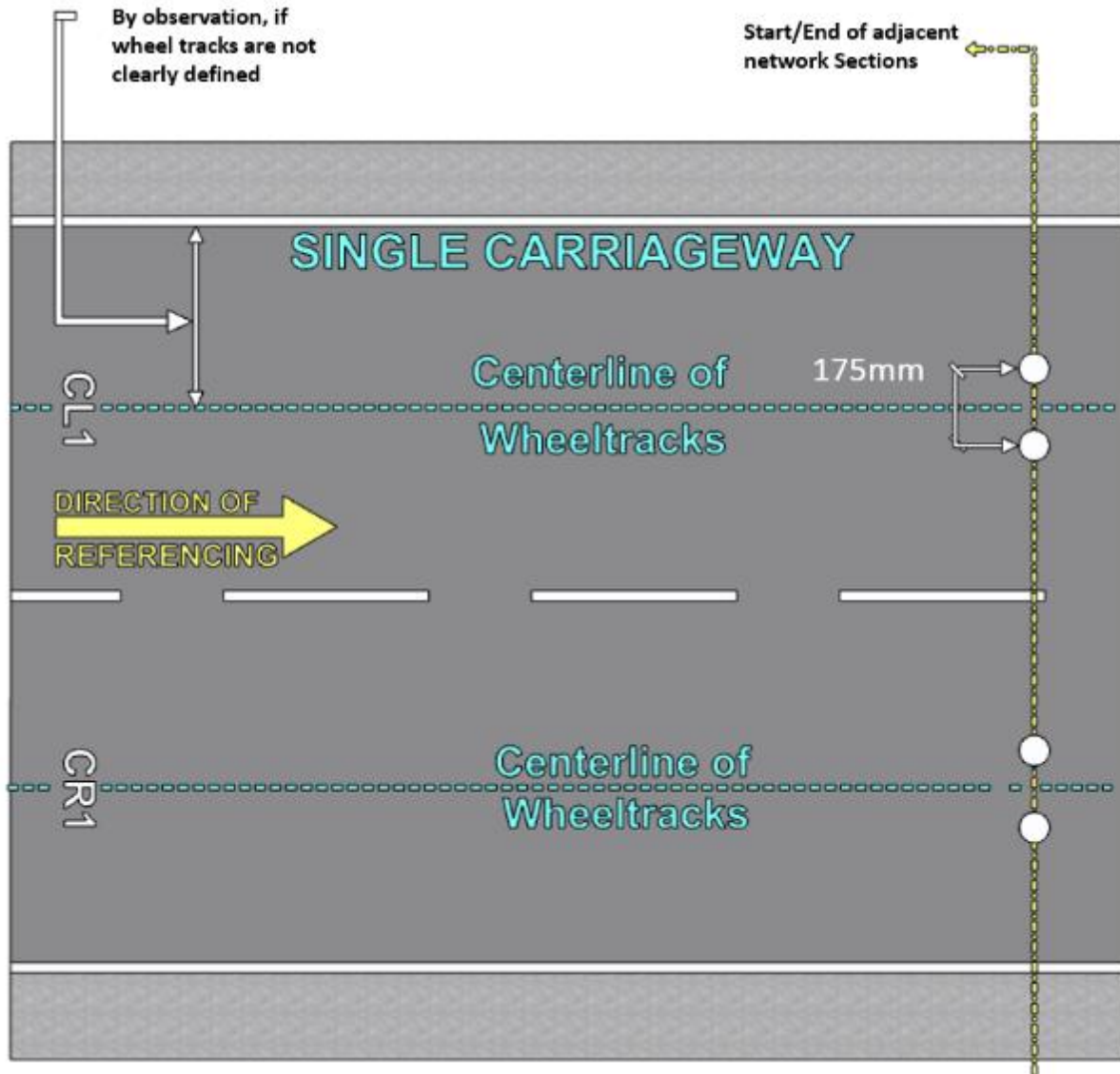
Figure 4-2 - Markers on Two Way Single Carriageway.
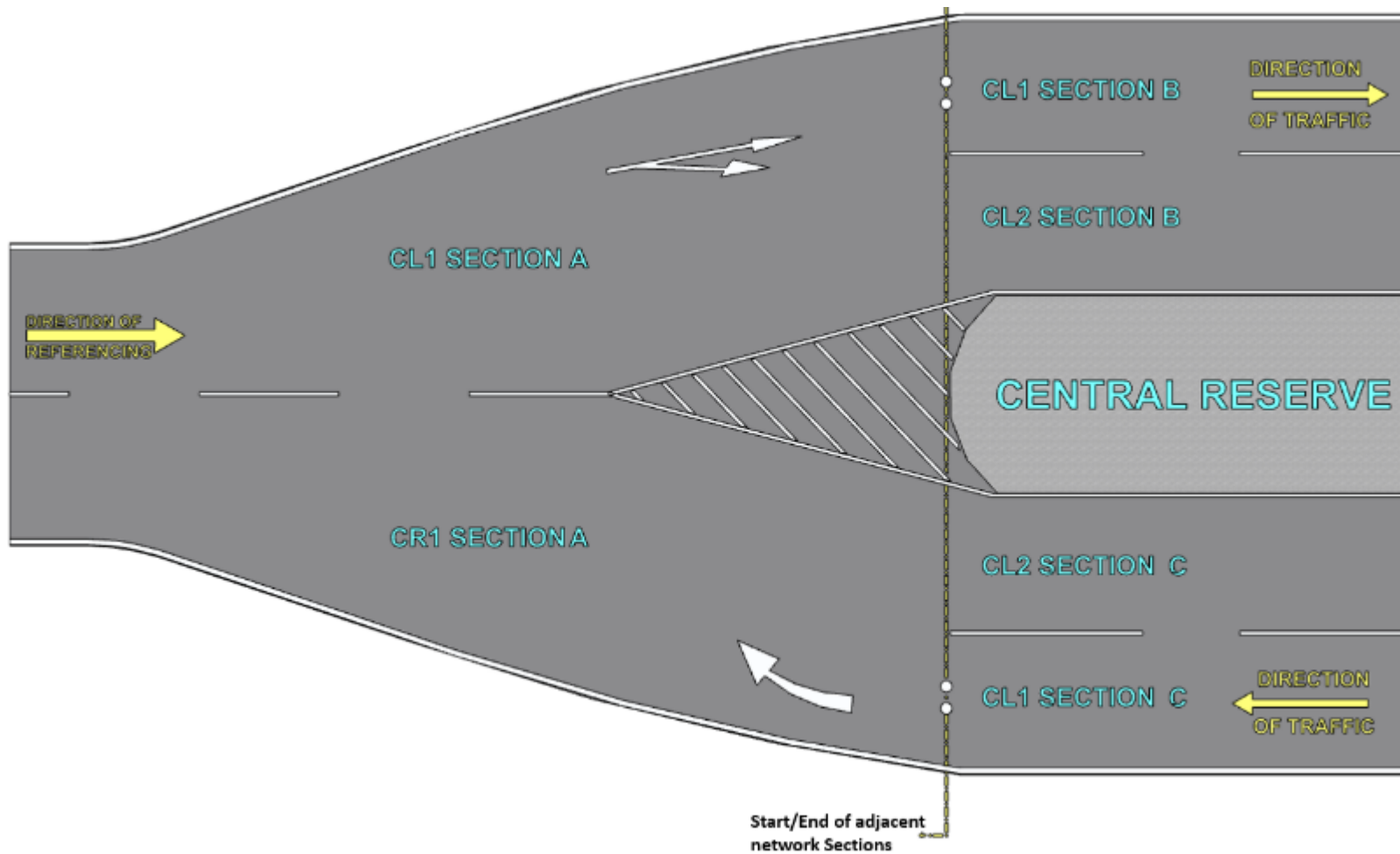
Figure 4-3 - Start of Dual Carriageway.
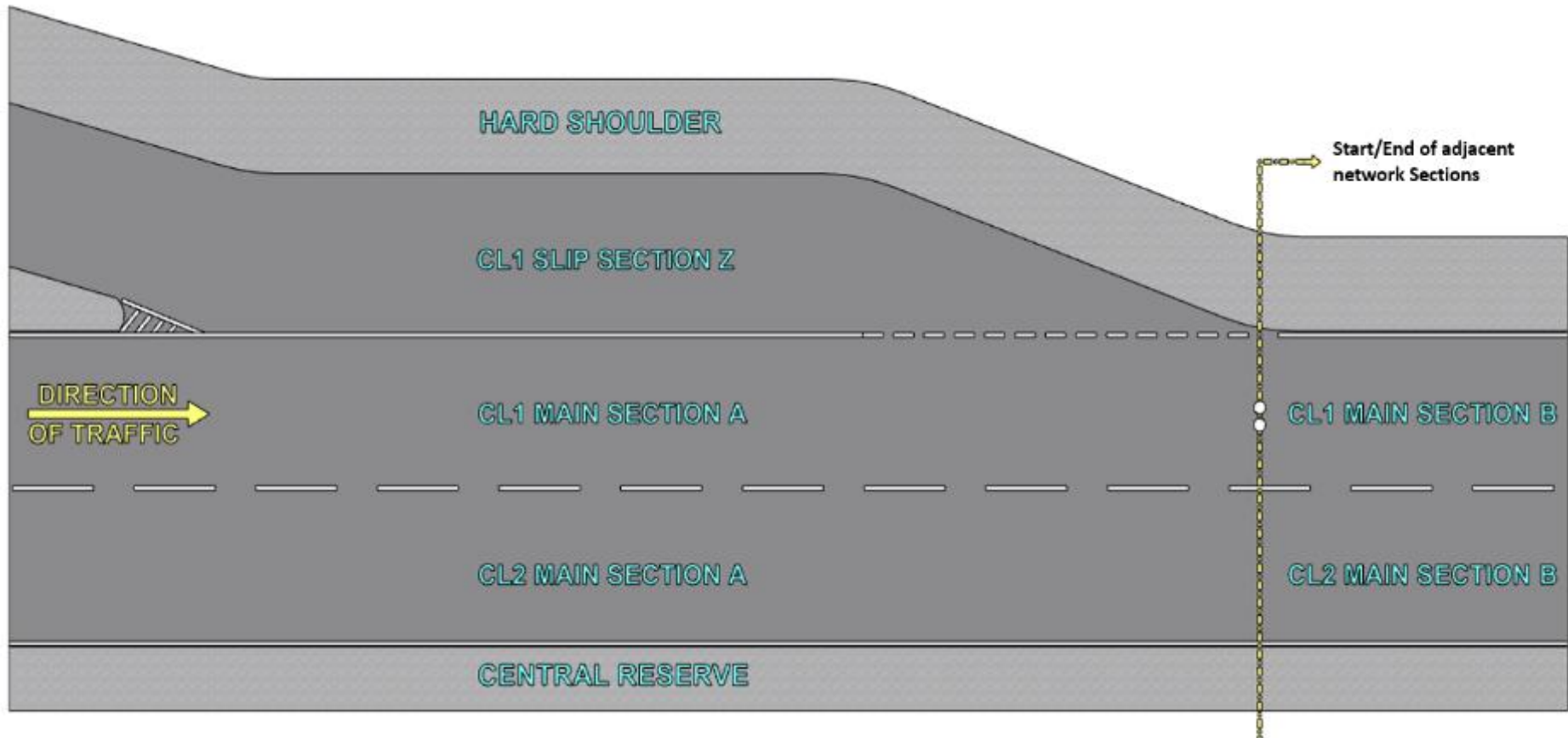
Figure 4-4 - Slip Road entering Main Carriageway.

Part 2 – Requirements and Additional Information
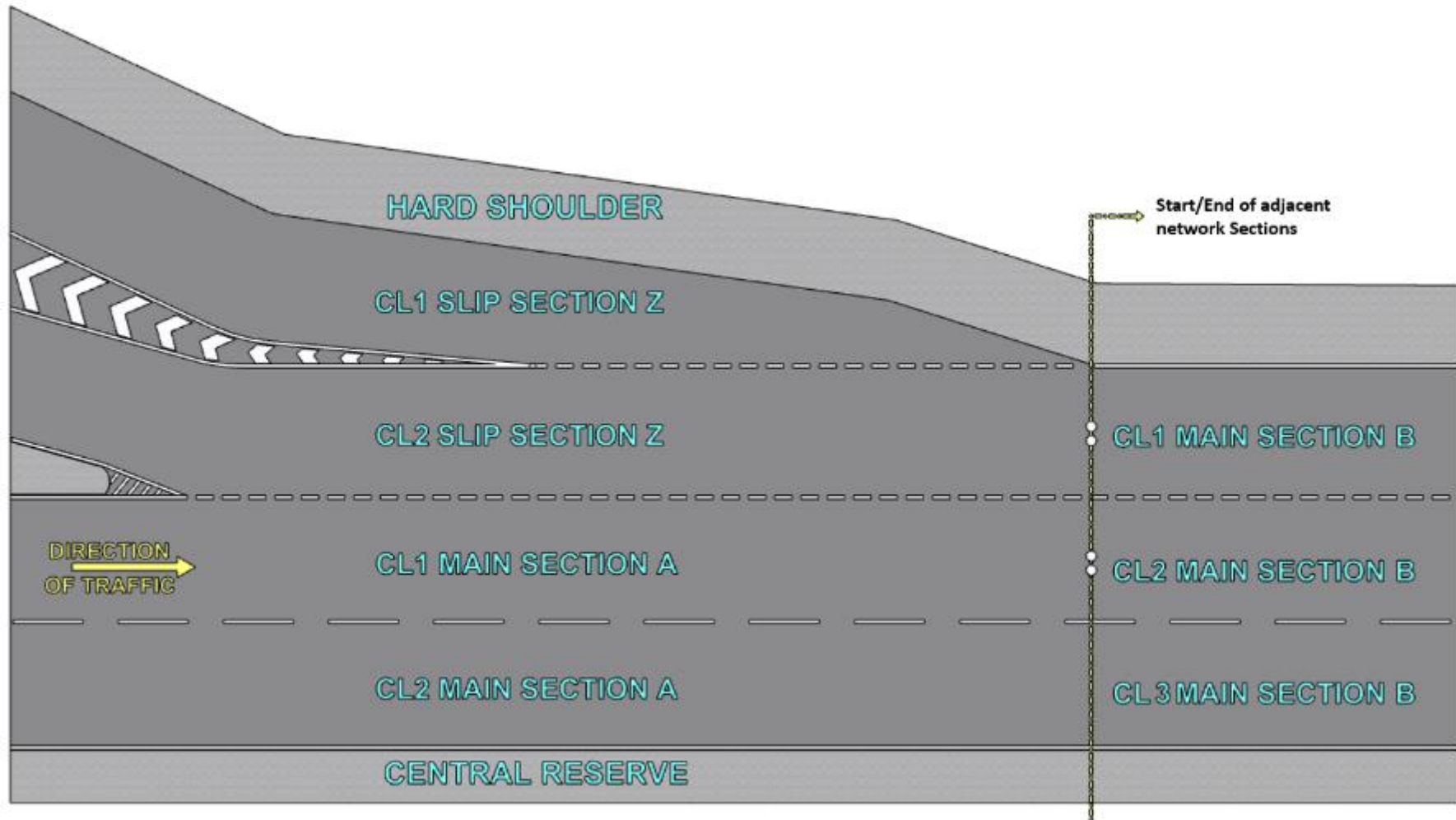
Figure 4-5 - Main Line Additional at a Ghost Island Merge.

Part 2 – Requirements and Additional Information
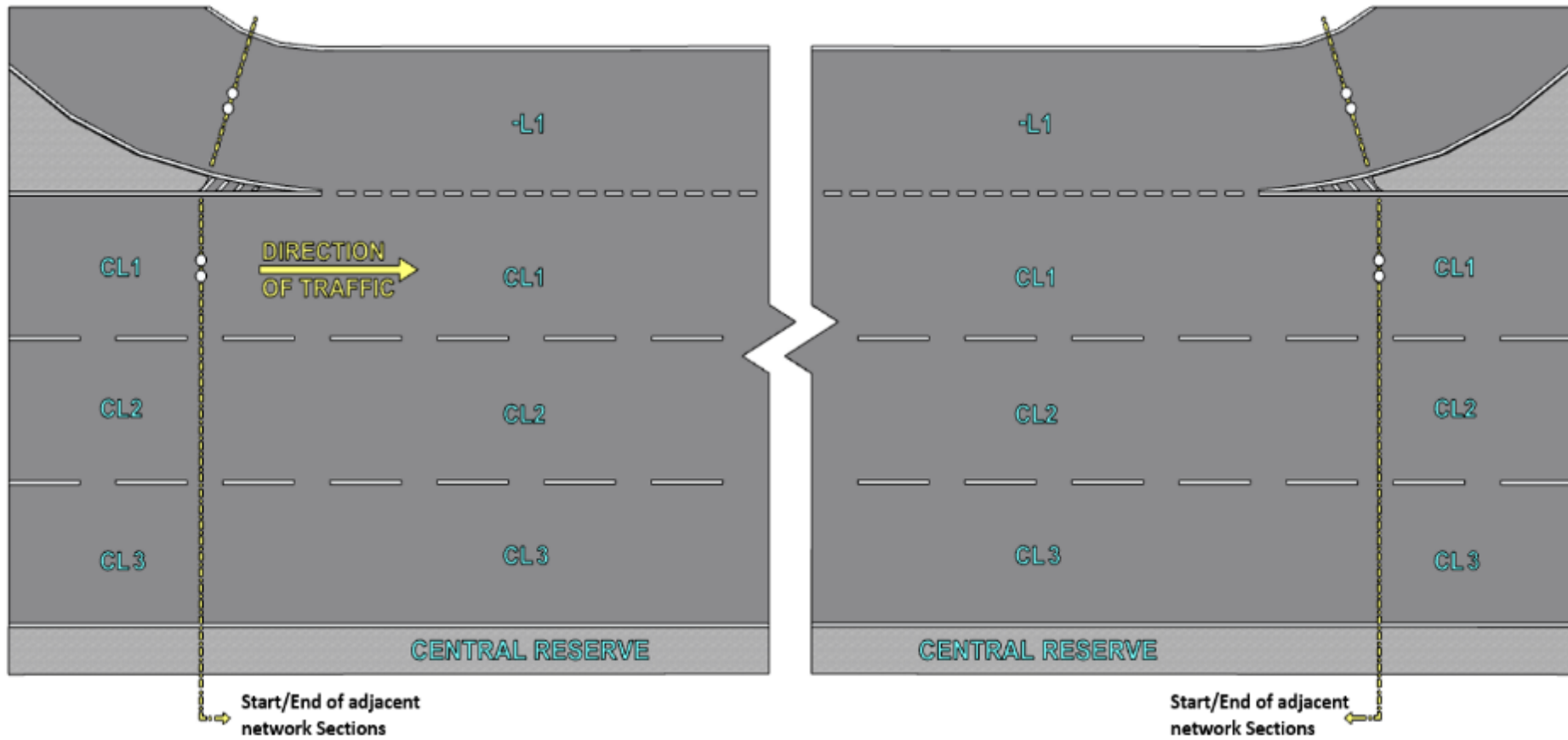
Figure 4-6 - Lane Gain and Drop – where the entering/leaving traffic is likely to use the additional left hand lane.
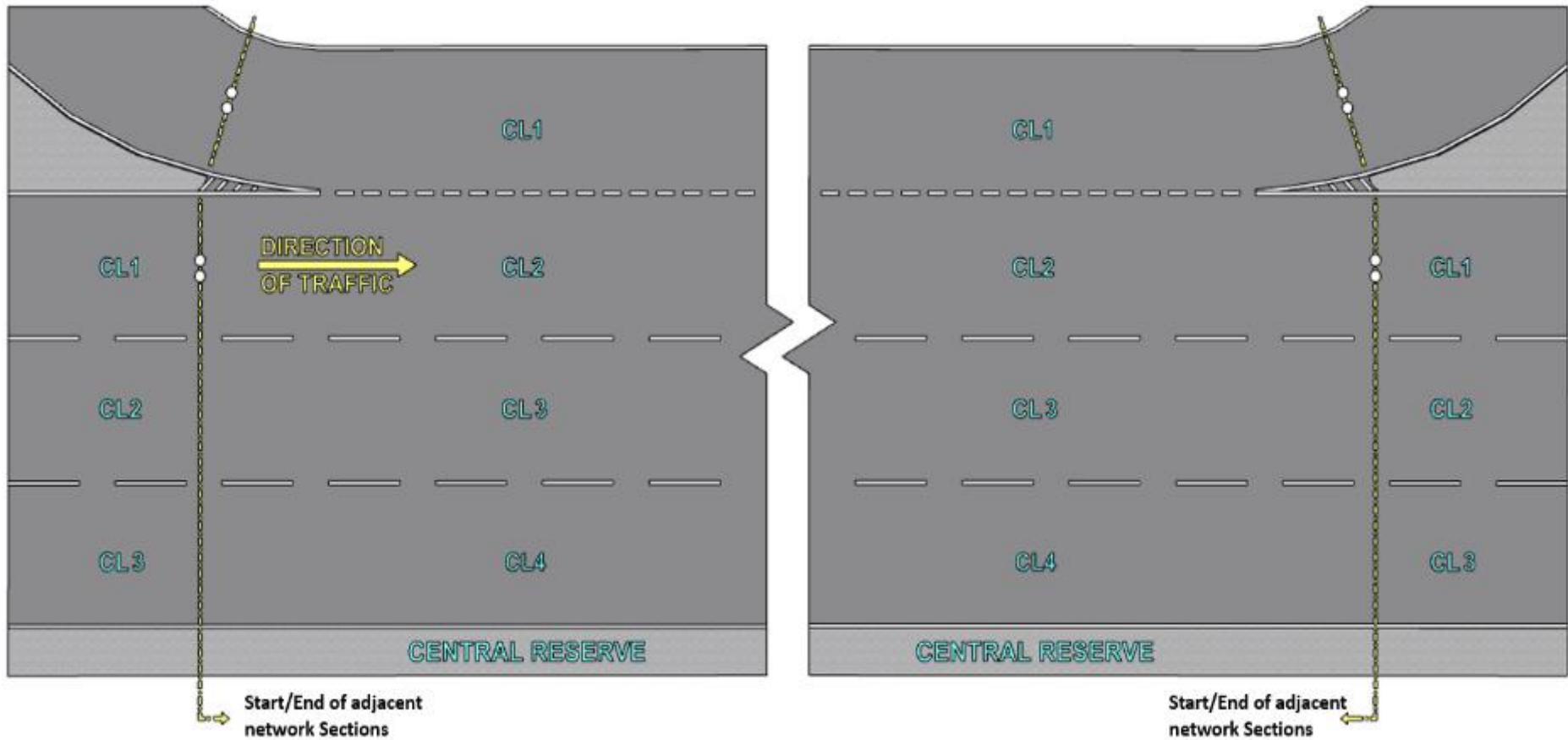
Figure 4-7 - Lane Gain and Drop – where the through traffic is likely to use the additional left-hand lane.

4.2 Section Referencing Procedures

Section referencing is primarily a desk exercise but should be supported by site visits if necessary.

4.2.1 Section Length Changes – Re-Referencing / Re-Calibrating a Section

Before changing a section's length, the distance between the start and end section reference markers must be measured using a calibrated measuring device, capable of measuring to an accuracy of ±1m. If the section reference markers are not in place, these must be re-instated before the length is measured.

If a section length is found to be wrong, adjacent sections must be investigated to ensure the overall Network length is consistent with identifiable physical features, for example, roundabouts.

Re-calibrating a section causes associated condition data to be stretched (or shrunk) in length.

Sections should only be re-calibrated when correcting a section length that was found to be wrong.

If a section's measured length is more than 10% (for sections shorter than or equal to 500m in length) or 50m (for sections over 500m) of the current the Company's Pavement Data Management System length, and other data is located on that section (for example, condition data) the section must be re-referenced not re-calibrated.

Re-referencing means end-dating an old section and creating a new one – it should happen only when sections change or are outside the recalibration tolerance. The new section created should be populated with any condition and wheel track information from the original section - copied and assigned to the relevant lanes - ensuring that survey data remains assigned to the correct real-world location.

A section must be re-referenced under the following circumstances:

- The start and/or end point of the section has moved (for example, the taper of a slip road has been extended). This may also result in a length change;

- A change in section function or direction, or;

- A change in the number of permanent lanes, environment or one-way or two-way status.

- An error in the length has been identified and re-calibration is not possible because of the recalibration tolerances are exceeded.

4.2.2 Changes Instigated by the Company

The Company reserves the right to make changes to section referencing.

4.2.3 Changes to the Approved Network within the Company's Pavement Data Management System

If any of the characteristics of a section are altered, the section must be retired, and one or more sections created. This is done by giving the original section an appropriate end date and creating the new section(s), with the updated characteristics, giving it/them a start date that is one day after the end date of the now retired section. (See section 4.1.4).

Where a section becomes no longer a part of the Approved Network, such as when it is detrunked or demolished, it must be retired by giving it an appropriate end date.

4.2.4 Re-Use of Section Labels

Section labels of retired sections may be re-used. Re-used section labels must have a start date after the end date of the retired section previously using the label.

4.2.5 Section Creation and Retirement Data

Introduction

This section describes the data requirements within the Company's Pavement Data Management System to support the Company's System for Management (SfM) Phase 2 Network Assets Solution.

Data Requirement

When any section is created or retired, the reason (and certain other data) must be entered into the Company's Pavement Data Management System.

Within the Company's Pavement Data Management System, the section data fields required for SfM are:

- Road, section label
- Start date
- End date
- Length
- Section Function
- Operational Area
- Permanent Lanes
- Single or Dual
- Environment
- Local Authority

Sections Creation

For all sections created the following data is also required:

Creation Type

Creation Type is to be selected from the following:

- New Build. For all section creations resulting from a construction or improvement scheme. This includes modified sections – e.g. where they are widened or lengthened.

- Trunking. When the section addition results from a local authority road being brought into the Company's ownership.

- Re-referencing. The new section has been created solely due to re-referencing – this is most common following a road number change.

- Data Cleansing. When a section is 'found' i.e. the section has been in existence and under the control of the Company but has not previously been recorded.

PIN (Project Identification Number)

All "New Build" sections require the PIN field to be populated with the PIN of the project that created that section.

Traffic Accumulation Date

The Traffic Accumulation Date should be set to the date of last major strengthening or the date of original construction if no major strengthening has since been carried out.

Retired Sections

For all sections retired the following data is also required:

Retirement Type

Retirement Type is to be selected from the following:

- Demolition. For all section retirements resulting from a construction scheme, e.g. an existing pavement section is demolished as part of a bypass scheme.

- Detrunking. When the section retirement results from the section being transferred to local authority management.

- Re-referencing. The section has been retired solely due to re-referencing – this is most common following a road number change.

- Data Cleansing. This type should be selected when a section is retired because it should not be recorded as a section e.g. a single physical section has been recorded twice.

PIN (Project Number)

All "Demolition" sections require the PIN field to be populated.

N.B. Within the *Company's* Pavement Data Management System, the above Creation and Retirement data can vary by chainage within a section.

4.3 Geographic Representation

Two geographic representations of each section are held within the *Company's* Pavement Data Management System. These are known as the 1:50,000 and 1:2,500 idealisations.

4.4 Location Reference Points (LRPs)

Within the Company's Pavement Data Management System Location Reference Points (LRPs) can be recorded against sections.

A Location Reference Point (LRP) is a known point somewhere on a section.

- LRPs are virtual assets, requiring no physical presence in the real-world location.

- However, they may be associated with the presence of a Node Stud asset, marked on the carriageway at the real-world location.

Each LRP is given a label, a chainage, a cross-section position (XSP), a position within the XSP between 0.0 (left hand side) and 1.0 (right hand side), and a pair of coordinates.

4.4.1 Use of LRPs with the Company's Pavement Data Management System

Currently the only direct use of LRPs within the Company's Pavement Data Management System are as reference points for the start and end of survey lanes within planned survey routes. When a planned survey route is created, for each survey lane the Company's Pavement Data Management System will search for a LRP in the following sequence:

- An LRP at the start of the survey lane in the survey lane XSP;

- An LRP at the start of the survey lane in another XSP;

- An LRP at the end of the preceding survey lane in its XSP;

- An LRP at the end of the preceding survey lane in another XSP.

4.5 Cross Section Positions

Each reference section represents a strip of road including both the carriageway and off-carriageway features (e.g. footways and verges) up to the highway boundary. The section therefore may be considered to consist of several longitudinal strips that correspond to features such as lanes, and lines that indicate the edge of the carriageway etc. These longitudinal strips and lines are referred to as Cross Section Positions (XSPs). It should be noted that each strip does not have to have a constant width.

The XSPs that may be used within the Company's Pavement Data Management System are shown in Table 4-1 with the numbering and position of the XSPs across the highway:

Name of XSP	Abbreviation	Strip or Line	Numbering Convention
Left Boundary	LB	Line	

Part 2 – Requirements and Additional Information

Name of XSP	Abbreviation	Strip or Line	Numbering Convention
Left Boundary Area	LA	Strip	
Left Off Carriageway	L	Strip	1 to 9, right to left
Left Edge	LE	Line	
Left Hard Shoulder	LH	Strip	
Left Additional Nearside Lane	-L	Strip	1 to 9, right to left
Left Permanent Lane	CL	Strip	1 to 9, left to right
Left Additional Offside Lane	+L	Strip	1 to 9, left to right
Centre Line	CC	Line	
Right Additional Offside Lane	+R	Strip	1 to 9, right to left
Right Permanent Lane	CR	Strip	1 to 9, right to left
Right Additional Nearside Lane	-R	Strip	1 to 9, left to right
Right Hard Shoulder	RH	Strip	
Right Edge	RE	Line	
Right Off Carriageway	R	Strip	1 to 9, left to right
Right Boundary Area	RA	Strip	
Right Boundary	RB	Line	

Table 4-1 - XSPs to be used in the Company's Pavement Management System and the Provider's Routine and Planned Maintenance System.

The Implied Direction of Reference of the section is 'left to right across the page'. The shaded XSPs correspond to the longitudinal lines, the un-shaded XSPs to longitudinal strips.

Figure 4-8 - XSP lines and strips.

Items at XSP Boundaries

Items occuring at the boundary of two cross sectional positions must be recorded as, described in the following sub-sections.

Note:

- The two sides of a dual carriageway must be modelled separately, this section assumes this to be the case.

- The outer lane or outer strip must not be confused with the outside lane, in the overtaking sense, they are different.

4.5.1 XSP Positions for Different Carriageway Types

The following Figures show some examples of XSP positions for different carriageway types.

Note: Within the following example diagrams the XSP lines and strips are highlighted with blue and white labelled cubes respectively. For clarity, each Section is shown with Direction of Reference highlighted by a blue arrow/line.

It should be noted that the XSP conventions assume that the two sides of a dual carriageway are modelled independently. Thus, any details relating to shared elements in the central reservation must be modelled by Right Off Carriageway XSPs, for the side of the dual carriageway which is the nominated carriageway. Also, as shown below, some XSPs may have an 'index' in the range 1 to 9.
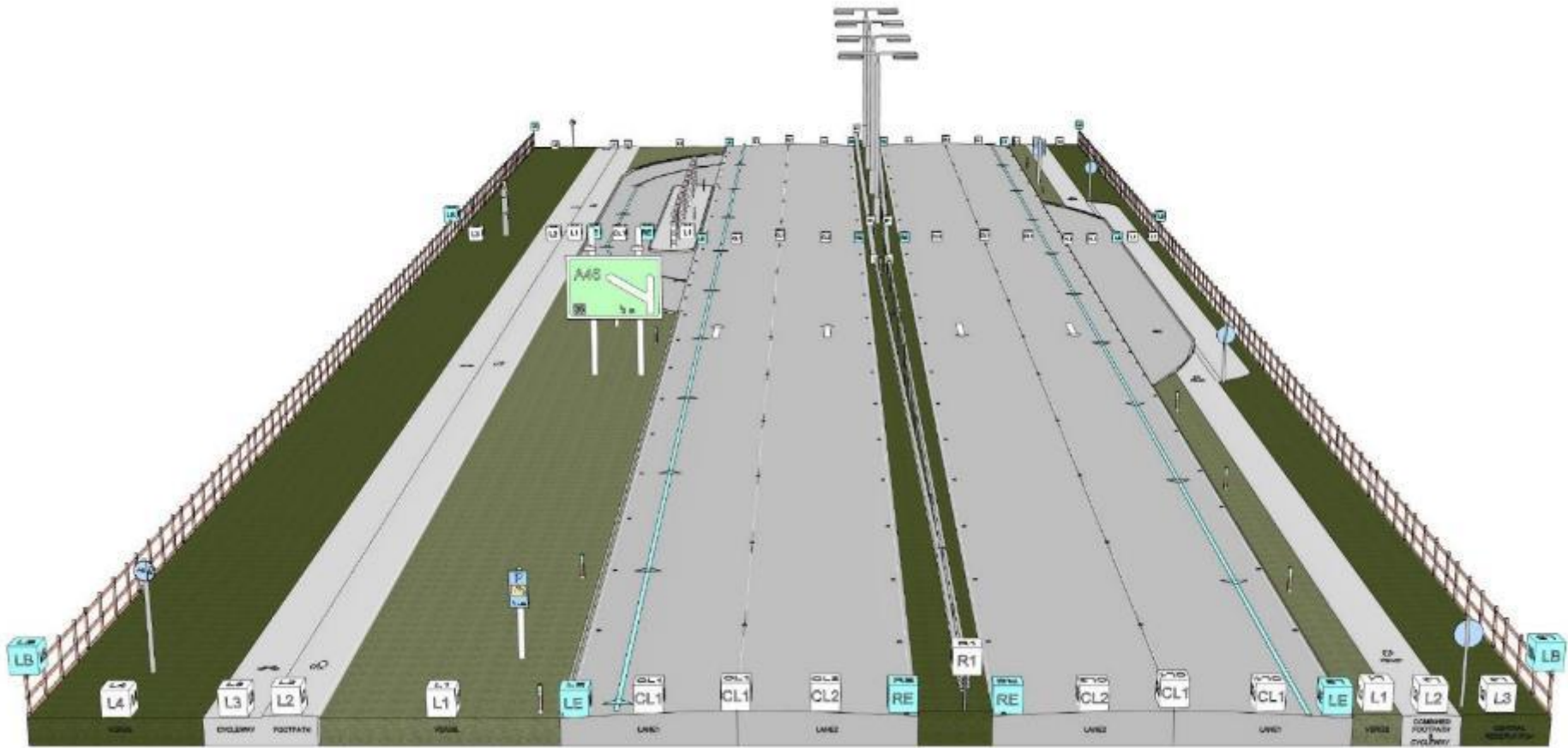
Figure 4-9 - Dual 2 Lane Layout example.

Part 2 – Requirements and Additional Information
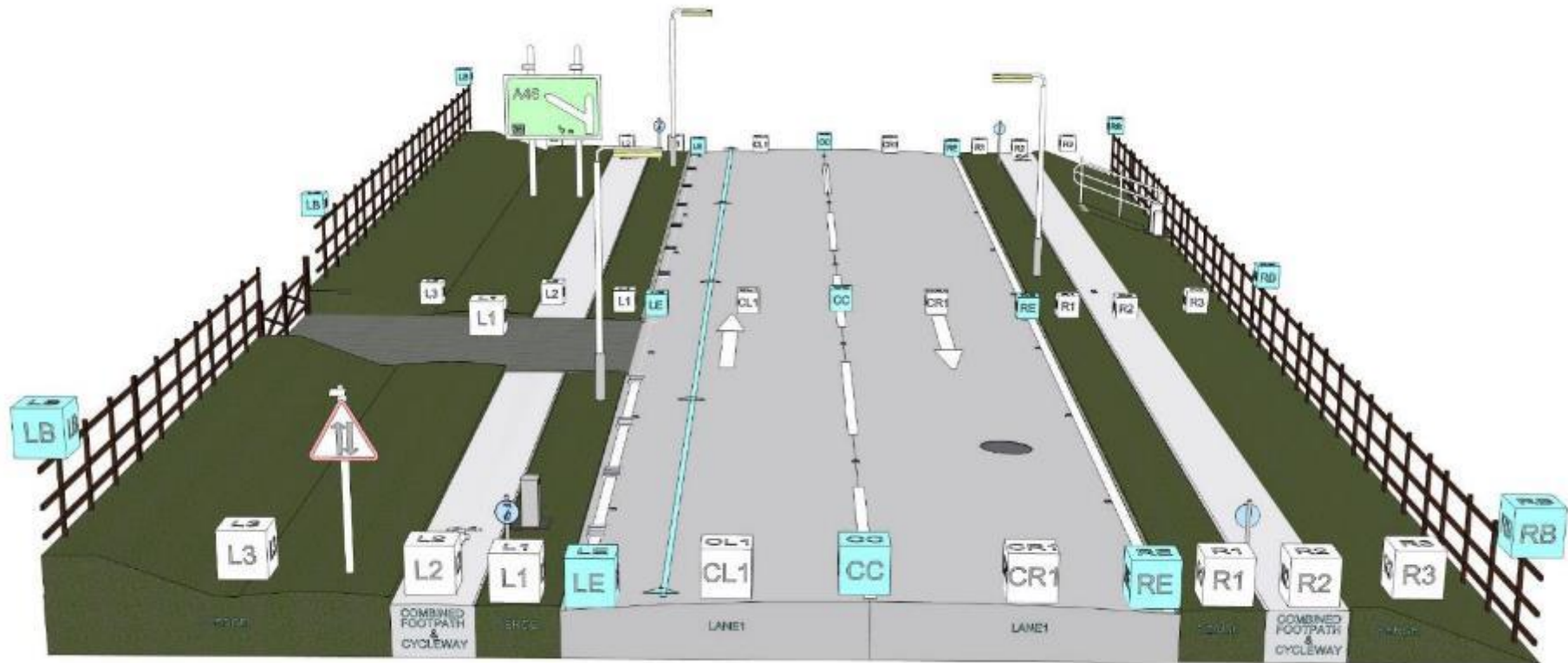
Figure 4-10 - Single 2 Lane 2 Way Layout example.

Part 2 – Requirements and Additional Information
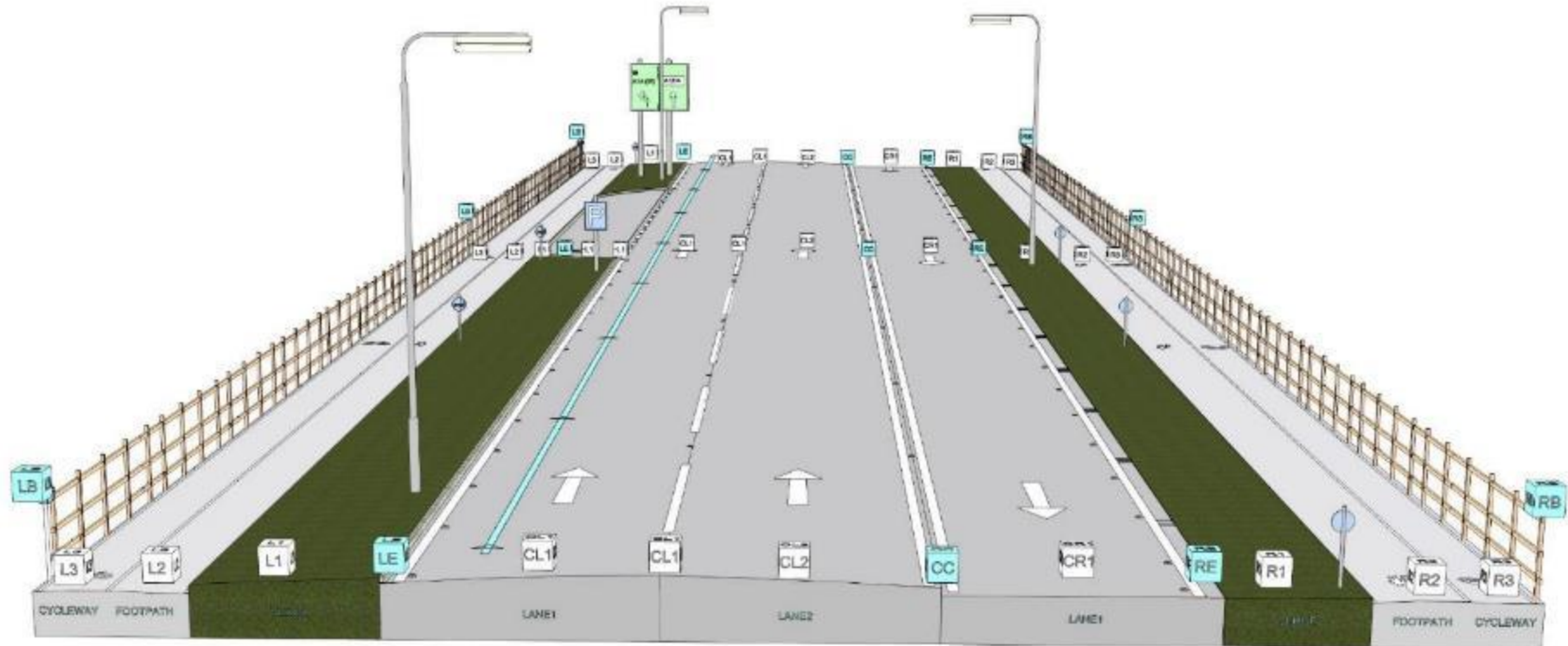
Figure 4-11 - Single 3 Lane 2 Way Layout example.
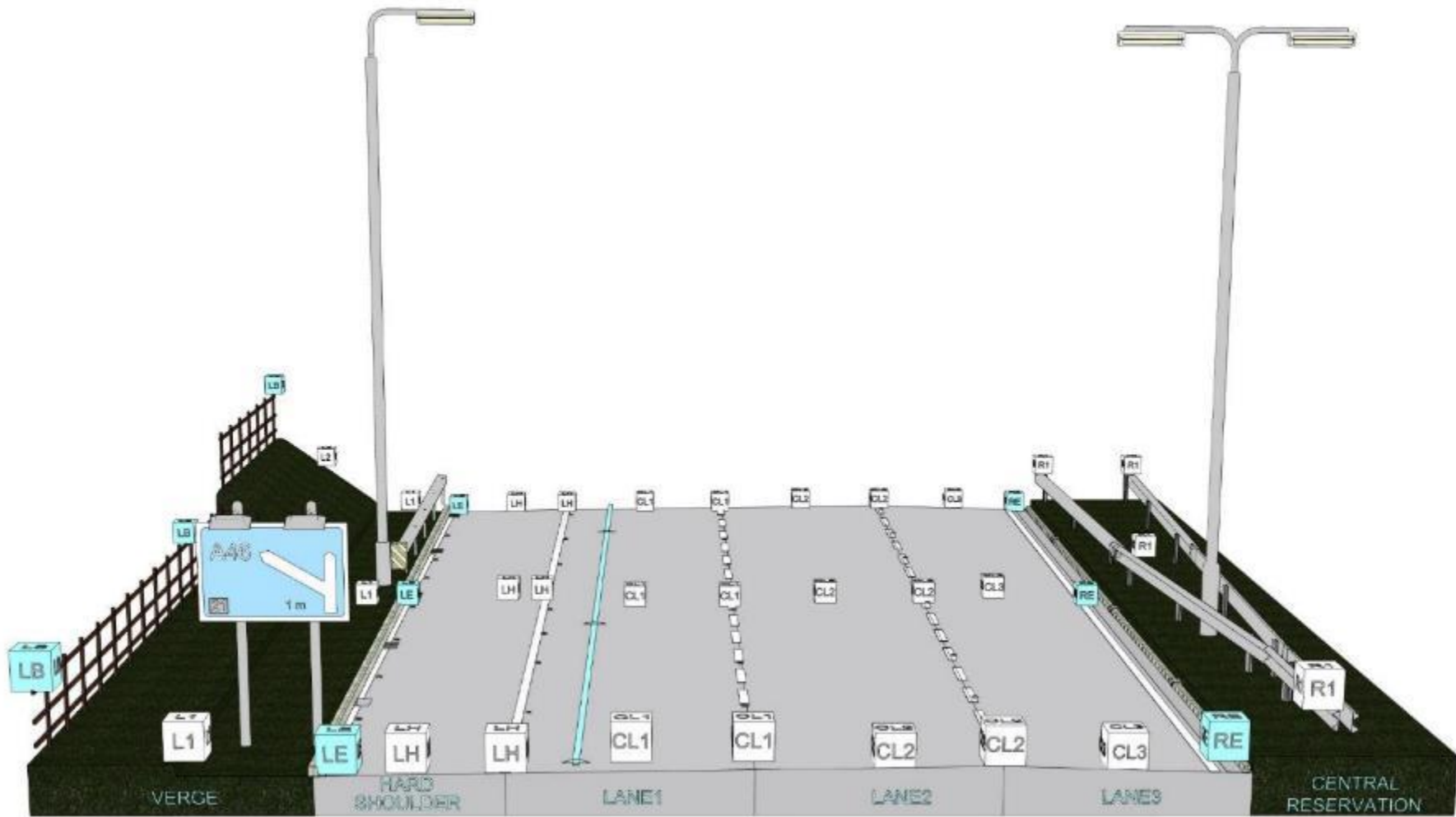
Figure 4-12 - Dual 3 Lane Motorway Layout example.
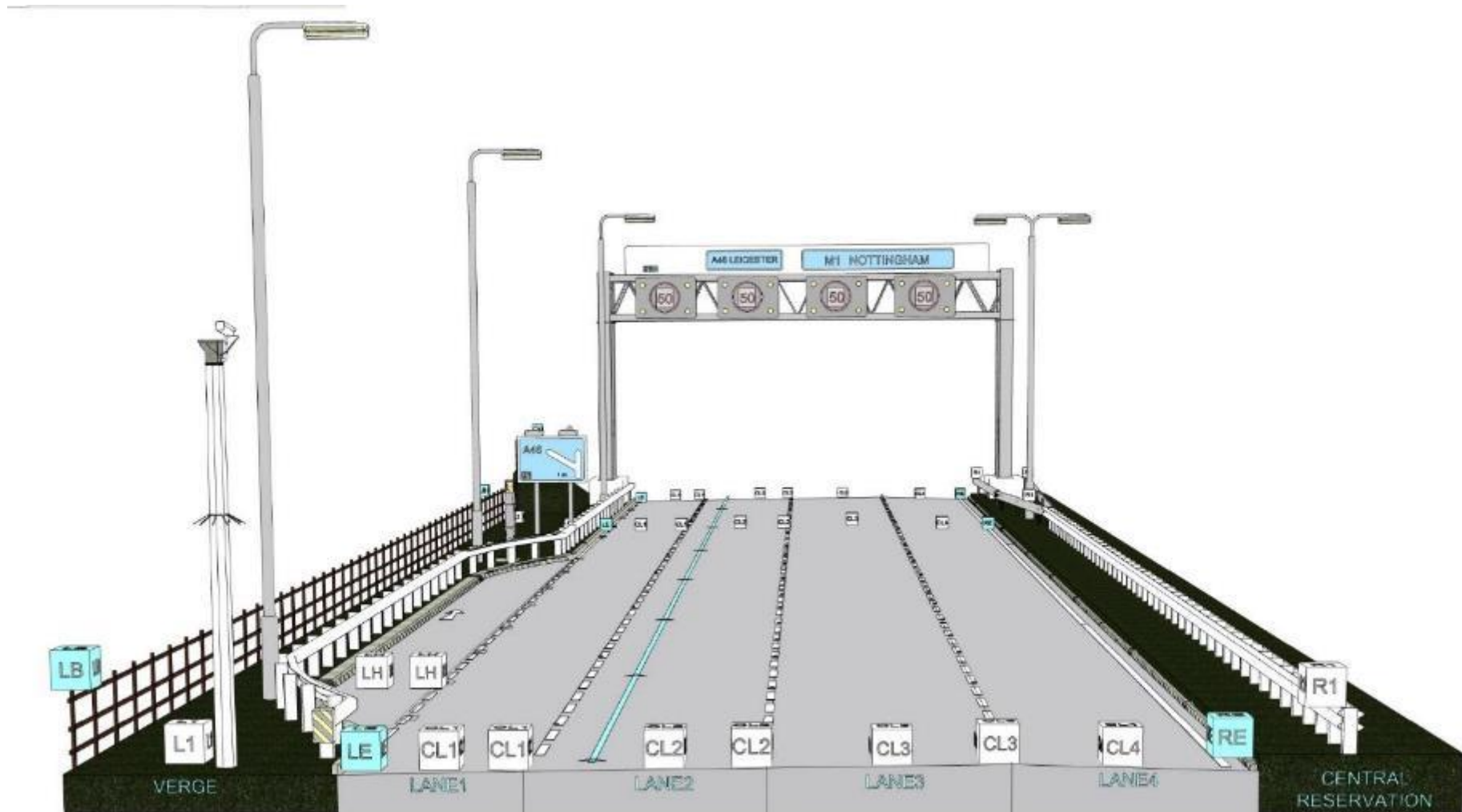
Figure 4-13 – "Dual All Lane Running" (ALR) Smart Motorway Layout example.

Figure 4-14 - Dual "Hard Shoulder Running" (HSR) Smart Motorway example.

XSPs on Smart Motorway Schemes:

Note that Figures 4-13 and 4-14 refer specifically to Smart Motorway Schemes. When consulting these diagrams appreciate the following:

- All Lane Running (ALR) – a Smart Motorway where there is no continuous hard shoulder; all lanes (typically four) are used for moving traffic. Emergency Areas are present intermittently, to allow refuge in the case of incident or emergency.

- Hard Shoulder Running (HSR) – a Smart Motorway where the hard shoulder may be flexibly used for vehicle traffic (only under specific instruction from the overhead signage). Emergency areas also present intermittently, to allow refuge in the case of incident or emergency.

XSP Boundaries *with* an XSP of Type = Line:

Where an item occurs at the conjunction of two or three XSPs, and one of those XSPs is of type line as defined in Figure 4-8, then the item must be recorded as having the XSP of type line.

Examples:

1. A longitudinal road marking occuring at the right edge of the fast lane of a carriageway, between the carriageway and the central reserve where there is no right edge strip / hard shoulder, is recorded at the line XSP Right Edge (XSP RE). See Dual 2 Lane layout at Figure 4-9.
2. A line of road studs marking the centre of a two-way section, is recorded at the line XSP Centre Line (XSP CC). See Single 2 Lane 2 Way layout at Figure 4-10 above.

XSP Boundaries *without* an XSP of Type = Line:

Where an item occurs at the bounary of two XSPs, of type strip, and there is no XSP of type line at that location, as defined in Figure 4-8. Then the item must be recorded as having the XSP of the outer strip.

The outer strip is that furthest from the Right Edge (XSP RE), for a one-way section (including a dual carriageway section). It is the furthest from the Centre Line (XSP CC) for a two-way section.

Examples:

1. A longitudinal road marking occuring between lane 1 and 2 of a one-way section (XSPs CL1 and CL2), is recorded at the strip XSP Left Permanent Lane 1 (CL1). See Dual 2 Lane layout at Figure 4-9.
2. A line of road studs occuring between right hand lanes 1 and 2 of a two-way section (XSPs CR1 and CR2), is recorded at the strip XSP Right Permanent Lane 1 (CR1). See Single 3 Lane 2 Way layout at Figure 4-11.
3. A longitudinal road marking occurring between lane 3 and a right edge strip / hard shoulder, of a 3-lane dual carriageway section (XSPs CL3 and RH) is recorded at the strip XSP Left Permanent Lane 3 (CL3). See Dual 3 Lane Motorway layout at Figure 4-12.

Part 2 - Requirements and Additional Information

5 Locating Assets

5.1 Topographical Asset Referencing

5.1.1 Point Items

The location of the asset should be recorded as the centroid (geographic centre), according to the Company's requirements for spatial referencing (Section 1.1) unless additional requirements are specified. New point assets must be located by XY coordinates and section, chainage and XSP.

Recorded assets must not overlap other recorded assets unless this is the true representation of asset.
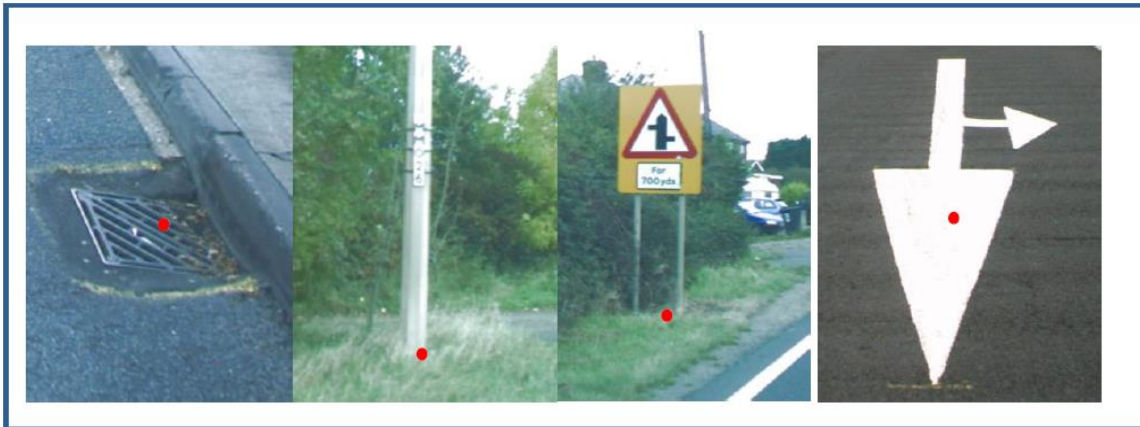
Figure 5-1 – Point item spatial referencing example.

5.1.2 Linear Items

The location of the asset should be recorded with the start/end point with sufficient vertices to ensure an accurate spatial representation of the centre line of the asset, according to the Company's requirements for spatial referencing (Section 1.1) unless additional requirements are specified. These requirements apply to the vertices and vectors between vertices as well as the whole asset. New linear assets must be located by section, chainage and XSP.

For a linear asset which connects to another asset, the digitised feature must be snapped onto the connecting asset digitisation creating a contiguous feature.

Digitised features must not overlap other features unless this is the true representation of asset.

Figure 5-2 – Linear item spatial referencing example.

Note: when recording linear assets which may run perpendicular to the network idealisation (e.g. Footways or Steps) convention must be followed to ensure that, where present, attribute values for "Start Chainage" and "End Chainage" have a minimum difference of 1m. This is to ensure the asset is compatible with linear referencing systems.

5.1.3 Polygon Items

The location of the asset should be recorded with enough vertices to ensure an accurate spatial representation of the boundary or outline of the asset, according to the Company's requirements for spatial referencing (Section 1.1) unless additional requirements are specified. These requirements apply to the vertices and vectors between vertices as well as the whole asset. New polygon assets must be located by XY coordinates and section, chainage and XSP using the centroid of the polygon as reference for the XY and chainage.

For a polygon asset which borders another polygon asset it must be snapped onto the bordering asset, so it is contiguous.

Digitised features must not overlap other features unless this is the true representation of asset.

5.1.4 Recording Individual Assets

Each asset record must have a single consistent set of attribute values.

This is critical to the recording of linear/polygonal assets, where a physical asset can continue uninterrupted, but a variation in form (attributes) may occur. E.g. a Steel Safety Barrier can transition its beam profile from 'boxed' to 'corrugated'.

Where a physical asset continues uninterrupted, but the attributes vary, the record must be divided, creating multiple assets corresponding to the position and variation of attributes.

Part 3 - Data Dictionary defines additional rules for specific assets to aid understanding of recording/division.

5.2 Linear Asset Referencing

Section 4 of this document details the convention for referencing to the National Highways network model. This includes details on Sections, Chainage, and cross-sectional positions (XSPs).

For each asset collected, the relevant Section Label and the Start and/or End chainage from within the section shall be associated with the Company's 1:2500 Network Idealisation (see Table 5-1).

5.2.1 Matching Assets to Sections

Each individual asset must be recorded and referenced to a single network section.

Assets are referenced to a corresponding section based on their position orthogonal to the network.

Point assets occupy a single discrete position, making this calculation straightforward.

However, linear/polygonal asset types run along(side) the carriageway; and can appear in consecutive sections. E.g. Safety Barrier may appear continuously, running adjacent to the carriageway, for many kilometres through multiple sections.

Where a physical asset crosses more than one section, the record must be divided, creating multiple assets corresponding to the sections they fall within.

Note: if less than 1m (measured longitudinally to the carriageway) of the asset crosses into an adjacent section, this is not considered an independent asset. As 1m is the minimum recorded length for linear assets.

sect_label	sec_length	funct_name	area_name	direc_code	dual_name
0200A1/156	710	Main Carriageway	Area X	NB	Dual Carriageway (Nominated)
0200A1/188	1586	Main Carriageway	Area X	NB	Dual Carriageway (Nominated)
0200A1/173	1719	Main Carriageway	Area X	SB	Dual Carriageway (Not Nominated)
0200A1/152	211	Roundabout	Area X	CW	One Way Single Carriageway

Table 5-1 - Example of the Employer's 1:2500 Network Idealisation attributes.

For the calculation of chainage from spatially located assets, the spatial coordinate at any given point shall be projected tangentially to the section and the distance then calculated from the first vertex based upon the actual length of the section in the direction of travel. Start chainage shall always be less than the end chainage.

For Motorways and Dual Carriageways, each carriageway has a separate section, and therefore chainage will always increase with the direction of referencing.

However, Single Carriageways have one section relative to both directions of travel:

- The lanes which share direction of travel with the direction of referencing, will have increasing chainage (for example – Left Permanent Lane 1 in XSP terms (see Section 4.5.1)).

- The lanes which have direction of travel opposite to the direction of referencing, will have decreasing chainage (for example – Right Permanent Lane 1 in XSP terms (see Section 4.5.1)).

5.3 Nominated Carriageway

Assets which are relative to or shared between two separate sections i.e. a Double Sided VRS in the central reserve of a dual carriageway shall be recorded in the nominated carriageway only, which will negate the potential to record an asset twice i.e. in both directions thus "double booking" assets.

5.4 Boundary Extents

All assets shall be collected within the highway boundary, defined between boundary fences, walls, hedges and other similar features for mainline sections. For other areas, the following rules shall apply if adjoining 3rd party roads/sections.

- Junctions, End of Exit Slip and beginning of Entry Slips – Give Way Road Markings perpendicular across the carriageway (feature included)

- Roundabouts
  - On carriageway features (Road Markings etc.) - Outside of Kerbs and/or Road Markings (both features included)
  - Off carriageway features (Signs, Lighting Points etc.) – Within 10m of the on-carriageway features stated above

- For Drainage assets follow the guidance set out in CD 535.

6 Operational Data Management and Requirements

6.1 Operational Roles and Responsibilities

National Highways is responsible for ensuring that asset data is up to date and accurate. To achieve this, National Highways have defined asset data governance roles as laid out in the following sections.

There are no defined roles for suppliers relating to asset data. All requirements for suppliers are defined in their respective contract (which may include reference to this document) and may include requirements for:

- Providing asset data in an accurate manner.
- Use of asset information systems.

6.1.1 Asset Data and Intelligence Manager

The Asset Data & Intelligence Manager oversees regional asset data activities. Specific responsibilities include:

- Implementing asset information policy e.g. primacy, access, and update cycles.
- Implementing national and local asset information management processes, ensuring these are resourced and are operationally effective.
- Supporting Asset Data Custodians to achieve compliance with asset data requirements and the ADMM, including facilitating continual improvement.
- Ensuring that local and central asset information management systems are aligned.

6.1.2 Asset Data Custodians

Asset Data Custodians are responsible for controlling quality of asset data. The Asset Data Custodians will, for their relevant asset class, ensure that asset data is:

- complete;
- correct;
- accurate;
- current;
- integral from point of capture to point of load into the relevant primary asset data system;
- compliant with the relevant standards;
- available in the relevant asset data system in a timely manner, and
- referenced using the metadata as defined in the relevant asset data management system.

The Asset Data Custodians will, for their relevant asset class:

- Drive continual improvement in asset data management, including working with the appropriate Asset Type Specialist to identify improvements to specifications for asset data management and improvements to asset data management systems;

- ensure compliance with all data management specifications;

- act as focal point to receive any communications regarding changes to the specifications for data management or asset data management systems and communication of these changes to relevant regional personnel;

- be the first point of contact for providing access to the relevant asset data management systems; and

- manage access rights to the asset data management systems.

The role of these Asset Data Custodian is to be undertaken by the Engineering Team Manager for the relevant asset class within their operational area. The roles are not mutually exclusive, and one individual may carry out more than one role.

6.1.3 Pavement Data Custodian

The Pavement Data Custodian is responsible for controlling the quality of pavement asset data in the Pavement Data Management System.

6.1.4 Structures Data Custodian

This Structures Data Custodian is responsible for controlling the quality of structures asset data in the Structures Data Management System.

6.1.5 Geotechnical Maintenance Liaison Engineer (GMLE)

The GMLE is responsible for all operational geotechnical management activities including geotechnical asset data. The GMLE is to be appointed in accordance with the requirements of CS 641.

The GMLE will, in addition to the obligations in section 2.1 of Part 1 – Data Principles and Governance, liaise directly with the Geotechnical Advisor as required.

6.1.6 Drainage Liaison Engineer (DLE)

The DLE is responsible for all drainage surveys, maintenance, and renewals. The DLE is to be appointed in accordance with the requirements of CD 535, including ensuring that requirements for minimum qualifications and experience are met.

The DLE will, in addition to the obligations in section 2.1 of Part 1 – Data Principles and Governance, ensure compliance with the requirements of CD 535 and CS 551.

The DLE may choose to appoint a dedicated Flood Champion. The Flood Champion is responsible for the integration and coordination of flood risk management. The Flood

Champion is to be appointed in accordance with the requirements of CD 535, including ensuring that requirements for minimum qualifications and experience are met. The Flood Champion will ensure compliance with all data management specifications relevant to managing the flood hotspots in accordance with CD 535.

6.1.7 Carriageway Inventory Data Custodian

The Carriageway Inventory Data Custodian is responsible for controlling the quality of carriageway inventory asset data (section 2.1) in the Routine and Planned Maintenance System and the Carriageway Inventory Data Management System.

6.1.8 Lighting Liaison Engineer (LLE)

The LLE is responsible for the provision of timely and up to date inventory data to meet the requirements of the applicable asset data management system.

The LLE's duties will, in addition to the obligations in section 2.1 of Part 1 – Data Principles and Governance:

- submit an 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

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

6.1.9 Environmental Liaison Co-ordinator (ELC)

The ELC is responsible for coordinating and overseeing environmental operations and includes both asset inventory activities and activities associated with ensuring regulatory compliance and permit renewal.

The ELC will, in addition to the obligations in section 2.1 of Part 1 – Data Principles and Governance:

- Work 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.

6.1.10   Technology Data Custodian

The Technology Data Custodian is responsible for controlling the quality of technology asset data in the Technology Data Management System.

6.1.11   Network Referencing Manager (NRM) and Deputy

The NRM and deputy must be fully appraised of the Approved Network maintenance procedures and must have attended the NRM course run by National Highways or other persons authorised by the National Highways.

The role of the NRM is to be undertaken by the Asset Data & Intelligence Manager.

The NRM:

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

- Is responsible for liaison with the Network Auditor regarding section referencing when necessary.

6.1.12   Network Auditor

This role is fulfilled by the HAST team.

6.2 Condition Inspections

GS 801 identifies the following inspection type to mitigate asset condition risks:

- Network Condition - asset condition inspections that look at the longer-term condition of all asset.

Inspections for Network Condition are intended to gather data on the long-term performance of the asset. This is achieved by applying condition grades to each asset that will be used to inform the planning and generation of future renewal schemes. GS 801 defines the frequency at which each asset type should be inspected for condition.

6.2.1 DMRB Condition Grading

The following DMRB guidance shall be referred to in assessing condition and grading:

- Carriageway Control:
    - o Road Markings and Road Studs – shall be considered in line with CS 126 and the NAA of CS 126.
    - o Posts and Sign Faces – shall be considered in line with CS 125.
- Drainage: shall be considered in accordance with CS 551.
- Environmental:
    - o Cultural Heritage - shall be considered in line with LA 116
- Geotechnical: shall be considered in accordance with CS 641.
- Lighting: shall be considered in accordance with TS 501.
- Structures: shall be considered in accordance with CS 450.
- Road Restraint:
    - o Safety Barriers - considered in line with section 3 of BS 7669.

Part 3 – Data Dictionary articulates the data requirements for the assessment of condition for Cultural Heritage, Drainage, Geotechnical, and Structures assets.

6.2.2 Asset Condition Grading

Where no asset grading system exists in the DMRB, i.e. where assets typically form part of general highway inspections and do not require specialist discipline training, the assets will be assessed using a 5-point condition grading scale. GS 801 defines the 5-point condition grading scale, which is shown in Table 6-1.

Grade	Description
1	As New/ No deterioration/Meeting management plan
2	Superficial damage/Deterioration with no loss of performance
3	Some damage/Deterioration and performance may be slightly reduced
4	Significant damage/Deterioration and performance may be severely reduced
5	Significant damage/Deterioration/Missing/ Failed and no longer fulfils its intended purpose

Table 6-1 - The 5-point condition grading scale for constructed and non-constructed assets.

Detailed condition grading criteria for the application of the 5-point condition grading scale to each relevant asset is included in Appendix A:.

When using this condition grading scale, additional grades of 9 or 0 may be assigned in the following circumstances:

- A Grade 9 should be assigned where the inspection of an asset has been attempted, but it was not possible to assess its condition. Examples of such instances may be when access to the asset is not possible (e.g. a manhole cover can be seen but not accessed due to excessive vegetation).
- A Grade 0 should be assigned where the inspection of an asset has not been attempted. Examples of such instances may be because the asset record was not produced during a field survey, recording of that asset's condition is irrelevant (e.g. for ghost nodes), or because the previously recorded asset could not be found in the field (e.g. a manhole cover cannot be found in the location where it should be).

The following must be considered when applying the 5-point condition grade:

- Asset condition grades are to be applied following a visual assessment.
- A 'whole number' condition grade should be assigned to each asset inspected i.e. no decimals.
- The worst-case component score shall be allocated to the asset, not the average score.
- Where it has only been possible to inspect part of an asset, the condition grade applied should reflect those parts that have been seen. For example, it may not be possible to inspect an asset fully due to severely overgrown vegetation.

- Each asset should be scored 'as seen' regardless of whether maintenance or repair works are planned for that asset. The condition grade should then be reset on completion of any maintenance or repair works.
- It may be appropriate for some asset types to use only parts of the grading table e.g. grade 1, 3 and 5. This is highlighted, where appropriate, in Appendix A:.
- Grading of linear assets will be carried out on defined sections/lengths. The applicable assets and their respective segments/lengths are outlined in table 6-2:

Asset Class	Asset Name	Distance
Ancillary	Bridleway	100m
Ancillary	Combined Cycle Track and Footway	100m
Ancillary	Cycle Track	100m
Ancillary	Footway	100m
Carriageway Control	Fence	20m
Carriageway Control	Block Wall	20m
Carriageway Control	Brick Wall	20m
Carriageway Control	Stone Wall	20m
Pavement	Pavement Section	100m
Environmental	Hedgerow	200m
Environmental	Linear Woodland Belt	200m
Road Restraint	Pedestrian Guard Rail	20m
Road Restraint	Safety Barrier (Concrete)	TBC
Road Restraint	Safety Barrier (Steel)	30m
Road Restraint	VRS Add On Motorcycle Protection	30m

Table 6-2 - The defined lengths for grading linear assets.

6.2.3 Recording Asset Condition

Figure 6-1 outlines the structure of the data schema for recording condition against an asset. Part 3 – Data Dictionary articulates the requirements for condition as three separate tables:

- Inspection Record
- Condition Record for Point/Polygon Assets
- Condition Record for Linear Assets

The Inspection Record defines who conducted the inspection and when; this is referentially linked to a Condition Record, which holds information defining the condition of the asset (using the 5-point condition grading scale). In turn this is referentially linked to the Asset Record. For a linear asset (e.g. a Safety Barrier) multiple Condition Records would be appended to an Inspection Record and an Asset Record in line with the linear segmentation method.
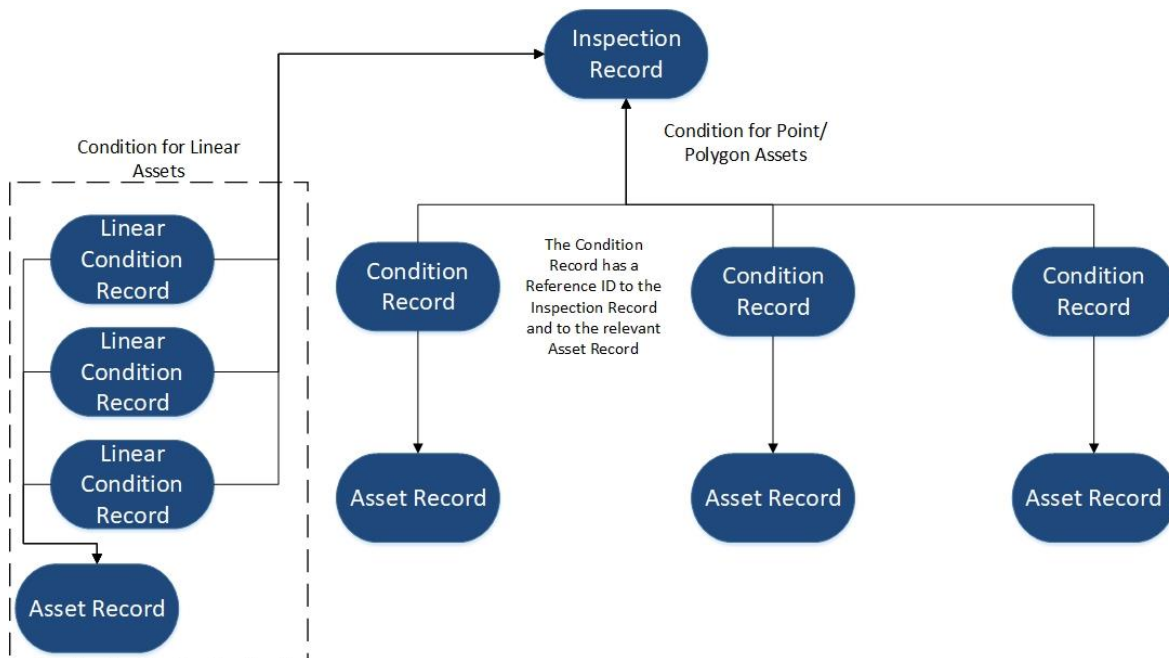
Figure 6-1 - The data schema structure for recording condition.

6.3 Litter Condition Grading

GS 801 states that the cleanliness of paved and non-paved areas on the affected property should be assessed and recorded annually. The grading of litter condition should be based on the 5-point condition grading scale set out in Table 6-1 and recorded by road section.

The following must be considered when applying the 5-point condition grade:

- Litter condition grades are to be applied following a visual assessment.
- A 'whole number' condition grade should be assigned to each asset inspected i.e. no decimals.
- The worst-case component score shall be allocated to the road section, not the average score.

- Litter condition should be scored 'as seen' regardless of whether maintenance or repair works are planned.

6.3.1 Recording Litter Condition

Figure 6-2 outlines the structure of the data schema for recording litter condition. Part 3 – Data Dictionary articulates the requirements for litter condition as two separate tables:

- Inspection Record
- Litter Condition Record

The Inspection Record defines who conducted the inspection and when; this is referentially linked to a Litter Condition record, which holds information defining the litter condition of the road section. Additionally, the road section being inspected should also be recorded as part of the Litter Condition record.
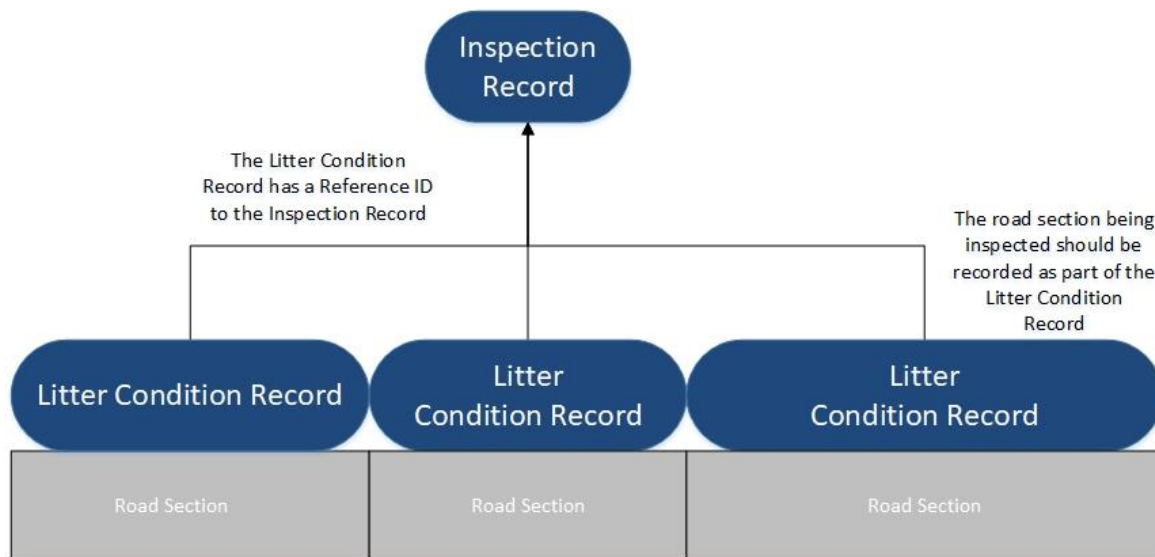
Figure 6-2 - The data schema structure for recording litter condition.

6.4 Network Safety Inspections

GS 801 defines a defect as when an asset:

1. Causes an unintended hazard, nuisance, or danger to the users of the highway.
2. Represents a deterioration from the normal condition.
3. Prevents the asset from acting in the intended manner.
4. Is damaged.
5. Is likely to increase the rate of deterioration of another asset.

Undertaking Network Safety patrols and inspections to ensure the network is safe and serviceable and to identify and classify defects to assets should be done in conjunction with GS 801.

6.4.1 Recording Asset Defects

Figure 6-3 outlines the data schema structure for recording defects against an asset. Part 3 – Data Dictionary articulates the requirement for defects as a Safety Patrol Record and a Defect Record. The Safety Patrol Record holds information pertaining to the date and name of the safety patroller, this is referentially linked to a Defect Record which defines the type of defect, date and time of identification, and an indication of its location. The Defect Record is referentially linked to the relevant Asset Record. Note: multiple Defect Records can be assigned against an individual Asset Record.
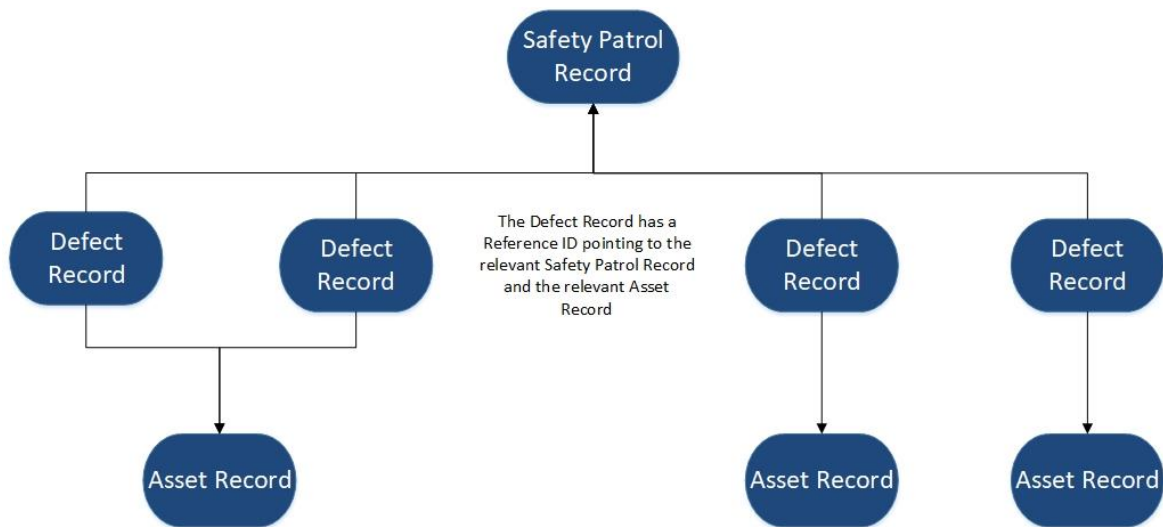
Figure 6-3 - The data schema structure for recording defects.

6.4.2 Defect Record Tables

Multiple Defect Record tables exist in Part 3 – Data Dictionary to account for the varied defect types that can be recorded against certain assets (i.e. Pavement). Table 6-3 outlines the different tables articulated.

Table Name (in Part 3 – Data Dictionary)	Asset Class	Applicable Assets
Bridleway Defect Record	Ancillary	Bridleway
Crisis Signage Defect Record	Ancillary	Crisis Signage
Equipment Store/Switch Room Defect Record	Ancillary	Equipment Store, Switch Room
Footway/Cycle Track Defect Record	Ancillary	Combined Cycle Track and Footway, Crossover, Cycle Track, Footway
Handrail Defect Record	Ancillary	Handrail
Non-Carriageway Surface Defect Record	Ancillary	Non-Carriageway Surface
Pedestrian Crossing Defect Record	Ancillary	Pedestrian Crossing
Salt Bin/Spill Kit Defect Record	Ancillary	Salt Bin, Spill Kit
Snow Gate Defect Record	Ancillary	Snow Gate
Steps Defect Record	Ancillary	Steps
Stile Defect Record	Ancillary	Stile

Street Furniture Defect Record	Ancillary	Street Furniture
Toilet Block Defect Record	Ancillary	Toilet Block
Anti-Glare Barrier Defect Record	Carriageway Control	Anti-Glare Barrier
Bollard Defect Record	Carriageway Control	Bollard
Carriageway Gate Defect Record	Carriageway Control	Carriageway Gate
Cattle Grid Defect Record	Carriageway Control	Cattle Grid
Fence Defect Record	Carriageway Control	Fence
Fence Gate Defect Record	Carriageway Control	Fence Gate
Kerb Defect Record	Carriageway Control	Kerbs.
Node Stud Defect Record	Carriageway Control	Node Stud
Posts Defect Record	Carriageway Control	Post (Sign), Post (Traffic Signal)
Reference/Utility Marker Defect Record	Carriageway Control	Reference Marker, Utility Marker Post
Road Markings Defect Record	Carriageway Control	Hatched Road Markings, Longitudinal Road Markings, Transverse Road Markings.
Road Stud Defect Record	Carriageway Control	Road Studs
Sign Face Defect Record	Carriageway Control	Sign Face
Walls Defect Record	Carriageway Control	Block Wall, Brick Wall, Stone Wall
Environmental Defect Record (Area)	Environmental	All Grassland, Vegetation, Water Bodies and Wildlife Structures assets in the Environmental asset class.
Environmental Defect Record (Points)	Environmental	All Grassland, Vegetation, Water Bodies and Wildlife Structures assets in the Environmental asset class.
Bracket Defect Record	Lighting	Bracket
Feeder Pillar/Interface Cabinet Defect Record	Lighting	Feeder Pillar, Interface Cabinet
Lighting Column Defect Record	Lighting	Lighting Column
Lighting Unit Defect Record	Lighting	Lighting Unit
Pavement Defect Record	Pavement	Pavement Section
Arrester Bed Defect Record	Road Restraint	Arrester Bed
Crash Cushion Defect Record	Road Restraint	Crash Cushion
End Terminal Defect Record	Road Restraint	End Terminal
Inspection Cover Defect Record	Road Restraint	Inspection Cover
Pedestrian Guard Rail Defect Record	Road Restraint	Pedestrian Guard Rail
Safety Barrier Gate (Steel) Defect Record	Road Restraint	Safety Barrier Gate (Steel)
Safety Barrier/Gate/Transition (Concrete) Defect Record	Road Restraint	Safety Barrier (Concrete), Safety Barrier Gate (Concrete), Transition (Concrete)
Safety Barrier/Transition (Steel) Defect Record	Road Restraint	Safety Barrier (Steel), Transition (Steel)

Table 6-3 - Defect Record tables in Part 3 – Data Dictionary and the applicable assets.

6.4.3 Pavement Defect Record

Table 6-4 specifies which defect types can be applied based on the Pavement type.

Defect Type	Pavement Type
Chip Loss	Flexible/Flexible Composite
Corrosive Spill	All
Cracking Area	All
Cracking Bifurcated	All
Cracking Longitudinal	All
Cracking Transverse	All
Dead Animal	All
Debris	All
Defective Joint Seal	Rigid
Defective Overband Crack	Rigid
Defective Repair	All
Edge Defect	All
Fatting	Flexible/Flexible Composite
Fire Damage	All
Fretting	Flexible/Flexible Composite
Fuel Spill	All
Gouging	Flexible/Flexible Composite
Graffiti	All
Horizontal Projection >50mm	All
Joint Faulting	Rigid
Joint Movement Vertical	Rigid
Joint spalling	Rigid
Offensive Graffiti	All
Other	All
Pop-out	Rigid
Pothole	Flexible/Flexible Composite
Pumping	Flexible/Flexible Composite
Rutting	Flexible/Flexible Composite
Settlement	Flexible/Flexible Composite
Surface Crazing	Flexible/Flexible Composite
Surface Defectiveness	Flexible/Flexible Composite
Surface Scaling	Rigid
Vertical Projection >20mm	All
Worn Texture	All

Table 6-4 - Translation of the defect types that can be applied based on the Pavement type.

6.5 Performance Inspections

The inspection of performance should indicate whether the asset is performing as intended (i.e. meeting its function(s)/objective(s)). Table 6-5 defines the grading scale which is to be used to assess performance against an asset.

Grade	Description
Pass	Asset is effectively meeting its intended objective(s)/is new and will take time to effectively meet its intended objective(s)
Monitor	Asset is meeting its objective(s) but there is some risk of future failure. Monitoring recommended.
Fail	Asset is not functioning in line with its intended objective(s)

Table 6-5 - Grading scale for the assessment of performance.

The following must be considered when assessing performance:

- Performance grades are to be applied following a visual assessment.
- The worst-case component grade shall be allocated to the asset, not the average grade.
- Where it has only been possible to inspect part of an asset, the performance grade applied should reflect those parts that have been seen. For example, it may not be possible to inspect an asset fully due to severely overgrown vegetation.
- Each asset should be graded 'as seen' regardless of whether maintenance or repair works are planned for that asset. The performance grade should then be reset on completion of any maintenance or repair works.

6.5.1 Recording Asset Performance

Figure 6-4 outlines the data schema structure for recording performance against an asset. Part 3 – Data Dictionary articulates the requirement for performance as an Inspection Record and Performance Record.

The Inspection Record holds information pertaining to the date and name of the inspector, this is referentially linked to a Performance Record which defines the objective type, its performance grade, and any additional information (i.e. description or photograph references).

The Performance Record is referentially linked to the relevant Asset Record. Note: multiple Performance Records can be assigned to an individual Asset Record.
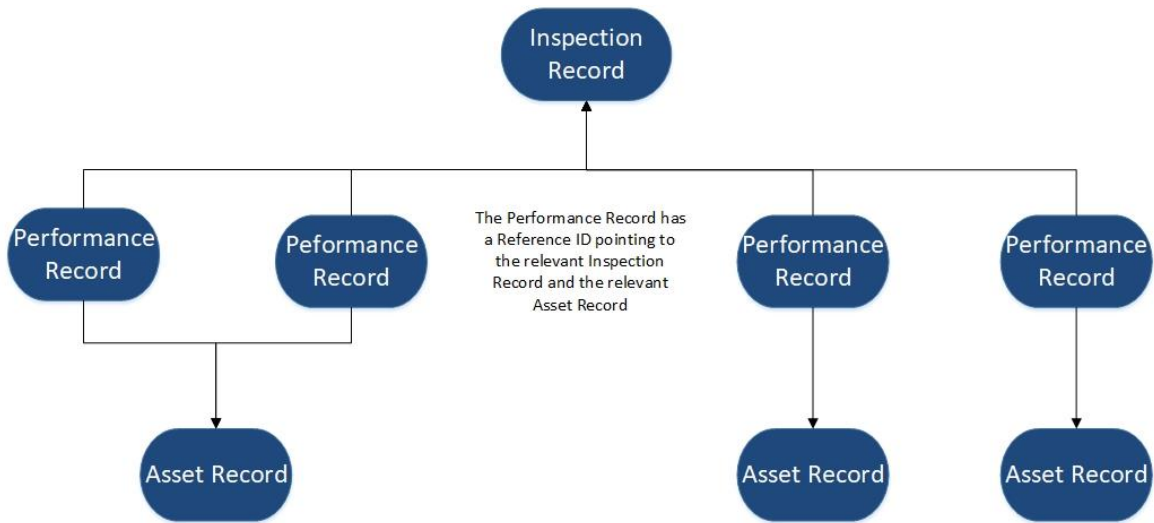
Figure 6-4 - The data schema structure for recording performance.

6.5.2 Performance Record Tables

Currently a Performance Record table only exists in Part 3 – Data Dictionary to account for assets which have been assigned an Environmental Objective. These exist to indicate why the asset has been constructed/installed and whether it is being effectively managed to meet its intended purpose. Table 6-6 outlines the assets which have been assigned Environmental Objectives that require a performance assessment.

Asset Class	Asset	Applicable Objectives
Ancillary	Handrail	Landscape Integration, Visual Amenity, Visual Screening
Ancillary	Street Furniture	Enhancing Built Environment, Visual Amenity
Carriageway Control	Block Wall	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Visual Amenity, Visual Screening
Carriageway Control	Brick Wall	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Carriageway Control	Fence	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Carriageway Control	Fence Gate	Visual Amenity
Carriageway Control	Stone Wall	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Environmental	Amenity Grassland	Enhancing Built Environment, Landscape Integration, Visual Amenity
Environmental	Climbers or Trailers	Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Environmental	Conservation Area	Protect Cultural Heritage
Environmental	Ecological/Wildlife Ponds	Conservation and Ecology, Landscape Integration, Manage Water Quality, Visual Amenity
Environmental	Grass Reinforced Walls	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Environmental	Grassland with Bulbs	Conservation and Ecology, Enhancing Built Environment, Visual Amenity

Environmental	Groundcover	Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Visual Amenity
Environmental	Heath and Moorland	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Hedgerow	Auditory Amenity, Conservation and Ecology, Landscape Integration, Protect Cultural Heritage, Visual Amenity, Visual Screening
Environmental	Historic Battlefields	Landscape Integration, Protect Cultural Heritage
Environmental	Historic Wreck	Protect Cultural Heritage
Environmental	Individual Trees	Auditory Amenity, Conservation and Ecology, Enhancing Built Environment, Landscape Integration, Protect Cultural Heritage, Visual Amenity, Visual Screening
Environmental	Habitat Areas	Conservation and Ecology, Landscape Integration
Environmental	Habitat Boundaries	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Linear Woodland Belt	Conservation and Ecology, Landscape Integration, Visual Amenity, Visual Screening
Environmental	Listed Building	Protect Cultural Heritage, Visual Amenity
Environmental	Marsh and Wet Grassland	Conservation and Ecology, Landscape Integration, Manage Water Quality, Visual Amenity
Environmental	Non-Designated	Landscape Integration, Protect Cultural Heritage, Visual Amenity
Environmental	Open Grassland	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Parks or Gardens of Specific Historic Interest	Landscape Integration, Protect Cultural Heritage, Visual Amenity
Environmental	Rock and Scree	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Scheduled Ancient Monument	Protect Cultural Heritage, Visual Amenity
Environmental	Scrub	Conservation and Ecology, Landscape Integration
Environmental	Shrubs	Enhancing Built Environment, Landscape Integration, Visual Amenity, Visual Screening
Environmental	Species Areas	Conservation and Ecology
Environmental	Species Locations	Conservation and Ecology
Environmental	Species Rich Grassland	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Splay/Swath	Conservation and Ecology, Landscape Integration, Visual Amenity
Environmental	Wildlife Housing	Conservation and Ecology
Environmental	Wildlife Underpass	Landscape Integration
Environmental	Woodland	Conservation and Ecology, Landscape Integration, Visual Amenity, Visual Screening
Environmental	World Heritage Site	Protect Cultural Heritage, Visual Amenity
Geotechnical	At-Grade	Landscape Integration
Geotechnical	Bund Back	Landscape Integration, Visual Amenity, Visual Screening
Geotechnical	Bund Front	Landscape Integration, Visual Amenity, Visual Screening
Geotechnical	Cutting	Landscape Integration
Geotechnical	Embankment	Landscape Integration

Table 6-6 - Assets and their applicable Environmental Objectives that require a performance assessment.

6.6 Cyclic Maintenance Activities

GM 701 defines all asset cyclic maintenance activities and their baseline frequencies to facilitate a programme of preventative maintenance. The outcomes of this includes the elimination of a potential defect or mitigating a potential risk impacting on safety, customers, or the performance of the asset.

Part 3 – Data Dictionary articulates the data requirement associated with each cyclic maintenance activity to enable intelligence-led maintenance to design the optimum maintenance intervention for individual assets, improve asset quality and customer satisfaction, and offer greater value for money.

6.6.1 Recording Cyclic Maintenance Activities

Figure 6-5 outlines the data schema structure for recording maintenance activities against an asset. Part 3 – Data Dictionary articulates these requirements as a Maintenance Record, the applicable cyclic maintenance activity (i.e. Clean Bollards Activity Record) and an optional Maintenance Defect Record.

The Maintenance Record holds information pertaining to the organisation and name of the maintainer and the activity being undertaken, this is referentially linked to the applicable cyclic maintenance activity record which defines the date/time the activity was undertaken, whether the activity was completed and any additional information (i.e. an indication of whether the asset was clean or dirty prior to the activity being undertaken).

The applicable cyclic maintenance activity record is referentially linked to the relevant asset record. In instances where the maintainer encounters a defect whilst undertaking the maintenance activity the Maintenance Defect Record should be used to indicate that a defect was encountered, what the defect was and whether it was rectified at the time of the activity.

The Maintenance Defect Record is referentially linked to the applicable cyclic maintenance activity record. For a linear asset (e.g. a Safety Barrier) multiple applicable cyclic maintenance activity records can be appended to a Maintenance Record and an Asset Record in line with the linear segmentation method.
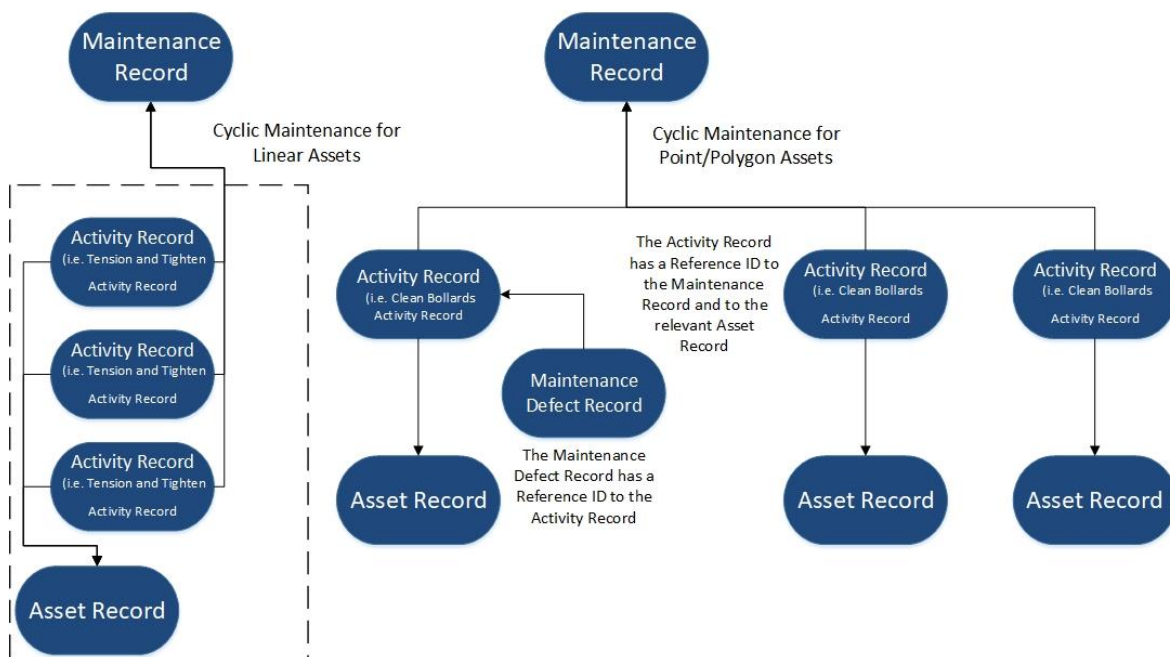
Figure 6-5 - The data schema structure for recording cyclic maintenance activities.

Part 2 - Requirements and Additional Information

6.6.2 Cyclic Maintenance Activity Record Tables

Multiple cyclic maintenance activity record tables exist in Part 3 – Data Dictionary in line with the activities defined in GM 701. Appendix B lists the cyclic maintenance activity record tables, the applicable activity defined in GM 701 and which assets they apply to in the ADMM.

7 Major Schemes and Asset Data Management

This section provides guidance to parties involved in the collection, creation, and transfer of asset data during the lifecycle of a major scheme. It provides a prime point of reference for the requirements and responsibilities regarding asset data exchange ensuring all parties have a common understanding of the wider process they are operating within.

Figure 7-1 demonstrates how the ADMM interrelates with GG 182 and GG 184.
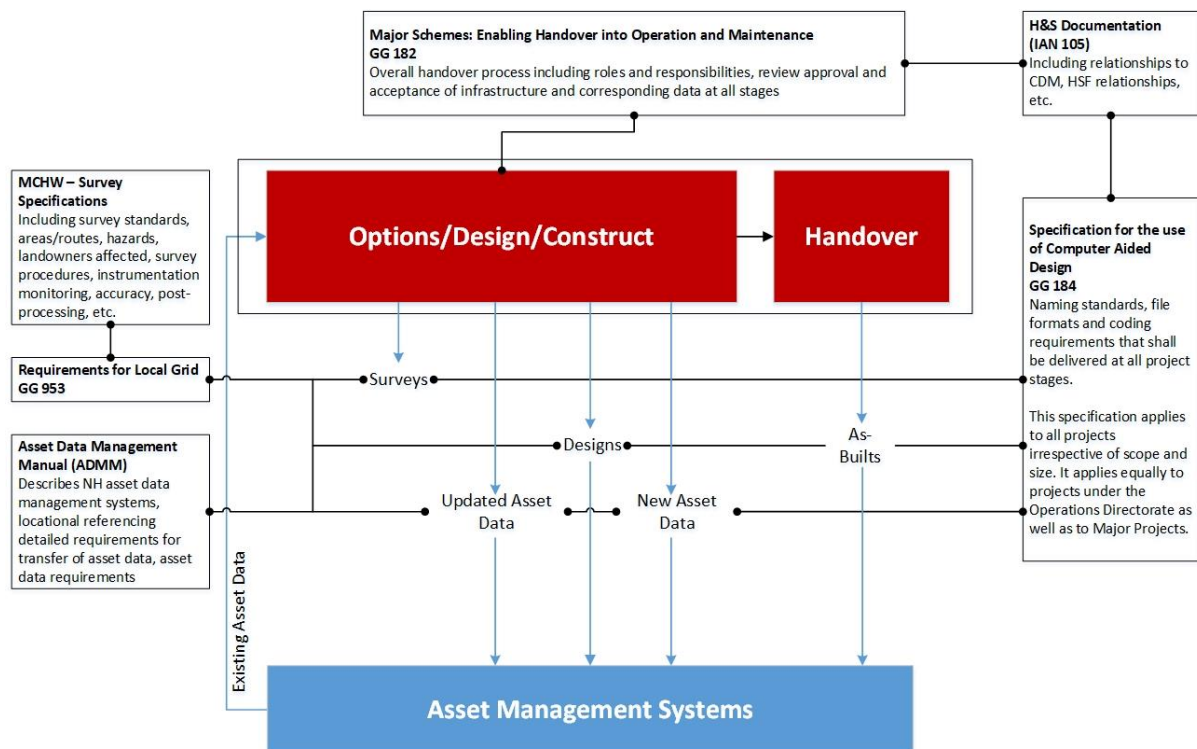
Figure 7-1 - Relationship between different documents.

7.1.1 Asset Data Systems

Scheme delivery partners are not expected to interact with the asset data systems, but provide data suitable for their update, the exception being the Geotechnical Data Management System (HAGDMS). This interaction may be undertaken by National Highways or their supply chain as appropriate.

Based upon the requirements of GG 182, scheme delivery partners shall from the outset establish with the regional National Highways teams a list of key systems and contacts to support the exchange of asset data, supported by a single point of contact for all correspondence.

Refer to section 2 for the further information and for details of the systems is in use in the region/area (local requirements and specific contract arrangements must be considered).

7.1.2 Data Requirements and Formats

Part 3 – Data Dictionary provides the requirements for attributes for each asset class currently recognised by the Company. The exchange of the asset data required by the ADMM will be included in the scheme Health & Safety File and delivered in accordance with the scheme Handover Schedule.

Suppliers are advised to review section 3 of this document and the following section for guidance in preparing data for exchange.

Class	Exchange Format	Notes
Network Reference	Shapefile & Alignment and Lining Drawings	The delivery partners should liaise with the local Network Reference Manager for requirements.
Pavement	CSV	Construction data file Construction layer data file
Ancillary	Shapefile	
Carriageway Control	Shapefile	
Road Restraint	Shapefile	
Technology	Shapefile	
Structures	Keyed in data Electronic and Native Formats	Structure file records to be provided covering the items below: **Inventory** • General inventory details • Structure type details • Structure summary **Drawings in accordance with GG 184** • Location Plan (and/or Strip Map) • General Arrangement drawings • As-built drawings **Design** • Approval in Principle or equivalent • Design and check certificates • Construction compliance certificates • Key correspondence • Design option choice **Construction and Demolition** • Special construction techniques • Special demolition techniques • Construction problems and repercussions **Materials, Components Materials and Treatments** • Materials • Components • Surface and protective treatments **Certification and Tests** • Operation • Operation Manual • Logbook

Class	Exchange Format	Notes
		• Access **Inspection** • Acceptance Inspection **Maintenance** • Routine maintenance schedule • Design features affecting maintenance **Legal** **Environmental** **Supplementary records**
Geotechnical	Data entered into HAGDMS Reports and drawings in PDF format Ground Investigation data in AGS4 format Attachments in other data formats	Refer to: CS 641, CD 622, and the Handover of Geotechnical As-Built Data Guidance Document. Data transfer is directly into the Geotechnical Data Management System (HAGDMS). Recording of the creation of, or modifications to geotechnical assets should be undertaken in accordance with CS 641 and the processes set out in the Handover of Geotechnical As-Built Data Guidance Document. This relates to data held in the Geotechnical Asset Database of HAGDMS and as-built drawings. In accordance with CD 622, the following will be uploaded Geotechnical Investigation Reports (GIR), Geotechnical Design Report (GDR) and Geotechnical Feedback Reports (GFR).
Drainage	Shapefile	Part 3 – Data Dictionary details the asset data requirements for Drainage data, and for non-asset data (such as flooding and priority registers), all in accordance with CD 535 and CS 551. Requirements for as-built records, attached documents and data packaging are given on the downloads page of HADDMS. Documents associated with the assessment of routine runoff on surface water courses carried out in accordance with LA 113 are to be attached as documents to the relevant drainage assets in HADDMS. These include HEWRAT assessments and field log sheets for Tier 2 assessments. Template files for the asset data SHP file format are available on the downloads page of HADDMS.
Lighting	CSV or Shapefile	Further detail behind the requirements in the ADMM can be found in HE Guidance, currently entitled 'Elexon BSCP520 – MAC-ASC Inventory Maintenance Procedures.doc'
Environmental	Shapefile	Part 3 – Data Dictionary details the asset data requirements for Environmental data. Section 9 provides detailed guidance on acceptable file formats and data rules.
Land & Property	Shapefile	Refer to guidance available via the Supply chain portal; Guidance_for_Land_Referencing_Plans

Table 7-1 - Asset Data Exchange Format.

7.1.3 Key Parties

Requirements contained within this section are referenced by GG 182 which in turn requires all parties reach and record agreement of their roles and responsibilities.

Role	Responsibilities
Asset Data Custodian	Shall be the party as defined in Part 1 - Data Principles and Governance from the Company (Asset Delivery Team) or the supply chain (Maintenance Service Provider) as appropriate for the operating model in the relevant Area
Maintenance Service Provider (MSP)	The supply chain. Further guidance is provided here.
Asset Delivery Team	Refer to the regional team for further information.
Principal Designer	Holds duties for the client under CDM 2015 for ensuring safe systems of work on site and that the Pre-Construction Information and Health and Safety File hold the appropriate information.
Scheme Designer	Requirements contained are referenced by GG 182; the Detailed Local Operating Agreement (DLOA) and the Handover Schedule PCF products.
Construction Supplier, Principal Contractor, Main Contractor	Requirements contained are referenced by GG 182; the Detailed Local Operating Agreement (DLOA) and the Handover Schedule PCF products.
ADMM Custodian, Asset Management Development Group	Author of the ADMM, see Part 1 - Data Principals and Governance for guidance regarding responsibilities and process.
Major Projects Project Manager	Responsible for the delivery of the scheme and the production of all information there-in.
Operations Directorate Senior User	Responsible for the taking the scheme into operations and maintenance at handover.

Table 7-2 - Roles and Responsibilities.

7.2 Contracts and Building Information Modelling

National Highways is making continuous improvement to its Asset Management Framework, systems, and requirements. Prior to the inclusion of Building Information Modelling (BIM) into contracts, asset data requirements would often stipulate a 'system' upon which the scheme should deliver, this led to inconsistent and often poor data being uploaded into the asset management systems.

As the systems and requirements are developing over time, suppliers will need to be continually aware of changes to the ADMM. Suppliers should have access to the Supply Chain Portal for updates on the ADMM, PCF, BIM, and other Major Project matters.

7.2.1 Pre-Collaborative Delivery Framework

Any current scheme which precedes the Collaborative Delivery Framework or April 2016 may not have had the ADMM explicitly written into contract. However, all schemes must follow the DMRB and any Interim Advice Notes (IAN). GG 182 has required delivery in line with the requirements of the ADMM since 2014. This may

constitute a change in scope and should be dealt with under normal contractual procedures.

7.2.2 Collaborative Delivery Framework (CDF)

Following the introduction of the Collaborative Delivery Framework (CDF), and as of April 2016 each scheme is contracted to develop its information digitally in line with the UK Industrial Strategy (previously Construction Strategy). The principles of the BS/PAS 1192 suite of standards have been enacted by National Highways and the ADMM is the principal source of Asset Information Requirements (AIR) for all National Highways schemes as specified in PAS 1192-3 (see Figure 7-2).
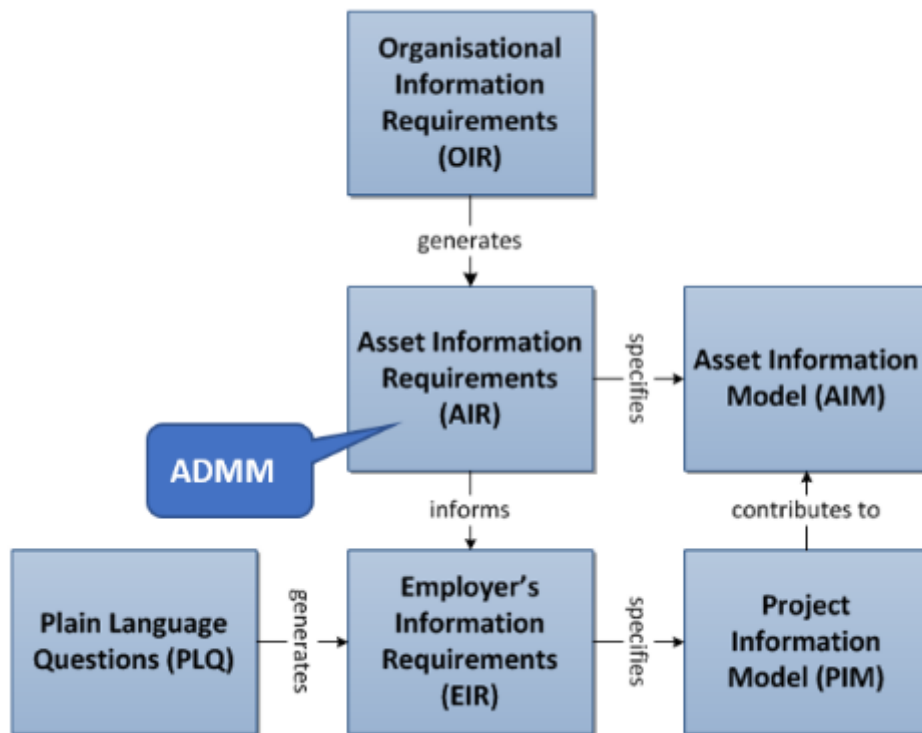
Figure 7-2 - Relationship between elements of Information Management (from PAS1192-3).

7.2.3 Regional Delivery Partnerships (RDP)

The Regional Delivery Partnerships (RDP) is a successor to CDF. Under RDP, Delivery Integrations Partners (DIPs) will be awarded contracts to deliver packages of schemes.

All schemes are to be provided in compliance with the Government's Strategy for Building Information Modelling as set out in the Cabinet Office Government Construction Strategy paper dated May 2011.

The relationship between the elements of Information Management supporting this approach, including the relationship to the ADMM, is as per that described for CDF in section 7.2.2 above.

7.2.4 Employers Information Requirements (EIR)

Employer's Information Requirements (EIR) is an element of the contract that describes how models and associated information are produced, delivered, and used, including any processes, protocols and procedures referred to in it.

7.2.5 BIM Execution Plan (BEP)

The BIM Execution Plan (BEP) is an element of the quality plan for a scheme that describes how the Supplier will produce the specified Information Models and meet the requirements in the EIR.

7.2.6 Model Production Delivery (MPDT)

The delivery partners shall confirm by completion of the Model Production Delivery Table (MPDT) the provision of information at each stage. The MPDT should be completed and included in the BIM Execution Plan submission for acceptance by the Project Manager.

MPDT is the schedule that sets out:

- the subject matter of each Model,
- the person who is to produce and deliver each Model at each Stage and
- the proposed Level of Definition for each Model at each Stage.

7.2.7 Project Information Model (PIM)

Project Information Model (PIM) is the accumulation of data developed during the design and production and construction phase of a project, consisting of graphical information, non-graphical information and documentation defining the delivered project.

7.2.8 Asset Information Model (AIM)

An Asset Information Model (AIM) can relate to a single asset, a system of assets or the entire asset portfolio of an organization. An AIM represents data and information that relates to assets to a level required to support an organisation's asset management framework. The AIM consists of graphical, non-graphical and documentation components as well as metadata.

7.2.9 GG 184 Data/CAD Standard

National Highways requires scheme delivery partners to create the PIM in accordance with GG 184 and the ADMM. The key elements to efficient and trustworthy asset data delivery, which can be validated and verified are.

- Named Containers

- Classification

- Unique Identification

- Asset Data Schema (Part 3 - Data Dictionary)

The application of these principles by the supply chain will ensure efficient exchange of asset data.

Named Containers - the implementation of BS 1192:2007 is believed to significantly reduce time spent searching for files, furthermore its consistent application across a programme such as National Highways should lead to enhanced management and quality of information in use. Leading to improved re-use of data and a reduction in errors, re-creation, and rework.

Classification – National Highways will continue to support the development of the UK classification; Uniclass for infrastructure and is a key stakeholder of the NBS. The Uniclass coding included in the Part 3 - Data Dictionary is currently considered to be 'Best Fit' and is subject to change due to the dynamic nature of the classification. Virtually all classes have been matched to a Uniclass code and are subject to continuous change and improvement for each iteration of the ADMM, however a small number remain under negotiation with NBS at the time of publishing.

Unique Identification - combined with classification, an asset which is uniquely identified provides an ability for links to schedules to be created. Several examples of suppliers linking their graphical models to spreadsheets or databases. National Highways recommends this approach thus providing assurance that wherever an asset is listed it is consistent in every other rendition.

Asset Data Schema - Part 3 - Data Dictionary provides the asset data schema for each asset. Although designed for handover, it is applicable to every stage of a project and suppliers are required to develop their PIM's with the end in mind.

Providing that delivery partners robustly apply the principles laid out in this section National Highways can be assured that improvements in asset information will be delivered by major schemes.

7.2.10   Data Quality

All delivery partners and suppliers certify the information provided in accordance with their business management systems. National Highways requirements for suppliers Quality Management Systems are found in GG 102, GG 184, and BS 1192. Suppliers are reminded that they must check, review, and approve their information.

Explicit quality criteria for all PCF Products are found in the guidance notes found on the supply chain portal.

After completion of any works activity the Asset Data Custodian is required to update the relevant prime asset data systems with changes to inventory, construction, and condition data in a complete, accurate and timely manner.

7.2.11   Common Data Environment (CDE)

Provision of a Common Data Environment (CDE) is determined by the Major Projects PMO and Digital Services, they contact the Project Manager for confirmation of which systems is in use.

7.3 Scheme Lifecycle / Plan of Work

A scheme lifecycle or plan of work can help the project team understand their obligations and ensure appropriate deliverables of geometry, data and other documentation are prepared for the client to enable timely and efficient decision making throughout the life of the project.

7.3.1 Major Projects: Project Control Framework

All major road projects are progressed through the Project Control Framework (PCF) which is split into three phases as shown below.

Phase	Options		Development			Construction				
Stage	Option Identification	Option Selection	Preliminary Design	Statutory Procedures	Construction Preperation	Construction	Commissioning		Handover	Closeout
Enabling Handover	A. Pre-Works					B. Construction	C. Asset Readiness	D. Operational Regime Testing	E. Acceptance into Operation and Maintenance	F. Post Handover

Each of the functional stages incorporates a transfer of asset data as follows:

Pre-works (Options & Development) – the Asset Data Custodian transfers data to the major scheme Delivery Partner (Designer)

Construction – the Delivery Partner transfers data to the Asset Data Custodian if the Delivery Partner acquires responsibility for maintenance

Handover – the major scheme Delivery Partner transfers data to the Asset Data Custodian

The key to good project handover is engagement with Operations Directorate throughout the scheme and not just as the project is coming to an end.

7.4 Asset Data Exchange Procedure

The purpose of this section is to guide all parties through the exchange of asset information throughout the lifecycle of a scheme. By providing a clear procedure it is anticipated that National Highways will receive good quality, complete asset information. This information will improve the prime asset data set and result in significantly improved customer, safety, and efficiency outcomes.

7.4.1 Options, Development, or Pre-Works

Data Need:

The major scheme Delivery Partner[1] (Designer) requires relevant and available asset data, stored on the National Highways prime asset data systems or locally, from the Asset Data Custodian to:

- enable the preliminary, and then pre-construction design, to be developed
- compile the pre-construction information required for identifying hazards and constraints that will impact the programming and methods of work.

Data: Process Map, Guidance and Responsibilities*:*

The following process map and notes define the process where the Maintenance Service Provider (MSP) arrangement exists.

Where the Asset Delivery model is operating, elements of the role of the MSP will be undertaken by the Company. In such cases, equivalent arrangements should be agreed locally.

Figure 7-3 – Asset Data Exchange Options, Development, or Pre-Works.

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[1] Delivery Partner – Subject to contractual arrangement, scheme designer or contractor (Design and Build).

Options, Development or Pre-Works

Process Purpose & Scope	Delivery Partner[1]	MP Project Team	HE Service Manager	Maintenance Provider

Process Purpose & Scope

Respond to the EIR by submitting BIM Execution Plan

Project Start. Contract let to Delivery Partner. Purpose; To assess existing asset inventory and inform design. Scope; All major schemes

Main Process Steps

A) Specifies data required – identifying relevant assets, section/location details and any data mining / manipulation

B) Identify Service Manager and seeks their agreement to the data request

C) Forwards request to the Provider

D) Review request.

Create scheme extents drawing and shapefile

Reassess requirements

G) Confirm if funding can be drawn from project budget — No

F) Agree if Provider assessment of additional work is valid — Agree

Prepare Costs — Yes

Has any Data Mining or Manipulation been requested?

Agreed — Instructs Provider

No

Subject to surveys provide any updates or improvement

Issue to Provider via CDE

Instructs Provider to update prime asset management system

E) Extracted data from relevant systems

Begin Data Mining or Manipulation

Yes

I) Datasets received Clarification required?

Issue to Delivery Partner via CDE

H) Data supplied to Delivery Partner with any relevant context and system IDs

No

J) Propose mechanism and frequency for updates to data

L) Resolves any issues in coming to a collaborative agreement

K) Agree mechanism and frequency for updates to data

Re-run from step E)

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External – National Highways

Part 2 – Requirements and Additional Information

A. The Delivery Partner must identify what data they require in terms of the asset types and section/location details; this will be provided by the MSP. The MSP is responsible for managing the data held within the Company's prime asset data systems, as well as locally held records, and should provide all available data from these sources. If the Designer wants the data to be transformed in any way, from its bulk extract format, they can ask the MSP to carry out this work; there is no obligation on either party for the MSP to be the one that carries out such work.

B. The National Highways Project Team should contact the National Highways Service Manager who is responsible for managing the MSPs contract. The Service Manager is a defined role within the MSPs contracts and therefore is responsible for overseeing interaction with the MSP.

C. The Service Manager will either forward the data request themselves or authorise the Designer to make direct contact with the MSPs. In either case, this constitutes an Asset Data Request from the Employer as specified in section 6.

D. The MSP reviews the data request and, if applicable, advises of any costs associated with data transformation. Where a bulk download is being provided there should be no cost to the Company as the MSPs is fulfilling their obligation to provide access to the data they are managing on behalf of the Company.

E. The MSP is expected to respond to bulk download requests within 10 working days. The default position is to provide data in the standard file format used by the relevant prime asset data systems (see section 7.1.1). The Company's prime asset data systems hold unique references (system IDs) for each asset and these should be provided to support the matching of records later in the scheme lifecycle.

F. The MSP manages asset data on behalf of the Company whether in the Company's prime asset data systems or local systems. Therefore, providing bulk downloads/extracts from any of these systems is a responsibility of the MSP. The Service Manager should be satisfied that the Company is only occurring additional costs where extra effort is required to mine and manipulate the data.

G. The National Highways Project Team should authorise any data mining/manipulation as cost reimbursable work through a project specific budget (PIN).

H. The MSP will supply any required context to ensure the data is understood. This would be expected, but not limited, to cover any reasons that reduce confidence in the completeness or accuracy of the data, clarification of any codes/terminology used and explanation of data structures/rules (particularly for local systems).

I. The clarification of data can be repeated until the Designer has sufficient understanding of the context surrounding the data. Updates following initial data process handover

J. From the point at which asset data is first handed over to the scheme Designer there will be ongoing maintenance activities which will affect the asset until the Delivery Partner assumes responsibility for the site. The Designer will need to be informed of updates to asset data to ensure they are working with the most current available data. Providing such updates is equivalent to a series of Asset Data Requests from the Employer; however, it will be most efficient to agree specific criteria or subsets of data to define what is provided in any updates.

K. Therefore, the MSP and Designer should agree an appropriate mechanism and frequency for updates to be provided when the initial data handover occurs.

L. The Service Manager will ultimately decide on the mechanism and frequency for updates if a collaborative arrangement cannot be agreed.

7.4.2 Construction

Data Need:

The Company needs to ensure the integrity of its maintenance records for all assets throughout the duration of the major scheme. Therefore, where the maintenance responsibility for an asset transfers to the Delivery Partner, any inspections, planned or reactive maintenance records need to be captured and populated into the relevant prime asset data system or local system.

Data: Process Map, Guidance and Responsibilities:

The following process map and notes define the process where the Maintenance Service Provider (MSP) arrangement exists.

Where the Asset Delivery model is operating, elements of the role of the MSP will be undertaken by the Company. In such cases, equivalent arrangements should be agreed locally.

Figure 7-4 – Asset Data Exchange Construction.

Construction
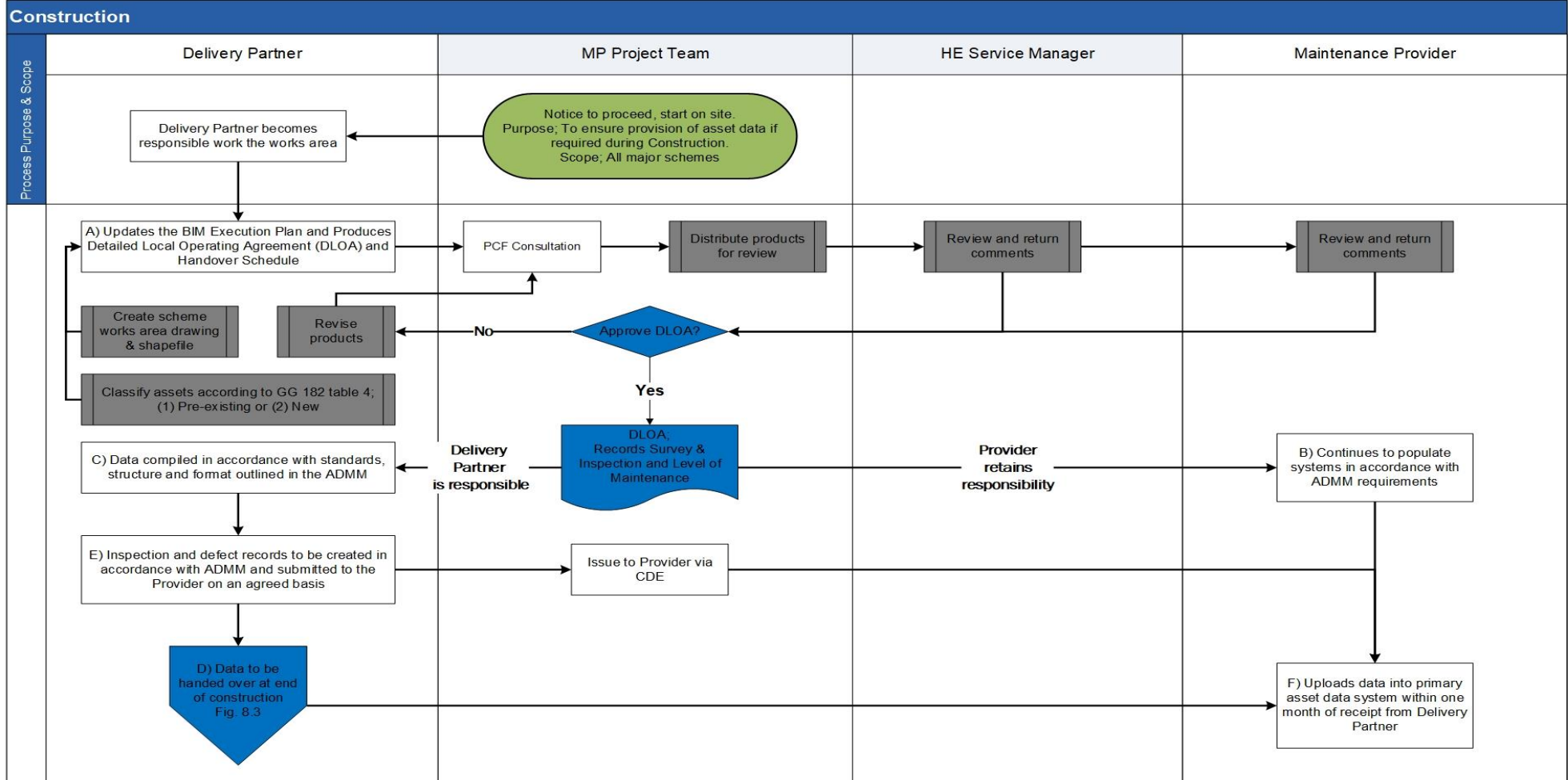
Figure 7-4

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External – National Highways

A. At the Pre-work stage, the Delivery Partner is required to engage with key stakeholders, including the MSP, to seek approval to of a Detailed Local Operating Agreement (DLOA). Through the Detailed Local Operating Agreement, it should be agreed which assets will have their maintenance responsibility transferred during the process of scheme delivery.

B. Where the MSP retains responsibility for an asset directly through their maintenance contract they will continue to capture and record asset data as per the ADMM (e.g. data from inspections / defect reporting).

C. The resulting detailed design and site clearance will determine which assets will in some way be changed by the scheme (e.g. removed, replaced, modified) and which assets will be within the area of works but will just require ongoing monitoring and maintenance. GG 182 provides guidance on the maintenance requirements Delivery Partners will have to operate to; in most cases this is likely to be the requirements under the MSP's contract.

D. Where an asset will be changed by design of the scheme e.g. removed, newly installed or modified in some way, any asset data will only need to be provided when the scheme is handed over (defect history will not be required for removed assets and is likely to be minimal/nil for modified and new assets).

E. Where an asset is not due for change but requires periodic or reactive maintenance during the time responsibility for the asset has been handed to the Delivery Partner, the maintenance history must be kept up to date. Therefore, the Delivery Partner must keep the same records as the MSP would under their contract. The ADMM details the inspection/defect records that the Delivery Partner should compile where the MSP is operating.

F. The Delivery Partner and MSP should agree the most practical and efficient way for the Delivery Partner to submit these records on a weekly basis. The MSP has one month from the date of receipt to upload these records into the Company's prime asset data systems in accordance with the ADMM requirements.

7.4.3 Handover

Data Need:

The Company requires appropriate data about the assets installed or modified as part of the major scheme to populate its prime asset data systems for ongoing asset management. The Provider has been appointed by the Company to be the custodian of its asset data and therefore plays a key role in accepting the asset data on behalf of the Company.

Data: Process Map, Guidance and Responsibilities:

The following process map and notes defines arrangements the process where the Maintenance Service Provider (MSP) arrangement exists. Equivalent arrangements should be agreed with the Asset delivery where appropriate. Where the Asset Delivery model is operating, elements of the role of the MSP will be undertaken by the Company. In such cases, equivalent arrangements should be agreed locally.

Figure 7-5 – Asset Data Exchange Handover.

Handover

Delivery Partner	MP Project Team	HE Service Manager	Maintenance Provider

Process Purpose & Scope

A) Data to be handed over at end of construction Fig. 8.2

B) BIM Execution Plan & DLOA records the agreed approach. Handover schedule records times scales

Start preparations during construction
Purpose; Successful handover of asset data
Scope; All major schemes

Supply Network Reference data Fig. 8.4

C) Data compiled in accordance with standards, structure and format outlined in ADMM. Upload to client CDE.

Issue to Service Manager via CDE

D) Data recieved

Revised data agreed and provided

H) Discuss issue with Delivery Partner
I) Escalation to Project Team

Fail

F) Data Validation and Verification check. Report is data complete, current and compliant with standards?

Pass

E) NH Primary Asset Data System(s) populated in accordance with ADMM

Handover Complete

Notify Delivery Partner

Notify MP PM

G) Confirm to Service Manager data is available in Primary Asset Data Systems

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External – National Highways

A. At the Construction, the Delivery Partner is required to engage with key stakeholders, including the MSP, to seek approval to a Detailed Local Operating Agreement (DLOA). As part of these discussions the Delivery Partner and MSP should agree a programme for data handover. This programme will need to consider the broader approach to scheme handover (e.g. section by section) and the need to have as built asset data handed over for any section of network prior to the MSP accepting the scheme into maintenance.

B. The DLOA & Handover Schedule will record the programme for data handover has been agreed. This does not mean the detail of the programme should not change if circumstances alter, but both Delivery Partner and MSP must agree.

C. During the construction phase of a scheme the Delivery Partner will take responsibility for assets in many ways. The data to be handed over in conjunction with transferring responsibility for the asset back to the MSP depends on what the Delivery Partner has done to the asset whilst being responsible for it (see Table 7-3).

Action by Delivery Partner	Data to be provided by Delivery Partner
No change	None (maintenance records supplied during construction stage)
Asset Removed	Confirmation of removal – date of removal, asset location, asset descriptor all to be provided in accordance with the format outlined in section 7.1.2; also, unique asset identification references from the relevant prime asset data system (as supplied when data provided for scheme design in Pre-works stage)
Asset Modified	Existing inventory records updated in accordance with the format and content requirements outlined in section 7.1.2; also, unique asset identification references from the relevant prime asset data system (as supplied when data provided for scheme design in Pre-works stage)
Asset Added	New, full inventory records created in accordance with the format and content requirements outlined in section 7.1.2; unique reference created by Designer/Delivery Partner (in accordance with relevant standards where applicable)

Table 7-3 - Delivery Partner actions and data.

D. The Delivery Partner hands over the asset data to the National Highways Project Team to issue to the MSP. This process could well be repeated several times depending on the programme agreed as part of the DLOA/Handover Schedule.

E. The MSP is responsible for loading the data into the Company's prime asset data systems; this is part of the ADMM requirements. If the MSP wishes to use Delivery Partner resource to carry out this requirement this would be as a sub-contract arrangement under the MSP's contract; there should be no additional cost to the Company and the MSP remains accountable for ensuring data is uploaded in a timely and accurate manner.

F. The MSP must assess whether the data provided to them is complete, current, and compliant with standards.

G. A set of process maps, guidance, and details of responsibilities specific to geotechnical assets are provided in the Handover of Geotechnical As-Built Data Guidance Document.

7.4.4 Network Referencing

Data Need:

The Company requires an accurate Approved Network Model to fit asset data to; this is achieved through network referencing which divides the Network into sections, each having fixed start and end positions and road alignment. Changes introduced by a major scheme will require this referencing to be reviewed and modified.

At the point where maintenance liability for the scheme transfers from the Delivery Partner to the MSP, the Network Referencing Manager will initiate the new network referencing within the Company's prime asset data systems.

Data: Process Map, Guidance and Responsibilities:

The following process map and notes defines arrangements the process where the Maintenance Service Provider (MSP) arrangement exists. Equivalent arrangements should be agreed with the Asset delivery where appropriate.

Where the Asset Delivery model is operating, elements of the role of the MSP will be undertaken by the Company. In such cases, equivalent arrangements should be agreed locally.

Figure 7-6 - Asset Data Exchange Network Referencing

Network Referencing

Delivery Partner[1]	MP Project Team	HE Service Manager	Maintenance Provider

Process Purpose & Scope

Purpose; To update the Network Reference data set
Scope; All major schemes

A) Supply drawings and shapefile of scheme alignment, lanes and lining

Issue to Service Manager / Provider via CDE

B) Network Reference Manager assess changes associated with scheme and creates new referencing

Supply Network Reference data Fig. 8.4

C) New Reference data used to enable asset data to be complied

Issue to Delivery Partner via CDE

D) Install/Remove Network Reference Markers in accordance with Network Referencing Manager's direction

E) Assets that will not be modified by scheme will have their referencing automatically updated by the asset data systems

Figure:	7-6	Issue No.:	01	Issue Date:	Aug 2017
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External – National Highways

Part 2 – Requirements and Additional Information

A. Delivery Partner must issue to the MSP's Network Referencing Manager, drawings and shapefile showing scheme alignment, lanes, and road markings for the entire scheme. This should be done as early as possible in the construction stage; with a change control process agreed if there is any potential for alteration after handover of these drawings. The Handover Schedule PCF product states this activity must be done at least 3 months prior to the scheme opening date – this is the latest possible date and should be the exception not the target.

B. The Network Referencing Manager's responsibilities are outlined in the ADMM. They will consider the effect of the scheme on existing sections and determine which sections need to be modified, retired, or replaced. They will also identify where section reference markers need to be installed or removed because of the changes.

C. Delivery Partners should reference all new assets using the new network referencing (i.e. section, start/end chainages) when compiling the asset data required at the handover stage. The dependency of this exercise on Network Referencing is why step A) of this process needs to start as early as practicable in the construction stage.

D. The installation of network reference markers and the removal of any redundant markers must be undertaken as part of the scheme to ensure the correct section reference markers are in place before the new or improved road opens.

E. Assets that have been within the scheme boundary but are not impacted by the works will have their network reference updated through the process which updates the Approved Network Model within the prime asset data systems.

Note: Refer to Section 4.5.1, the position of the Network Reference line is illustrated in 'blue' within lane 1 on both carriageways.

PART 2.2 – ASSET CLASS SPECIFIC REQUIREMENTS

NOTE:

- The asset data requirements are entirely set out in Part 3 – Data Dictionary.
- The asset must be located according to Section 5.

8 Drainage

The Drainage Data Management System (HADDMS) maintains the primary data set for drainage asset inventory and condition (excluding routine defects) data.

The drainage data requirements are defined as follows

- The high-level asset data requirements for the drainage asset and for non-asset data (such as flooding and priority registers) are defined in CD 535 and associated England NAA, and in CS 551. Requirements for as-built records, attached documents and data packaging are given on the downloads page of HADDMS.

  - o Documents associated with the assessment of routine runoff on surface water courses carried out in accordance with LA 113 are to be attached as documents to the relevant drainage asset in HADDMS. These include HEWRAT assessments and field log sheets for Tier 2 assessments.

- Template files for asset data SHP file formats can be downloaded from HADDMS.

8.1 Flood Events

The Company has a requirement to record all reported flood events on their network. All reported flood events are recorded in the Flood Events Register on the Drainage Data Management System in accordance with CD 535.

- As soon as a flood is reported, actions must commence to mitigate any impacts.

- The flood must be assessed to determine if it is a reportable flood event in accordance with the flood definition in the England NAA to CD 535.

- The flood event and arising mitigation actions must be logged within the Area's operational management system within 24 hours. This should include as a minimum:

  - o Location of the approximate centre of the flood.

  - o Date and time the flood was initially reported.

  - o Whether the flood affected the carriageway and/or adjacent third-party property.

- The flood event must also be recorded in the Flood Events Register on HADDMS within 7 days of the flood event being notified. The following information is required to "Open" a flood event on HADDMS:

  - o Location of the approximate centre of the flood using Ordnance Survey (OSGB36 datum, using the OSTN15 transformation model, as required in the England NAA to CD 535).

  - o Date and time the flood was initially reported.

  - o Whether the flood affected the carriageway and/or adjacent third-party property.

- The Flood Events Register on HADDMS must be updated within 28 days of the initial notification with full details of a flood event to "Close" the flood event record. The additional data needed to "Close" a flood event is detailed in Part 3 – Data Dictionary and in the Data Formats document on the download page of HADDMS.

All reported flood events are recorded in the Flood Events Register on HADDMS in accordance with CD 535.

- Once a flood notification has been confirmed as a flood event, mitigation actions must be initiated and recorded on Confirm within 24 hours including the location, date/time, and impact of the flood.

- The information required to "Open" a flood event must be transferred from Confirm to HADDMS within 7 days of the flood being notified to satisfy the 7-day CD 535 reporting requirement. This will be carried out via an automatic transfer in due course (see footnote).

- The additional information required to "Close" a flood event must be entered on to HADDMS within 28 days of the initial notification to satisfy the 28-day CD 535 reporting requirement. This will be carried out via an automatic transfer in due course (see footnote).

- If the flood event record requires any further editing after it has been "Closed" this must be carried out on HADDMS, not Confirm.

  Footnote: Until the automated Confirm to HADDMS transfer process is in place, it will be necessary to manually transfer the data into HADDMS.

8.2 Data Maintenance

The drainage asset data held on HADDMS is currently undergoing a consolidation process, which will remove data duplication and help identify gaps. Consolidated data on HADDMS is grouped into drainage highway catchments, each being a group of all the drainage systems and the adjacent land they drain, between two geographical high points of the highway network. Both carriageways of a dual carriageway are considered part of the same catchment, but risks can be assessed separately for each carriageway.

A drainage highway catchment can include one or more drainage systems, each being a group of drainage assets that are directly or indirectly connected to each other, within a single drainage highway catchment. Each highway catchment's data is managed as a drainage "scheme" on HADDMS. The process described in the England NAA to CD 535 must be followed for maintaining the data for each drainage highway catchment all drainage data must be round tripped from and back to HADDMS when any survey is carried out. In any Areas that have yet to be consolidated the round-tripped data must be de-duplicated and re-organised into drainage highway catchments as part of the survey process.

8.3 Drainage Data Acceptance Criteria

Drainage contractors and other data suppliers may be given access to HADDMS for the purposes of checking data prior to submission to Service Providers. They are not permitted to amend the HADDMS database or import their data into the database. Data to be imported into the database must be finally uploaded and checked by the Service Provider.

If any of the checks fail, a report of the problems will be provided. Failures can result in either a "critical error" or a "warning", as indicated below.

The presence of any "critical errors" indicates an illogical or ambiguous drainage model and means that the whole scheme must be rejected. Such errors must be fixed, and the data re-uploaded before the data can be added to the system.

The presence of any "warnings" means that the scheme can be added to the system, provided there are no critical errors. Warnings may indicate incorrect data or can arise due to unusual drainage layouts or incomplete records (e.g. due to a limited scope survey). Any warnings should be reviewed before confirming that the scheme can be added to the system.

The scope of checking is to ensure that a logical and unambiguous drainage model has been defined in the supplied data and that it is provided in the correct format; checking of data quality and completeness is otherwise not checked at import stage by HADDMS and is the responsibility of the data supplier.

If data is uploaded as a new version of an existing scheme, additional checks are carried out to detect potential loss of existing data, for example the removal of any assessed priority assets from a scheme. If significant data loss is detected, users may need to discuss this with the HADDMS Support Team before they can complete the data import.

Additional checks resulting in "warnings" may be added to HADDMS periodically to help promote improvements in data quality.

HADDMS provides a check report of all critical errors and warnings using the reporting codes given and defined in Table 8-1 below.

HADDMS check report code	HADDMS check report code description
A10.7 Basic checks	
The following checks confirm that all files are present, hold appropriate types of data in the correct format, and that all mandatory fields have been completed. Checks A10.7.1 and A10.7.2 relate to the fundamental structure of the data; failure of these will generally prevent the system from carrying out any further checks.	
A10.7.1	Critical check: The shapefiles submitted in the .zip file must be correctly named and contain the appropriate type of geometry (i.e. points, lines or polygons for "point", "continuous" and "region" assets respectively).

HADDMS check report code	HADDMS check report code description
A10.7.2	Critical check: All fields in the data file specification must be present and contain the appropriate type of data (e.g. text, number, date, etc.). To avoid some software defaulting blank number fields to 0, "Integer" and "Number" fields may be formatted as text, provided these only contain a number or are left blank.
A10.7.3	Critical check: All system-assigned fields ("SYS") for new inventory assets must be blank. When re-uploading a catchment that has been downloaded from HADDMS, the values in these fields must be left unchanged. If the values are deleted, then those inventory assets will be treated as new assets and assigned a new CD 535 reference, and the old assets will be removed from HADDMS.
A10.7.4	Critical check: All mandatory fields ("M") must be completed.
A10.7.5	Critical check: The catchment reference ("SUPP_SCH") must be the same for all entries in each of the submitted shapefiles for a catchment. This is to confirm that all inventory assets are part of the same catchment.
A10.7.6	Critical check: All fields identified as requiring a code (e.g. asset type, system type, material, shape, etc) will be checked for valid code entries, as defined in the ADMM.
A10.8 Referencing checks	
The following checks confirm that there is connectivity between the point, continuous and region assets, based on their supplier's asset references.	
A10.8.1	Critical check: As per check A10.7.3, all CD 535 asset reference fields are system assigned, and must be left blank for newly submitted inventory asset.
A10.8.2	Critical check: All supplier's reference fields ("SUPP_REF") will be checked to ensure there are no duplicates within the submitted catchment. (Duplication with assets in other catchments is permitted.)
A10.8.3	Critical check: The supplier's reference of any point asset must not match the supplier's reference of any continuous asset in the same catchment.
A10.8.4	Critical check: All upstream and downstream references of continuous assets ("SUPP_REFUP" and "SUPP_REFDN" respectively) must exist as point references within the same catchment.
A10.8.5	Critical check: All region assets must have a corresponding region node point asset (asset type code = "RN") with the same supplier's reference within the same catchment.
A10.8.6	Warning check: All supplier's reference fields ("SUPP_REF") will be checked to ensure that they are not in a CD 535 format.
A10.9 Connectivity referencing checks	
The following checks relate to checking the referencing used in connectivity attributes and connectivity nodes.	

HADDMS check report code	HADDMS check report code description
A10.9.1	Critical check: If the connectivity attribute ("SUPP_CONN") of a point asset is specified, it must exist as the reference of a continuous asset within the same catchment.
A10.9.2	Warning check: If the connectivity attribute of a point asset is specified, the asset should not be used as the upstream node of any continuous asset.
A10.9.3	Warning check: The connectivity attribute should not be specified for outfalls, soakaways, soakaway boreholes, ghost nodes, region nodes or phantom nodes.
A10.9.4	Critical check: The connectivity attribute must be specified for connectivity nodes (asset type code = "CN").
A10.10 Upstream and downstream asset checks	
The following checks ensure that appropriate point assets have been used as upstream and downstream nodes of continuous assets.	
A10.10.1	Warning check: Point assets that are gullies should not be used as the downstream point asset for a continuous asset. (In some cases, this is required; however, in the majority it is not appropriate, so it is flagged as a warning.)
A10.10.2	Warning check: Outfalls should not be used as the upstream point asset for a continuous asset.
A10.10.3	Warning check: Ghost nodes and phantom nodes should be specified as either the upstream or the downstream node of at least one continuous asset. The only exception is a ghost node at the centroid of an isolated region asset. Connectivity nodes (asset type code = "CN") should be specified as the downstream node of at least one continuous asset. All other point assets may exist in isolation.
A10.10.4	Warning check: Point assets that are only referenced as downstream nodes of continuous assets should be outfalls, soakaways, soakaway boreholes, connectivity nodes, phantom nodes, region nodes or ghost nodes.
A10.10.5	Warning check: The region node at the centroid of a region asset should only be the up- or downstream asset of region connectors (asset type code = "RC"). Conversely, region connectors should have either their upstream or downstream node assigned as a region node.
A10.11 Location checks	
The following checks ensure that spatial geometry is appropriate, and that point assets are located correctly relative to any continuous asset to which they are connected.	
A10.11.1	Critical check: All locations given in the geometry and attribute data must be to OS Grid (as defined in the NAA to CD 535) within the appropriate range of Eastings and Northings.
A10.11.2	Critical check: All point assets must have "EASTING" and "NORTHING" attributes that match the easting and northing defined in the SHP geometry.

HADDMS check report code	HADDMS check report code description
A10.11.3	Critical check: The geometry Eastings and Northings of the ends of the line representing each continuous asset must match the Eastings and Northings of its upstream and downstream point assets.
A10.12 Observation related checks	
The following checks ensure that observations are referenced to a valid asset. If observations are referenced to an inappropriate asset (e.g. a pipework observation is related to a gully), then it will be accepted but not scored.	
A10.12.1	Critical check: All observations must have a "SUPP_REF" that matches a point, continuous or region asset in the same catchment.
A10.12.2	Critical check: If an "ASSET_REF" is provided in the observation data, it must match the "ASSET_REF" or "PIPE_REFER" of the same asset as its "SUPP_REF".
A10.12.3	Critical check: All observations must have an "OBS_CODE" entry.
A10.12.4	Warning check: The "OBS_CODE" of an observation should be associated with an asset of the appropriate type, otherwise it will not be scored.
A10.13 Attached documents checks	
The following checks ensure that any documents which should be attached to the assets or observations are present and referenced in the data.	
A10.13.1	Critical check: Documents in the ZIP file must be of one of the acceptable types, as defined in guidance on the downloads page of HADDMS.
A10.13.2	Warning check: Any document that is named in an "ATT_DOCS" or "PHOTO_REFS" attribute should be present in the root folder of the ZIP file. This warning could indicate a document has been omitted, incorrectly named or referenced, or placed in a sub-folder in the ZIP file.
A10.13.3	Warning check: Any document that is present in the ZIP file should be referenced in at least one "ATT_DOCS" or "PHOTO_REFS" attribute.
A10.13.4	Warning check: Referencing a single document to large numbers of assets or observations is discouraged, so a warning is generated for any document referenced more than once.
A10.14 Other checks	
A10.14.1	Critical check: The Structural Grade ('STRU_GRADE') and Service Grade ('SERV_GRADE') for this asset must be a whole number between 0 and 5 or 9 (field surveyed condition) or between 100 and 105 or 109 (desk assessed condition) or left blank (no assessment).
A10.14.2	Critical check: Text fields must not contain backslashes
A10.14.3	Warning check: An asset has a data origin of other ('ORIGIN_DAT' is "OT") but has no description of the origin in 'OTHER_SOU'.

HADDMS check report code	HADDMS check report code description
A10.14.4	Warning check: An asset has a cover shape of other ('COVER_SHAP' is "OT") but has no description of the cover shape in 'OTHER_SHAP'.
A10.14.5	Warning check: The soakaway, culvert or outfall register for this asset will be unlinked as the assets asset type code has changed or the asset does not exist in this version.
A10.14.6	Warning check: The 'HEIGHT', 'WIDTH' or 'PIPE_DIA' is less than an expected minimum value of 50mm. Have you used the correct units?
A10.14.7	Warning check: The 'HEIGHT', 'WIDTH' or 'PIPE_DIA' is 900mm or greater and this asset is not a culvert.
A10.14.8	Warning check: 'DEPTH', 'UPSTR_DEPT' or 'DOWNSTR_DE' is greater than an expected minimum value of 20m. Have you used the correct units?
A10.14.9	Warning check: 'LENGTH' of a continuous asset is greater than an expected maximum of 300m. Have you used the correct units?
A10.14.10	Warning check: The continuous 'LENGTH' attribute is more than 10% higher than the actual geometric length of the asset
A10.14.11	Warning check: 'PIPE_U_LEN' is less than an expected minimum value of 100mm or greater than an expected maximum value of 10000mm. Have you used the correct units?
A10.14.12	Warning check: 'UPSTR_INVE' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.13	Warning check: 'DOWNSTR_IN' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.14	Warning check: 'UPSTR_BACK' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.15	Warning check: 'DOWNSTR_BA' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.16	Warning check: 'COVER_LEVEL' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.17	Warning check: 'INVERT_LEV' is less than an expected minimum level of -50mAOD or greater than an expected maximum level of 500mAOD.
A10.14.18	Warning check: The 'LENGTH', 'WIDTH', 'COVER_WIDT', 'COVER_LENG', 'CHAM_WIDT' or 'CHAM_LENGT' of the point asset is greater than the expected maximum value of 10m. Have you used the correct units?
A10.14.19	Warning check: An Outfall Register assessed as Z1 classification will be deleted.

Table 8-1 - HADDMS check report code definitions.

8.4 Drainage Condition Defect Scoring Criteria

8.4.1 Inspection Observation Codes

These observations relate to information specific to the inspection, they apply to all asset types and are not scored.

Observation Type	Description/Quantification	HADDMS Code
Not Inspected	Extent of continuous asset not inspected	BLOS
Additional Details	General photograph	GP
	General remark	REM
Inspection Abandoned	Unspecified Reason	SA
	Due to Obstruction	SAOB
	Due to High Water Level	SAWL
	Due to equipment failure	EQ
	Due to other reasons	Z
Water Level	Water level	WL
	Clear	WLC
	Turbid	WLT
Flow from Incoming Asset	Flow from incoming asset	FW
	Clear flow from incoming asset	FWC
	Wrong surface water flow from incoming foul asset	FWCS
	Turbid flow from incoming asset	FWT
	Wrong foul flow from incoming surface water asset	FWTF
	Flow from incoming asset not visible	FWYY
Hazardous Atmosphere	Oxygen deficiency	OD
	Hydrogen sulphide	HS
	Methane	ME
	Other	GZ
Pollutants	Presence of pollutants	PZ
Loss of Vision	Camera under water	CUW
	Silt	CUD
	Steam	CUS
	Other	CUZ
Start of Survey		START
End of Survey		END
Sediment Depth (mm)		SD
Cross-Section	General photograph	CSGP

Table 8-2 – Inspection observation codes.

Note: The Cross-Section observation type is only applicable to the following assets – Combined Kerb and Drainage Channel (DGCK), Combined Pipe and Channel (DGCS), Linear Drainage Channel (DGLI), Swale (DGSC), Surface Water Channel (DGSC), Drainage Channel Block (DGDB), Edge Channel (DGEC), Ditch (DGDI), Grip (DGGP).

8.4.2 Inventory Observation Codes

These observations relate to a detailed aspect of the asset's inventory and are not scored.

Observation Type	Description/Quantification	HADDMS Code
Connections	Junction (having prefabricated connection)	JN
	Junction closed	JNC
	Connection other than junction	CN
	Connection other than junction, closed	CNC
Curvature of Pipe	Deviates left	LL
	Deviates left and up	LLU
	Deviates left and down	LLD
	Deviates right	LR
	Deviates right and up	LRU
	Deviates right and down	LRD
	Deviates up	LU
	Deviates down	LD
Start Node Type	Manhole	MH
	Inspection Chamber	IC
	Rodding Eye	RE
	Lamphole	LH
	Outfall to Watercourses	OF
	Start node type, major connection (branch) without manhole	BR
	Gully	GY
	Catchpit	CP
	Soakaway	SK
	Oil Separator	OS
	Other Node Type	OC
Finish Node Type	Manhole	MHF
	Inspection Chamber	ICF
	Rodding Eye	REF
	Lamphole	LHF
	Outfall to Watercourses	OFF
	Finish node type, major connection (branch) without manhole	BRF
	Gully	GYF
	Catchpit	CPF
	Soakaway	SKF
	Oil Separator	OSF
	Other Node Type	OCF
Cross-Section	Invert level on left side	CSILL
	Invert level on right side	CSILR
	Crest level on left side	CSCLL
	Crest level on right side	CSCLR
	General level (position on cross-section to be defined in notes)	CSGL
Gradient	Maximum (%)	GRMAX
	Minimum (%)	GRMIN

	Average (%)	GRAVE
	Maximum deflection from optional gradient (mm)	GRDEF

Table 8-3 – Inventory observation codes.

Note: The Cross-Section observation type is only applicable to the following assets – Combined Kerb and Drainage Channel (DGCK), Combined Pipe and Channel (DGCS), Linear Drainage Channel (DGLI), Swale (DGSC), Surface Water Channel (DGSC), Drainage Channel Block (DGDB), Edge Channel (DGEC), Ditch (DGDI), Grip (DGGP).

8.4.3 Structural and Service Observation Codes

These observations relate to the structural and service condition of the asset and are scored.

Applicable assets: All

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
No Defects	Asset fully inspected, and no structural defects present	1	SOUND

Table 8-4 – Structural observation code and score (no defects).

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
No Defects	Asset fully inspected, and no service defects present	0.5	CLEAN

Table 8-5 – Service observation code and score (no defects).

Applicable assets: Pipework (DGPW), Gravity Drain (DGGD), Rising Main (DGRM), Combined (sub) Surface FD (DGCF), Land Drain (DGLD), Culvert (DGCU), Syphon (DGSY).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Deformation	Flexible Material: 6-10%	20	D
	Flexible Material: 11-20%	40	
	Flexible Material: 21-33%	80	
	Flexible Material: >33%	165	
	Rigid Material: 1-5%	40	
	Rigid Material: 6-10%	80	
	Rigid Material: >10	165	
Surface Crack	Longitudinal (at joint)	2	HFL(J)
	Circumferential (at joint)	2	HFC(J)
	Multiple/Complex (at joint)	2	HFM(J)
	Spiral/Helical (at joint)	2	HFS(J)
Cracked	Longitudinal (at joint)	10	CL(J)
	Circumferential (at joint)	10	CC(J)

	Multiple/Complex (at joint)	40	CM(J)
	Spiral/Helical (at joint)	40	CS(J)
	Puncture in internal wall (at joint) - Flexible material	40	CPU(J)
Fractured	Longitudinal (at joint)	40	FL(J)
	Circumferential (at joint)	40	FC(J)
	Multiple/Complex (at joint)	80	FM(J)
	Spiral/Helical (at joint)	80	FS(J)
	Split in internal wall (at joint) - Flexible Material	80	FSP(J)
Broken	Broken (at joint)	80	B(J)
Hole	Hole (at joint) - Radial Extent <1/4	80	H(J)
	Hole (at joint) - Radial Extent > 1/4	165	
Collapsed	Collapsed (at joint)	165	X/XP(J)
Surface Damage	Increased roughness due to wear	10	SW
	Surface wear, slight	10	SWS
	Increased roughness due to spalling	10	SS
	Slight spalling	10	SSS
	Visible aggregate	40	SAV
	Medium spalling	40	SSM
	Surface wear, medium	40	SWM
	Aggregate projecting from surface	40	SAP
	Missing aggregate	120	SAM
	Large spalling	120	SSL
	Surface wear, large	120	SWL
	Visible reinforcement	120	SRV
	Reinforcement projecting from surface	165	SRP
	Corroded reinforcement	165	SRC
	Porous due to manufacturing or other defect	40	PP
Connection/Junction	Defective connection	165	CX
	Intruding connection	165	CXI
	Defective junction	165	JX
	Defective connection, position incorrect	165	CXP
	Intruding connection, position incorrect	165	CXPI
	Defective junction, position incorrect	165	JXP
	Defective connection, gap	165	CXG
	Intruding connection, gap	165	CXGI
	Defective connection, partial gap	165	CXH
	Intruding connection, partial gap	165	CXHI
	Defective connection, connecting pipe damaged	165	CXD
	Intruding connection, connecting pipe damaged	165	CXDI
	Defective junction, connecting pipe damaged	165	JXD
Sealing Material	Sealing ring intruding	40	SR
	Visible but not intruding	10	SRN
	Hanging loop above centre	80	SRHA
	Hanging loop below centre	120	SRHB
	Broken	80	SRB
	Other sealant intruding	40	SO
Displaced/Open Joint	Medium	10	OJM
	Large	40	OJL

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Radially Displaced Joint	Medium (1-1.5x wall thickness)	10	JDM
	Large (greater than 1.5x wall thickness)	40	JDL
Angular Displaced Joint	Angular	10	AJ
Lining	Detached lining	165	LXD
	Discoloured lining	1	LXC
	Defective end of lining	120	LXE
	Longitudinal wrinkled lining	40	LXWL
	Circumferential wrinkled lining	40	LXWC
	Spiral wrinkled lining	40	LXWS
	Blistered lining	80	LXB
	Other lining defect	40	LXZ
Defective Repair	Radial extent < 1/4	80	RX
	Radial extent > 1/4	165	
Weld Failure	Longitudinal (flexible material)	40	WXL
	Circumferential (flexible material)	40	WXC
	Spiral/helical (flexible material)	80	WXS
Soil Visible	Soil outside the asset is visible through a defect	165	SV
Void Visible	Void outside the asset is visible through a defect	165	VV
Point Repair	Pipe replaced	20	RPR
	Localised lining	20	RPL
	Injected mortar (pipes) or sealant (chambers)	20	RPI
	Other injected sealing material	20	RPS
	Hole repaired	20	RPH
	Other trenchless method	20	RPZ
Lining	Lining material inserted as remedial measure	20	RCL

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Roots	Fine (at joint)	1	RF(J)
	Tap (at joint)	5	RT(J)
	Mass (at joint) - Range 0%-4%	2	RM(J)
	Mass (at joint) - Range 5%-19%	4	
	Mass (at joint) - Range 20%-49%	6	
	Mass (at joint) - Range 50%-74%	10	
	Mass (at joint) - Range >74%	20	
Attached Deposits	Encrustation (at joint) - Range 0%-4%	1	DEE(J)
	Encrustation (at joint) - Range 5%-19%	2	
	Encrustation (at joint) - Range >19%	5	
	Grease (at joint) - Range 0%-4%	2	DEG(J)
	Grease (at joint) - Range 5%-19%	4	
	Grease (at joint) - Range 20%-49%	10	
	Grease (at joint) - 50%-74%	15	
	Grease (at joint) - Range >74%	20	
	Fouling (at joint)	0	DEF(J)
	Other (at joint) - Range 0%-4%	1	DEZ(J)
	Other (at joint) - Range 5%-19%	2	
	Other (at joint) - Range >19%	5	
	Blocked perforations	10	DEPB

Settled Deposits	Fine (at joint) - Range 0%-4%	1	DES(J)
	Fine (at joint) - Range 5%-19%	2	
	Fine (at joint) - Range 20%-49%	5	
	Fine (at joint) - Range 50%-74%	8	
	Fine (at joint) - Range >74%	10	
	Coarse (at joint) - Range 0%-4%	1	DER(J)
	Coarse (at joint) - Range 5%-19%	2	
	Coarse (at joint) - Range 20%-49%	5	
	Coarse (at joint) - Range 50%-74%	8	
	Coarse (at joint) - Range >74%	10	
	Hard or compacted (at joint) - Range 0%-4%	1	DEC(J)
	Hard or compacted (at joint) - Range 5%-19%	2	
	Hard or compacted (at joint) - Range 20%-49%	5	
	Hard or compacted (at joint) - Range 50%-74%	8	
	Hard or compacted (at joint) - Range >74%	10	
	Other (at joint) - Range 0%-4%	1	DEX(J)
	Other (at joint) - Range 5%-19%	2	
	Other (at joint) - Range 20%-49%	5	
	Other (at joint) - Range 50%-74%	8	
	Other (at joint) - Range >74%	10	
Intruding Lateral	Intrusion Percentage - Range 0%-4%	1	CNI
	Intrusion Percentage - Range 5%-19%	2	
	Intrusion Percentage - Range 20%-49%	5	
	Intrusion Percentage - Range 50%-74%	8	
	Intrusion Percentage - Range >74%	10	
Blocked Connection/Junction	Connection Defective	20	CXB
	Connection Intruding	20	CXBI
	Junction Defective	20	JXB
Ingress of Soil	Sand (at joint) - Range 0%-4%	1	INGS(J)
	Sand (at joint) - Range 5%-19%	2	
	Sand (at joint) - Range 20%-49%	5	
	Sand (at joint) - Range 50%-74%	8	
	Sand (at joint) - Range >74%	10	
	Peat (at joint) - Range 0%-4%	1	INGP(J)
	Peat (at joint) - Range 5%-19%	2	
	Peat (at joint) - Range 20%-49%	5	
	Peat (at joint) - Range 50%-74%	8	
	Peat (at joint) - Range >74%	10	
	Other Fine Material (at joint) - Range 0%-4%	1	INGF(J)
	Other Fine Material (at joint) - Range 5%-19%	2	
	Other Fine Material (at joint) - Range 20%-49%	5	
	Other Fine Material (at joint) - Range 50%-74%	8	
	Other Fine Material (at joint) - Range >74%	10	
	Gravel (at joint) - Range 0%-4%	1	INGG(J)
	Gravel (at joint) - Range 5%-19%	2	
	Gravel (at joint) - Range 20%-49%	5	
	Gravel (at joint) - Range 50%-74%	8	
	Gravel (at joint) - Range >74%	10	
	Other (at joint) - Range 0%-4%	1	INGZ(J)

	Other (at joint) - Range 5%-19%	2	
	Other (at joint) - Range 20%-49%	5	
	Other (at joint) - Range 50%-74%	8	
	Other (at joint) - Range >74%	10	
Other Obstacles	Brick or masonry in invert (at joint)	10	OBB(J)
	Pipe material in invert (at joint)	10	OBM(J)
	Other object in invert (at joint)	10	OBX(J)
	Protruding through wall (at joint)	10	OBI(J)
	Wedged in joint (at joint)	10	OBJ(J)
	Through connection/junction (at joint)	10	OBC(J)
	External pipe/cable (at joint)	20	OBP(J)
	Built into structure (at joint)	20	OBS(J)
	Other (at joint)	10	OBZ(J)
Infiltration	Seeping (at joint)	2	IS(J)
	Dripping (at joint)	5	ID(J)
	Running (at joint)	10	IR(J)
	Gushing (at joint)	20	IG(J)
	Exfiltration (at joint)	5	EX(J)
Vermin	Rat	1	VR
	Other vermin	1	VZ
Standing Water due to Pipe Deviation	Standing water percentage - Range 0%-19%	1	WLS
	Standing water percentage - Range 20%-49%	5	
	Standing water percentage - Range 50%-74%	8	
	Standing water percentage - Range >74%	10	

Table 8-6– Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Ditch (DGDI), Grip (DGGP).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Slope Stability			
	No slope erosion	1	QDAA
	Slight slope erosion - evidence of scour, exposed subsoil	20	QDAB
	Holes in channel side and loose soil	40	QDAC
	Slippage - failure of channel side obstructing channel	80	QDAD
	Slippage - failure channel side blocking channel	165	QDAE
Burrows	No evidence of burrowing	1	QDBA
	Evidence of burrowing, exposed subsoil	20	QDBB
	Established burrowing with flow slightly impeded	40	QDBC
	Burrowing with spoil obstructing flow	80	QDBD
	Severe burrowing causing failure of channel side blocking channel	165	QDBE
Lining	No exposure of lining	1	QDCA
	Lining exposed at top of bank	20	QDCB
	Displaced joints in lining	20	QDCC
	Lining (non-concrete) exposed in slope side	40	QDCD
	Displaced concrete liner	40	QDCE

Defect Type	Description/Quantification	Score	HADDMS Code
	Lining exposed in channel. Lining torn or broken above top water level	80	QDCF
	Concrete liner broken but not blocking channel	80	QDCG
	Lining torn or broken below top water level	165	QDCH
	Concrete liner collapsed and blocking channel	165	QDCI
Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Sedimentation	No sediment or detritus	0.5	QDPA
	Minor accumulation causing no loss of flow	1	QDPB
	Accumulation causing some loss of flow or pooling	3	QDPC
	Heavy causing obstruction of flow	5	QDPD
	Channel full	10	QDPE
Vegetation	Short grass - stands in flow	0.5	QDQA
	Long grass - folds in flow	1	QDQB
	Weed growth - plants established in channel	1	QDQC
	Reeds - established in channel	1	QDQD
	Rushes - invasive growth in channel	2	QDQE
	Shrub or brambles - low growing dense plant greater than 300mm	4	QDQF
	Sapling tree - <100mm girth	5	QDQG
	Mature tree - >100mm girth	10	QDQH
Debris	No debris	0.5	QDRA
	Litter - individual pieces	1	QDRB
	Litter - accumulation	2	QDRC
	Debris - vehicle component	4	QDRD
	Debris - building products	4	QDRE
	Debris - multiple vehicle components	8	QDRF
	Debris requiring mechanical removal (vehicle)	10	QDRG

Table 8-7– Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Closed Kerb & Drainage (DGCK), Combined Pipe & Channel (DGCS), Linear Drainage Channel (DGLI).

Defect Type	Description/Quantification	Score	HADDMS Code
Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General	No structural defects	1	QLAA
	Surface damage, e.g. chipped, weathered or corrosion.	10	QLAB
	Cracked kerb-drain unit	40	QLAC
	Displaced unit	80	QLAD
	Broken kerb-drain unit	165	QLAE
Defective Integral Cover	Cracked	40	QLAF
	Broken	165	QLAG
Defective Removable Cover	Damaged	40	QLAH
	Missing	165	QLAI
Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**

Sedimentation	No sediment or detritus	0.5	QLPA
	Minor accumulation causing no loss of flow	1	QLPB
	Accumulation causing some loss of flow	2	QLPC
	Heavy causing obstruction of flow	5	QLPD
	Channel full	10	QLPE
Debris/ Vegetation	No litter/debris	0.5	QLQA
	Minor accumulation causing no loss of flow	1	QLQB
	Accumulation blocking individual waterway	2	QLQC
	Heavy causing obstruction of multiple waterways	5	QLQD
	Blocking outlets	10	QLQE

Table 8-8 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Surface Water Channel (DGCH), Drainage Channel Block (DGDB), Edge Channel (DGEC).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General	No structural defects	1	QCAA
	Surface cracking or weathering	20	QCAB
	Missing sealant	40	QCAC
	Displaced pre-cast concrete blocks	80	QCAD
	Spalling concrete	80	QCAE
	Fractured or broken	165	QCAF
Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Sedimentation	No sediment or detritus	0.5	QCPA
	Minor accumulation causing no loss of flow	1	QCFB
	Accumulation causing some loss of flow or ponding in invert	2	QCPC
	Heavy causing obstruction of flow	5	QCPD
	Channel full	10	QCPE
Debris	No litter/debris	0.5	QCQA
	Minor accumulation causing no loss of flow	1	QCQB
	Accumulation causing some loss of flow and/or ponding	2	QCQC
	Heavy causing obstruction of flow	5	QCQD
	Blocking channel	10	QCQE

Table 8-9 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Swale (DGSC).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General	No structural defects	1	QVAA
	Shallow rut or depression with no impact on flow	20	QVAB
	Shallow wheel rut or depression slightly impeding flow	40	QVAC

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Defect Type	Description/Quantification	Score	HADDMS Code
	Deep wheel rut or depression severely impeding flow	80	QVAD
	Multiple wheel ruts or displaced soil forming ridges	165	QVAE
Lining and Geogrid	Displaced or exposed geogrid	80	QVAF
	Exposed impermeable lining	165	QVAG
Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Sedimentation	No sediment or detritus	0.5	QVPA
	Minor accumulation causing no loss of flow	1	QVPB
	Accumulation causing some loss of flow or ponding	2	QVPC
	Heavy causing obstruction of flow	5	QVPD
	Filling channel	10	QVPE
Debris	No litter/debris	0.5	QVQA
	Minor accumulation causing no loss of flow	1	QVQB
	Accumulation causing some loss of flow and/or ponding	2	QVQC
	Heavy causing obstruction of flow	5	QVQD
	Filling channel	10	QVQE
Vegetation	Short grass	0.5	QVRA
	Long grass	1	QVRB
	Intrusive	2	QVRC
	Raised grass strip at pavement edge	2	QVRD
	Patches of bare ground	2	QVRE
	Extensive bare ground	5	QVRF
	Completely bare ground	10	QVRG
	Extensive blocking flow	10	QVRH
Contamination	No contamination	0.5	QVSA
	Causing isolated damage	5	QVSB
	Causing extensive damage	10	QVSC

Table 8-10 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Combined (sub) Surface FD (DGCF), Counterfort Drain (DGCD), Filter Drain (DGFD), Soakaway Trench (DGST).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General	No structural defects	1	QFAA
	Individual displacement of stones	20	QFAB
	Individual wheel rut with scattered medium	40	QFAC
	Earthworks encroached on filter drain	80	QFAD
	Surface obscured (no treatment)	80	QFAE
	Multiple wheel ruts with major displacement of medium onto carriageway	80	QFAF
Design, Construction or Maintenance Defects	Inappropriate medium (Type A in carriageway drain)	80	QFAG
	Combined surface & sub-surface drain remote from pavement edge	165	QFAH
Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**

Part 2 - Requirements and Additional Information

General	Clean	0.5	QFPA
	Sediment present on surface	1	QFPB
	Sediment build up at pavement edge	1	QFPC
	Vegetation growth at pavement edge	2	QFPD
	Vegetation established in medium	4	QFPE
	Filter medium surface crusted	5	QFPF
	Standing water at surface	10	QFPG
	Filter medium blocked	10	QFPH

Table 8-11 – Structural and Service observation codes and scores for above applicable assets.

Applicable Assets: Combined (sub) Surface FD (DGCF), Counterfort Drain (DGCD), Filter Drain (DGFD), Fin Drain (DGFN), Narrow Filter Drain (DGND), Soakaway Trench (DGST).

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Ground Penetrating Radar	Interpreted void ratio good	0.5	QFQA
	Interpreted void ratio adequate	2	QFQB
	Interpreted void ratio poor	10	QFQC
	Interpreted void ratio standing water	10	QFQD

Table 8-12 – Service observation codes and scores for above applicable assets.

Applicable assets: Bifurcation or Storm Overflow (DGBI), Catchpit (DGCP), Inspection Chamber (DGIC), Lamphole (DGLH), Manhole (DGMH), Rodding Eye (DGRE), Soakaway Borehole (DGSB), Soakaway Chamber (DGSO), Other Special Chamber (DGOC).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Deformation	Localised (affecting small proportion of asset wall)	80	DS
	General (affecting large proportion of asset wall)	165	DL
Surface Crack	Vertical	5	HFV
	Horizontal	5	HFH
	Inclined	5	HFIN
	Multiple/complex	5	HFM
Cracked	Vertical	20	CV
	Horizontal	20	CH
	Inclined	20	CIN
	Multiple/complex	40	CM
Fractured	Vertical	40	FV
	Horizontal (chambers) (finish survey legacy code)	40	FH
	Inclined	40	FIN
	Multiple/complex	80	FM
Break	Broken	40	B
	Hole	80	H
	Collapsed with complete loss of structural integrity	165	XPV
	Units displaced from original position	20	DB

Defective Brickwork/Masonry	Units missing	80	MB
	Collapsed with complete loss of structural integrity	165	XB
Missing Mortar	Missing mortar	20	MM
Surface Damage	Increased roughness due to wear	10	SW
	Increased roughness due to spalling	20	SS
	Visible aggregate	20	SAV
	Aggregate projecting from surface	20	SAP
	Missing aggregate	40	SAM
	Visible reinforcement	40	SRV
	Reinforcement projecting from surface	80	SRP
	Corroded reinforcement	80	SRC
	Missing wall	165	SH
	Corrosion products on surface	20	SCP
Defective Connection	Intruding	20	CXI
	Position incorrect	20	CXP
	Gap	80	CXG
	Partial gap	80	CXH
	Connecting pipe damaged	80	CXD
Intruding Seal	Visible but not intruding	40	SRN
	Hanging but not broken	80	SRH
	Broken	80	SRB
Defective Joint	Unpointed	10	UJ
	Units displaced vertically	20	OJ
	Units displaced horizontally	80	JD
	Angular displaced units	80	AJ
Repair	Intact replacement of asset material	10	RPR
	Intact localised lining	10	RPL
	Injected of sealant	10	RPI
	Missing part of wall	80	RXM
	Defective patch sealing hole	80	RXP
Defects (other)	Porous due to manufacturing or other defect	40	PP
	Soil outside the asset is visible through a defect	165	SV
	Void outside the asset is visible through a defect	165	VV
Defective Step or Ladder	Broken plastic encapsulation	20	SXP
	Step corroded	80	SXC
	Step bent	80	SXB
	Step loose	165	SXL
	Step missing (where provided)	165	SXM
	Ladder handrail corroded	20	SXH
	Ladder runner corroded	40	SXRC
	Ladder support loose	80	SXSL
	Ladder support missing	80	SXSM
	Ladder support corroded	80	SXSC
	Ladder handrail loose	165	SXHL
	Ladder handrail missing	165	SXHM
	Defective toe hold	40	SXT
	Defective hand hold	80	SXQ
	Rocking cover	20	TXCR

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Defective Cover	Cover below surface level	20	TXCD
	Cover above surface level	20	TXCU
	Unpointed lifting holes	20	TXCP
	Broken cover	80	TXCB
	Seized cover	80	TXCS
	Missing cover	165	TXCM
Defective Frame	Loose frame	40	TXFL
	Broken frame	80	TXFB
	Missing frame	165	TXFM
Benching	Benching defective (e.g. spalling)	40	BEX
Channel	Channel defective	40	CHX
Safety Feature	Safety chain - missing with evidence of attachments	165	SFCM
	Safety chain defective	165	SFCX
	Safety bar - missing with evidence of attachments	165	SFBM
	Safety bar defective	165	SFBX
Slit Pit	Silt pit defective	165	CPX

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Roots	Fine	2	RF
	Tap	5	RT
	Mass	10	RM
Attached Deposits	Encrustation	1	DEE
	Grease	1	DEG
	Fouling	2	DEF
Settled Deposits	Fine - Range 0%-4%	1	DES
	Fine - Range 5%-19%	2	
	Fine - Range 20%-49%	5	
	Fine - Range 50%-74%	8	
	Fine - Range >74%	10	
	Coarse - Range 0%-4%	1	DER
	Coarse - Range 5%-19%	2	
	Coarse - Range 20%-49%	5	
	Coarse - Range 50%-74%	8	
	Coarse - Range >74%	10	
	Hard or compacted - Range 0%-4%	1	DEC
	Hard or compacted - Range 5%-19%	2	
	Hard or compacted - Range 20%-49%	5	
	Hard or compacted - Range 50%-74%	8	
	Hard or compacted - Range >74%	10	
	Other - Range 0%-4%	1	DEX
	Other - Range 5%-19%	2	
	Other - Range 20%-49%	5	
	Other - Range 50%-74%	8	
	Other - Range >74%	10	
Settled Deposits (Catchpit)	Filling Catchpit sump	4	OBDA
	Obstructing flow less than 50% pipe diameter	8	OBDB
	Obstructing flow 50% of pipe diameter or more	10	OBDC
	Soakaway part full of sediment	5	OBDD

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Settled Deposits (soakaways)	Soakaway full of sediment or water	10	OBDE
Intruding Connection	Above flow level	0.5	CNIA
	Into flow or through benching	10	CNIX
Blocked Connection	Connecting pipe blocked	10	CXB
Obstacles and Debris	Brick or masonry in invert	2	OBB
	Pipe material in invert	2	OBM
	Other	2	OBZ
	Protruding through wall	1	OBI
	Wedged in joint	1	OBJ
	Through connection/junction	5	OBC
	External pipe/cable	5	OBP
	Built into structure	5	OBS
Infiltration	Seeping	1	IS
	Dripping	2	ID
	Running	5	IR
	Gushing	5	IG
Sealed Pipe Through Chamber	Access cover missing	20	SPM
Contamination	Oil or other contaminant present	10	OIL

Table 8-13 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Gully (DGGU).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Grating and Frame	Intact	1	QGAA
	Rocking	20	QGAB
	Missing frame bedding	20	QGAC
	Cracked	40	QGAD
	Void forming adjacent to frame	80	QGAE
	Failure of surrounding pavement	80	QGAF
	Missing bar	80	QGAG
	Broken or collapsed	165	QGAH
	Missing grating	165	QGAI
	Missing frame and grating	165	QGAJ
	Grating bars parallel to road	165	QGAK
Adjustment Course	Intact	1	QGBA
	Missing mortar	20	QGBB
	Broken or fractured brick	40	QGBC
	Missing brick	80	QGBD
	Broken section	80	QGBE
	Unsuitable material (slate, timber etc)	80	QGBF
Pot	Intact	1	QGCA
	Missing stopper	20	QGCB
	Cracked	20	QGCC
	Fractured	40	QGCD

	Broken	80	QGCE
	Leaking	80	QGCF
	Collapsed	165	QGCG
Position	In channel	1	QGDA
	Above surface level	10	QGDB
	> 25mm below surface level	40	QGDC
	75-125mm in front of kerb line or channel edge	80	QGDD
	> 125mm in front of kerb line or channel edge	165	QGDE

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Grating & Frame	Clear	0.5	QGPA
	Partially obstructed by leaves or litter	2	QGPB
	Completely obstructed by leaves or litter	5	QGPC
	Blocked by sediment	10	QGPD
Sediment	No sediment	0.5	QGQA
	Some within sump	1	QGQB
	Filling sump but outlet not obstructed	2	QGQC
	Obstructing outlet but no water	5	QGQD
	To grating level and pot full	10	QGQE
Contamination	Thick layer of oil	5	QGRA

Table 8-14 – Structural and Service observation codes and scores for above applicable asets.

Applicable assets: Grip Inlet (DGGI), Inlet (DGIT), Outfall (DGOU), Outlet (DGOL)

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General	No structural defects	1	QIAA
	Settlement of piped outlet	20	QIAB
	Fractured pipe	40	QIAC
	Displaced pipe (differential settlement)	80	QIAD
	Collapsed pipe	165	QIAE
Formal	Cracked mortar joints	20	QIBA
	Loose concrete	20	QIBB
	Insecure bagwork or gabions	40	QIBC
	Cracked brickwork	40	QIBD
	Missing bricks	40	QIBE
	Spalling concrete	40	QIBF
	Exposed reinforcement	40	QIBG
	Displaced bagwork or gabions	80	QIBH
	Fractured concrete or brickwork	80	QIBI
	Differential settlement	80	QIBJ
	Collapsed	165	QIBK
Banks	Erosion	40	QICA
	Collapsing around pipe	80	QICB
	Failure	165	QICC
Screen	Inclined to outlet	1	QIDA

Defect Type	Description/Quantification	Score	HADDMS Code
	Inclined to inlet	10	QIDB
	Loose fixing	20	QIDC
	Free standing	20	QIDD
	Deformed bars	40	QIDE
	Vertical screen to outlet	40	QIDF
	Buckled or broken	80	QIDG
	Vertical to inlet (unsafe)	165	QIDH
Safety Features	No safety-related defects	1	QIEA
	Safety feature remote from structure	10	QIEB
	Loose rails	80	QIEC
	Loose or insecure guardrail posts	80	QIED
	Missing guardrail	165	QIEE
	Missing fence	165	QIEF
	Missing harness eye	165	QIEG
	Missing access path	165	QIEH

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Sediment	No sediment, and invert is above channel bed	0.5	QIPA
	Up to pipe invert	1	QIPB
	<25% pipe diameter	2	QIPC
	25%-75% pipe diameter	5	QIPD
	>75% pipe diameter	10	QIPE
Debris	No debris	0.5	QIQA
	Light not obstructing flow	1	QIQB
	Causing standing water	2	QIQC
	Obstructing flow or partially blocked screen	5	QIQD
	Flow blocked or surcharging	10	QIQE

Table 8-15 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Flow Control Device (DGFC), Interceptor (DGIN), Oil Separator (DGOS), Pumping Station (DGPS).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General Structure	No defect within general structure	1	QAAA
	Surface cracking or rust	10	QAAB
	Structural crack	40	QAAC
	Fractured	80	QAAD
	Poor condition but functioning	80	QAAE
	Broken	165	QAAF
	Unsafe	165	QAAG
Component Specific	Damaged baffle	40	QABA
	Loose or unseated flap valve	80	QABB
	Missing vent pipe from oil separator	80	QABC
	Missing weir sections	80	QABD

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	Seized flap valve	165	QABE
	Missing handrail where required for safety	165	QABF

Service Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
General Service Condition	Unobstructed	0.5	QAPA
	Minor accumulation of litter, sediment or vegetation	1	QAPB
	Flow slightly impeded	2	QAPC
	Flow severely impeded	5	QAPD
	Blocked causing surcharge	10	QAPE
Contamination	Asset poses a pollution risk	10	QAQA
	Oil separator full	10	QAQB

Table 8-16 – Structural and Service observation codes and scores for above applicable assets.

Applicable assets: Detention Pond (DGDP), Infiltration Basin (DGIB), Pollution Containment Pond (DGPC), Reed Bed (DGRB), Retention Pond (DGRP), Sediment Pond (DGSP), Wetlands (DGWL), Pond (DGPU).

Structural Condition			
Defect Type	**Description/Quantification**	**Score**	**HADDMS Code**
Stability	No slope defects	1	QPAA
	Slope disturbance	20	QPAB
	Slope movement	40	QPAC
	Slope slippage	80	QPAD
	Slope failure	165	QPAE
Burrows	No burrowing	1	QPBA
	Minor burrows on non-water-retaining slope	40	QPBB
	Large burrows on non-water-retaining slope	80	QPBC
	Burrows on water-retaining slope	165	QPBD
Linear	Liner visible in bank	40	QPCA
	Liner exposed and displaced in bank	80	QPCB
	Liner torn or split	165	QPCC
Access	Vehicular access unobstructed	1	QPDA
	Vehicular access difficult	20	QPDB
	Vehicular access track obstructed	40	QPDC
	No constructed vehicular access	80	QPDD
	No vehicular access	165	QPDE
Safety	Intact and secure fence	1	QPEA
	Insecure security fence	80	QPEB
	No security fence	165	QPEC
	Missing safety equipment (e.g. lifebelt) where required	165	QPED
	Pond has vertical sides with no means of escape	165	QPEE
Ovality	Flexible material - Range 6%-10%	20	OVLP
	Flexible Material - Range 11%-20%	40	
	Flexible Material - Range 21%-33%	80	
	Flexible Material - Range >33%-33%	165	
	Rigid Material - Range 1%-5%	40	
	Rigid Material - Range 6%-10%	80	

Defect Type	Description/Quantification	Score	HADDMS Code
	Rigid Material - Range >10%-10%	165	
Service Condition			
Sediment	No sediment	0.5	QPPA
	Visible sediment not impeding flow	1	QPPB
	Sediment levels less than 25% inlet/outlet diameter	2	QPPC
	Pools formed due to sediment	5	QPPD
	Sediment levels greater than 25% inlet/outlet diameter	5	QPPE
	Sediment blocking inlet/outlet	10	QPPF
Vegetation	No invasive vegetation	0.5	QPQA
	Invasive vegetation on banks	1	QPQB
	Invasive vegetation in pond	2	QPQC
	Invasive shrubs in pond	5	QPQD
	Tree(s) in pond that may affect liner	10	QPQE
Debris	No litter or debris	0.5	QPRA
	Litter accumulation	2	QPRB
	Building products	4	QPRC
	Other large items not requiring mechanical removal (e.g. due to fly-tipping)	8	QPRD
	Items requiring mechanical removal (due to size or location)	10	QPRE

Table 8-17 – Structural and Service observation codes and scores for above applicable assets.

9 Environmental

9.1 Environmental Data Types

The environmental data specification is designed to facilitate the collection, transfer, storage and sharing of consistent environmental asset data across the Company and its service providers. This in turn enables visualisation and analysis of spatial data via the EnvIS application within HAGIS, the interactive mapping system for the Company.

The Company has a licence commitment to: *'Maintain high quality and readily accessible information about the assets held, operated and managed by the Licence holder' (Asset Management 5.9, Highways England: Licence)*

With a requirement to then: *'Consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance' (Environment 5.23, Highways England: Licence)*

This confirms the need for the Company to collect data of a consistent quality to understand what and where our environmental assets are, to understand the condition of those assets and whether they are performing as they were designed to, and to identify opportunities to produce better environmental outcomes across the Strategic Road Network.

Environmental data is categorised as **Environmental** which provides key detail on the composition of the soft estate, what condition those assets are in and how they should be managed. Environmental inventory data describes each environmental asset in terms of what it is, where it is and what it does.

9.2 Environmental Inventory Data

The environmental inventory contains data collected by Major Projects, and Asset Delivery:

- Detail of an assets sub-class relating to the environmental topics of:
    - Landscape
    - Biodiversity
    - Cultural Heritage
    - Noise
- Detail of the asset's precise geographic location.
- Detail of the assets intended objective, recorded as:
    - National Highways objective(s), and
    - Environmental objective(s)

9.2.1 Environmental Inventory Tables

Submissions of environmental inventory asset data should be broken down by point/line/polygon feature into GIS tables. Table 9-1 specifies the required GIS table name for the corresponding environmental asset.

GIS Table Names	Applicable Asset Names
ENVIS_LAND_GRASS_POLY	Amenity Grassland
	Grass Reinforced Walls
	Grassland with Bulbs
	Heath and Moorland
	Open Grassland
	Rock and Scree
	Species Rich Grassland
	Splay/Swathe
ENVIS_LAND_VEGETATION_POINT	Individual Trees
ENVIS_LAND_VEGETATION_POLY	Linear Woodland Belt
	Scrub
	Shrubs
	Woodland
	Climbers or Trailers
	Groundcover
	Injurious Weeds
	Invasive Weeds
ENVIS_LAND_HEDGES_LINE	Hedgerows
ENVIS_LAND_WATER_POLY	Marsh and Wet Grassland
	Ecological/Wildlife Pond
ENVIS_NCE_HABITAT_LINE	Habitat Boundaries
ENVIS_NCE_HABITAT_POLY	Habitat Areas
ENVIS_NCE_SPECIES_POLY	Species Areas
ENVIS_NCE_WILDLIFE_STRUCTURES_LINE	Wildlife Underpass
ENVIS_NCE_WILDLIFE_STRUCTURE_POINT	Wildlife Housing
ENVIS_CULT_HERIT_POLY	Conservation Area
	Historic Battlefields
	Historic Wreck
	Listed Building
	Non-Designated
	Parks or Gardens of Specific Historic Interest
	Scheduled Ancient Monument
	World Heritage Site
ENVIS_STUDY_SURVEY	Formal Surveys
	Incidental Observations (Fauna)
	Incidental Observations (Flora)

Table 9-1 - Translation of Environmental assets in Part 3 – Data Dictionary to their corresponding GIS layer name.

9.2.2 Asset Objectives

To effectively design and manage the strategic road network towards achieving the desired environmental outcomes, there is a need to state the purpose of

various assets, i.e. why they are there and what they are intended to achieve. An asset's intended objective can be recorded as either a National Highways objective(s) and/or an environmental objective(s).

`National Highways Objectives`: The descriptive text used for these objectives enables the attachment of National Highways objectives to assets, where appropriate, within and surrounding the strategic road network. These demonstrate how an asset may assist in supporting and achieving National Highways environmental strategic aims. It is possible that an asset may contribute to several objectives e.g. the implementation of a combined hedgerow and wall, could assist in demonstrating both noise and landscape objectives. In such cases, all relevant objectives appropriate to an asset must be submitted.

`Environmental Objectives`: The descriptive text used for these objectives enables the attachment of environmental objectives, where appropriate, to the various assets of the strategic road network that will adequately describe the expected characteristics and performance of that asset. In this way environmental objectives assist in ensuring assets are managed effectively to fulfil these objectives in the medium and long term. Most **existing** assets will have multiple objectives e.g. a noise barrier may be designed to achieve both visual screening and noise attenuation. In these cases, all relevant environmental objectives must be submitted to prioritise the design and / or maintenance requirement of that asset.

9.3 Submission of Data

Environmental data will be collected and amended over time in a cycle of continual improvement as an integral part of the Company's licence obligation to maintain high quality and readily accessible information about the assets we hold, operate and manage. This will enable us to consider the cumulative impact of those activities across the strategic road network to identify holistic approaches to mitigate such impacts and improve environmental performance.

Achieving this continual improvement requires adherence to regular and specific data submission milestones, ensuring those data submissions are of the required standard specified in Part 3 - Data Dictionary, and submitted in the correct format to the right location. Any new or changed environmental inventory should be submitted to the central database at the end of each quarter.

For Major Projects the Project Control Framework (PCF) identifies two key milestones when major schemes should submit new environmental data to reflect the work that is/has been undertaken.

- **Stage 3 Outline Environmental Management Plan (OEMP):** Species survey data is produced during PCF Stages 2/3 and is a valuable record of species, habitats and cultural heritage assets found on the soft estate. However, there is no guarantee that it will be passed onto subsequent contractors and eventually reach EnvIS when the scheme is complete. Submission of

environmental data at PCF Stage 3 will ensure it is retained for the benefit of the business instead of being lost in the handover from design to construction and eventual handover.

- This is reinforced in the revised Environmental Management Plan PCF product (See section 5 of the EMP structure document under Forms and Guidance). To be clear, we only expect species data and cultural heritage data if survey work has identified previously unknown assets.

- **Stage 6/7 Handover Environmental Management Plan (HEMP):** Final As-built environmental inventory should be submitted by the end of PCF Stages 6/7. The HEMP will not be signed off by the Environment Group regional environmental advisor without confirmation that environmental data has been submitted and fully validated.

Prior to the preparation and submission of as-built data at Stage 6/7 the major scheme must request an extract of the existing environmental data by supplying a shapefile polygon of the scheme extents to the EnvIS Support Mailbox in section 2.1.6. This extract should then be used to identify any assets that have been removed or amended by the scheme to inform the central database accordingly.

9.3.1 Data Identifiers

All environmental record types include two key National Highways assigned identifiers:

- **10-digit unique identifiers** (**HAID**, **DOCID/CONTID/ATTACH_ID**, **HACOMID**) - these are 10-character text fields containing only numeric values to identify any single asset/document record submitted and accepted following validation. The identifier (HAID) assigned to an inventory record means that it can occur only once on the network. All subsequently supplied records will reference this unique identifier. DOCID/CONTID/ATTACH_ID is the unique identifier attached to document records and HACOMID is the unique identifier attached to commitment records.

- **Agent ID** – A unique ID assigned to each Area / Service Provider / Scheme supplying environmental data. The purpose is to link this identifier with the organisation supplied asset Unique ID to make a reasonably secure key by which to identify environmental inventory items. Each major scheme will be assigned a new Agent ID available on request from the EnvIS Support mailbox in section 2.1.6.

9.3.2 Data Validation

To ensure the quality of environment data is maintained in accordance with the ADMM specification each individual layer goes through an automated validated process before finally being loaded onto the central database.

If a layer passes validation, then that data will be loaded onto EnvIS and a HAID will be created for each record. This is a unique identifier that is detailed in a HAID report and forwarded on to the data supplier for them to add those HAIDs against the corresponding records in their local database.

If a layer does not pass validation, then an Error report will be created detailing exactly which records have failed and why. The Error report will be forwarded on to the data supplier who should correct the errors before resubmitting for re-validation.

Once all layers from a major scheme submission have passed validation then a copy of that data will be passed to the operational area for them to load onto their system and manage accordingly.

Validation errors can be categorised as **critical**, **spatial** and **inventory** errors.

Critical Errors - the validation tool will cease validating any individual layer upon discovery of a critical error. Therefore, further spatial and/or inventory validation errors may exist within that layer but will only be highlighted once the critical errors have been addressed and the layer resubmitted.

Critical errors can be avoided by obtaining a set of shapefile templates from the EnvIS Support mailbox in section 2.1.6. This will avoid the following errors:

- Incorrect shapefile names – shapefiles that are incorrectly named will not be "seen" by the validation tool and won't be processed.
- Invalid field names – all field names must correspond exactly with those specified within Part 3 - Data Dictionary.
- Additional fields – the number of fields must correspond with the exact number specified within the Part 3 - Data Dictionary. Additional unspecified fields will cause the layer to fail validation.

Spatial Errors - assuming there are no critical errors, the validation tool will scan each layer for the following spatial errors:

- Landscape polygons combined must provide continuous mosaic coverage of the entire soft estate.
- Polygons within an individual layer must not overlap each other.
- All polygon features must be closed, with coincident start and end vertices.
- Any self-intersections must be removed from polygon features.

Inventory Errors - assuming there are no critical errors, the validation tool will scan each layer for the inventory errors. These errors result from the submission of a look-up value that is not permitted against a particular attribute.

9.3.3 Submission Process

Environmental data can be submitted in numerous ways:

- National Highways Supply Chain Portal:
    - Major Projects consultants and external service providers can submit Environmental data to the supply chain portal. Access to the SCP can be obtained by requesting an application form from and returning it to the Digital Communications inbox.
- OneDrive:
    - Asset Delivery areas can submit Environmental data by uploading it to their OneDrive.

- Compact Disc / Hard Drive
  - EnvIS Management Team

    National Highways

    Lateral

    8 City Walk

    Leeds

    LS11 9AT

All submissions should be saved in a zip file (encrypted with a password if submitting via compact disc / hard drive). An email giving notification that a submission has been made should then be sent the EnvIS Support mailbox in section 2.1.6 detailing the Agent ID and a list of which layers have been submitted.

10 Geotechnical

A geotechnical asset is defined as the man-made or natural earthworks below the road pavement layers and the adjacent land beside the road.

CS 641 provides the overarching approach to the management of geotechnical assets, it details:

- The role of organisations and people in the management of geotechnical assets.

- Planning and risk management of activities undertaken on geotechnical assets throughout their life cycle (inspection, monitoring and interventions).

- The information requirements for the management of geotechnical assets.

It does not cover the data management of geotechnical asset information.

The data requirements for the geotechnical asset are to be used in association with the requirements in CS 641.

The asset information system for geotechnical assets for the Company maintains the prime data set for geotechnical asset inventory, construction, and condition data. The asset information system is defined in Section 2.1.42.1.4 of this document.

The requirements for transfer of data relating to geotechnical assets are described in the following locations:

- CS 641 describes asset Principal Inspections, and the method of transfer of such data is described in the user documentation for the asset information system.

- The process for the handover of geotechnical as-built data is described in detail in the Handover of Geotechnical As-Built Data Guidance Document, available for download from the asset information system, or by contacting the support email address shown in Section 2.1.4 of this document.

- The data and file format requirements for the transfer of geotechnical asset data are formally laid out alongside the attributes for Geotechnical assets in Part 3 – Data Dictionary.

Advice or support on all aspects of data transfer for geotechnical assets is available from the support email address shown in Section 2.1.4 of this document.

11 Lighting

The Company requires accurate lighting inventory data to ensure they have the correct energy consumption data for billing purposes. Energy procurement and asset management support is an integral part of this function.

Electricity trading for unmetered road lighting is governed by the Balancing and Settlement Code (BSC Procedure) for Unmetered Supplies Registered in SMRS (BSCP520). It is a requirement to comply with BSCP520. BSCP520 uses the Operational Information Document "A Guide to Unmetered Supplies under the BSC" to define the standard file format for lighting inventories that is the minimum needed to achieve billing settlement.

The following requirements shall also be met:

- Inventories should reflect changes to the asset as soon as practical. National Highways, through the EPS project, provides monthly updates to the DNOs. A complete inventory, including all normal changes occurring in the previous month, should be submitted on the 1st day of every month.

- Inventory submission details, including file identifier and inventory specification format are provided in this document.

- At the earliest opportunity any major planned changes to the network should be notified to the EPS System Administrator e.g. the opening of a new road or de-trunking of an existing road. Advanced information should be provided so that DNO's may be informed at the earliest opportunity.

- Where a Photo Electric Control Unit (PECU) Array is used to record the switching times of the lighting, the photocells in these arrays must be representative of those on the road, i.e. similar age, type, switching levels / mode etc. As such any significant change in switching regime, e.g. a major change in photocell manufacturer/type will require similar changes to the population of photocells employed in the PECU array. To initiate this change, the EPS System Administrator should be informed in advance of any major changes.

- Electricity supply invoices for equipment not covered by the unmetered supplies Balancing and Settlement Code Process should continue to be paid in the usual way. The billed items should be entered on the lighting inventory as "metered" to ensure they are filtered out of the asset database by the EPS Administrator and therefore not submitted to the DNO to prevent double billing.

- All data shall be stored electronically in a format that can be read, copied, and recorded.

- Storage conditions and handling processes shall be designed and implemented to protect data from unauthorised access, loss or destruction, and from theft and disaster.

- Data systems shall be designed so that data remains accessible, authentic, reliable and useable through any kind of system change, for the entire period of their retention. This may include migration to different software, re-

presentation in emulation formats or any other future ways of re-presenting data. Where such changes occur, evidence should be kept, along with details of any variation in design and format.

11.1 Data Transfer Requirements for Standard Lighting Billing Inventory

The first fifteen fields align with the Operational Information Document (OID) standard file format for unmetered energy trading. These fields describe the data to be reported monthly to comply with the energy trading requirements. It also serves as the minimum dataset needed to derive the condition indicators that quantify the condition of the lighting asset under the GN 22 (ILP) "Asset-Management Toolkit: Minor Structures (ATOMS). This information plays an increasingly important role in requesting funding to maintain the lighting asset outside of the scope of lump sum maintenance and in predicting future budget needs for the asset.

Transfer of billing inventory data

To enable the EPS System Administrator to handle the data from different areas efficiently, the inventory should be issued to the EPS System Administrator under the cover of a unique file which must be formed as detailed below.

File naming convention: AADDMMYY.csv

Where: AA are two digits forming the Area Number (e.g. 01 for Area 1, 02 for Area 2)

DD are two digits forming the day (e.g. 01 – first, 02 – second)

MM are two digits forming the month (e.g. 01 – January)

YY are the last two digits forming the year (e.g. 16 for 2016)

The fifteen fields that are required to be sent to the EPS System Administrator are listed in the order that they must be formed. This file format is subject to amendment by Elexon. If the OID is revised, any changes to the standard file format will take precedence over the following requirements:

- Agent Record Number
- Parish
- Road Name
- Feature Location
- Item Class Code
- Lamp Equivalent Number
- CMS Unit Reference Number
- Charge Code
- Number of Lamps
- Switch Regime

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- Number of PECUs
- Control Charge Code
- Grid Reference East
- Grid Reference North
- Exit Point

11.2 Data Transfer Requirements for Variable Lighting Billing Inventory

Data for lighting assets affected by variable lighting for carbon reduction purposes are to be submitted 1st day of every month in a format agreed with the EPS System Administrator.
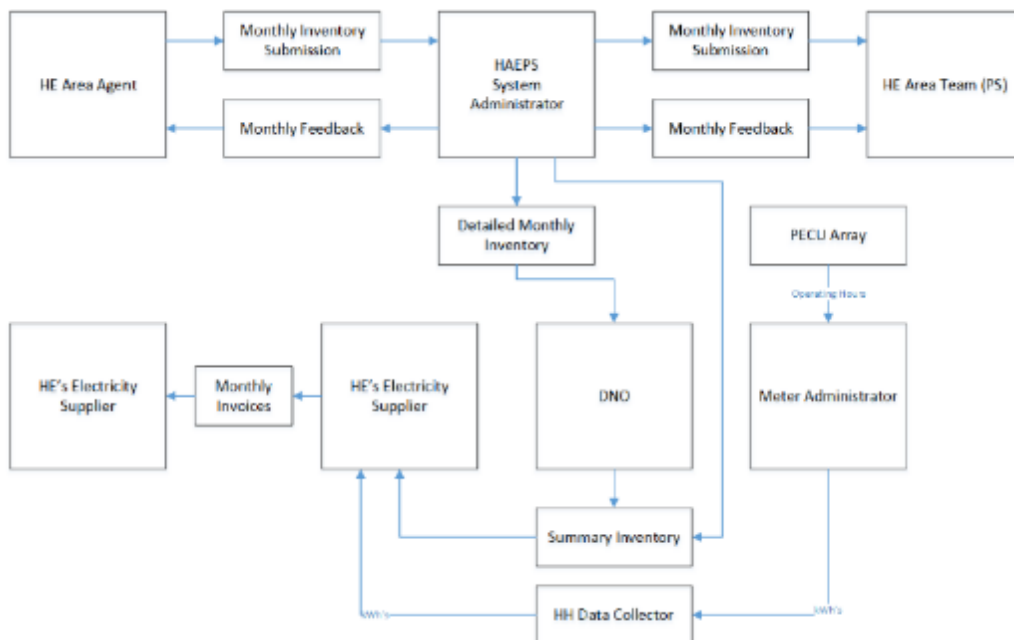

Figure 11-1 - Interaction of Main Parties.

12 Pavements

The asset data requirements for the assessment of maintenance at a network level are set out in CS 229. The procedures for using this data are detailed in CS 230.

12.1 Pavement Condition Surveys

This section describes the strategy for Pavement Condition Surveys, which is supported by the facilities provided in the Company's Pavement Data Management System.

For clarity, a differentiation is made between surveys and inspections.

Surveys

Defined as the collection of data either by machine or visually. Machine surveys are the collection by machine of measurements. Visual surveys are a mixture of assessments and measurements, with data capture possibly by hand-held computer.

Inspections

Defined as viewing of the relevant length of road, either on foot or from a slow-moving vehicle, to apply and to record judgements but not to collect data.

12.1.1   Pavement Condition Survey Strategy

Network Visual Surveys and Pavement Visual Surveys should be carried out in accordance with the provisions of the HAPMS Visual Survey Manual available through National Highways Extranet http://hawacphap013/hapms/.

Procedures and methods for carrying out Visual Condition Surveys (VCS) for concrete surfaced pavements (including CRCP) are fully described in the CS 229 and CS 230.

There are two levels of pavement condition survey:

- Network level
- Scheme level

All network level pavement issues (for example, network level reporting, budget planning, targeting of priority lengths for treatment) will be based on the data collected by the Network level surveys.

Any additional data required to define/design individual maintenance scheme will be collected by the scheme level surveys. The actual scheme level condition surveys required to be undertaken for each individual scheme will vary from scheme to scheme.

Lengths of road that will be candidates for treatment will be defined by the relevant maintenance engineer and will include those lengths identified by the Network surveys and any other lengths that the maintenance engineer wishes to consider for other reasons.

After the Network level surveys, and prior to the confirmation that any length of road is considered a candidate for treatment and subject to scheme level surveys, an

inspection must be carried out by an engineer (or experienced Inspector). This inspection must formally confirm that the length identified from the Network surveys, or by other means, is a proper candidate for treatment and give the engineer or Inspector's considered views of other elements of the proposed work, which are currently considered as part of the Value Management exercise.

12.1.2   Network Level Surveys

The network level machine surveys are:

- TRACS
- Skid Resistance survey
- TRASS (TSD)

Surveys are undertaken in accordance with CS 228 and CS 229.

12.1.3   Scheme Level Surveys

See relevant contract requirements boxes for more information on specific local surveys.

Surveys are undertaken in accordance with CS 228 and CS 229.

12.2 Emergency Areas

Emergency Areas (EAs) are recorded as part of the Pavements asset data requirement. EAs have been defined as a pre-defined lookup (Table 12-1) value pertaining to XSP Function; an attribute assigned to XSP Detail Data.

Value	Description
Acceleration Lane	-L9 to -L1, +L1 to +L9, +R9 to +R1, -R1 to -R9
Bus Lane	-L9 to -L1, +L1 to +L9, CL1 to CL9, CR9 to CR1, +R9 to +R1, -R1 to -R9
Deceleration Lane	-L9 to -L1, +L1 to +L9, +R9 to +R1, -R1 to -R9
Dynamic Hard Shoulder	-L1
Edge Strip	LH, RH
Emergency Area	**LH**
Hard Shoulder	LH, RH
Lay-by	-L9 to -L1, +L1 to +L9, +R9 to +R1, -R1 to -R9

Not Specified	LH, RH
Other	LA, L9 to L1, -L9 to -L1, +L1 to +L9, +R9 to +R1, -R1 to -R9, R1 to R9, RA
Permanent Lane	CL1 to CL9, CR9 to CR1

Table 12-1– Pre-defined lookup vales for PV_XSPDET_FUNCTION.

When new EAs are installed or existing EAs are changed an obligation now exists to ensure that the associated location data is updated accordingly.

An aspiration exists for this initial data requirement to be refined with further detail in the future.

13   Road Restraint

The road restraint assets concern Safety Barriers and related items installed on the highways network. Note:

- Temporary Barrier Assets – the inventory requirements do not include the recording of any temporary barrier products used for traffic management, or safety purposes.

- Road Restraint Assets & Structures Assets – the inventory requirements do not include the recording of bridge parapets (these products are recorded as components of the structure, within the structures asset class). However, where safety barriers are installed on the bridge deck (for example in front of a non-compliant bridge parapet), these are to be included in the road restraint inventory.

14 Structures

The DMRB provides the overarching approach for the management of existing highway structures, including their inspection, maintenance, repair, and assessment.

More specifically, the overarching principles and requirements for the provision and maintenance of records and inspections for trunk road structures are set out in the following key documents:

- CG 302 'As Built, operational and maintenance records for highway structures',
- CS 450 'Inspection of highway structures', and
- CS 452 'Inspection and records for road tunnels'.

Although this list is not exhaustive, these and other similar documents do now cover the Company's data requirements for structures.

14.1 Structures Information Tables

The following tables describe reference information essential to the Structures asset data requirement in Part 3 – Data Dictionary. The information below describes the intrinsic relationship between values in the tables. These are referenced in the following tables in Part 3 – Data Dictionary:

- Assessment Location
- Activity Sub-Type
- Defect Severity
- Defect Type

Assessment Location	
Activity Location Description	**Activity Location Type**
All Traffic Lanes	Carriageway
Lane 1	Carriageway
Lane 2	Carriageway
Lane 3	Carriageway
Lane 4	Carriageway
Lane 5	Carriageway
Lane 6	Carriageway
Hard Shoulder	Carriageway
Verge Cantilever	Non-Carriageway

| Verge Main Deck | Non-Carriageway |
| Central Reserve | Non-Carriageway |

Table 14-1 – Additional information for Assessment Location.

Activity Sub-Type	
Activity Sub-Type Description	**Activity Type**
Confirmation	Appraisal
Departure Appraisal Actions	Appraisal
Half-joint agree interim measure	Appraisal
Half-joint Interim Appraisal	Appraisal
Hinge Deck agree interim measure	Appraisal
Hinge Deck Interim Appraisal	Appraisal
Pending	Appraisal
Review Need for Assessment	Appraisal
Road/Rail BA37/92 Summary	Appraisal
Road/Rail Confirm need for mitigation sheet	Appraisal
Road/Rail Decision to Proceed with Assessment	Appraisal
Road/Rail Optional Risk Ranking, and Decision	Appraisal
Road/Rail Questionnaire for a corner	Appraisal
Road/Rail Risk Ranking Questionnaire	Appraisal
Area Scheme Related	Asbestos Appraisal
Major Projects	Asbestos Appraisal
Part of Initial MA/MAC Area Annual Target	Asbestos Appraisal
Review of AAP	Asbestos Appraisal
Third Party	Asbestos Appraisal
1st Assessment	Assessment
2nd Assessment	Assessment
Assessment Data Verification	Assessment

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Parapet Assessment	Assessment
Pier Assessment	Assessment
Primary Load Assessment	Assessment
Data	Data Capture
Designer Input Completed	Data Capture
Detrunking Scheme	Detrunking Scheme
End of Defects Liability Period	Inspection
General	Inspection
M & E General	Inspection
M & E Principal	Inspection
Monitoring	Inspection
Pre-Opening Inspection	Inspection
Principal	Inspection
Special	Inspection
Opt Out	Opt Out
Add Kilometerage	Post-New Structure
Check As built Data for a New Structure	Post-New Structure
Check As built Data for an Existing Structure	Post-New Structure
Confirm End of Construction Contract	Post-New Structure
Confirm Structure is Commissioned	Post-New Structure
Programme Completed	Programme Completed
Sign Off by HA	Sign Off by HA
N/A	Work

Table 14-2 – Additional information for Activity Sub-Type.

Defect Severity			
Defect Severity Description	**Keycode**	**Defect Severity Type**	**Value**
Defect in tolerable condition	A1	Appearance related defects	1

Defect in low tolerability condition	A2	Appearance related defects	1.1
Defect in unacceptable condition	A3	Appearance related defects	2
Defect in offensive condition	A4	Appearance related defects	3
Defect is definitely not causing damage to element or structure	D1	Damage causing defects	1
Minor: Defect is unlikely to be causing damage to the element or structure now or unlikely to do so in the near future	D2	Damage causing defects	2
Moderate: Defect is probably causing damage to element or structure, or is likely to do so in the near future	D3	Damage causing defects	3
Moderate: Defect may present a danger to the public in the near future	D3S	Damage causing defects	3.1
Severe: Defect is clearly causing damage to element or structure	D4	Damage causing defects	4
Severe: Defect is presenting a danger to the public	D4S	Damage causing defects	4.2
Defect is causing element to be non-functional	D5	Damage causing defects	5
Adjacent element will not be affected	X1	Defects affecting adjacent areas	1
Defects unlikely to affect condition of adjacent elements now or in the near future	X2	Defects affecting adjacent areas	1
Defect probably is affecting condition of adjacent elements or is likely to in near future	X3	Defects affecting adjacent areas	2
Defect clearly affecting condition of adjacent elements	X4	Defects affecting adjacent areas	3
Defect likely to affect safety of adjacent elements in near future	X4S	Defects affecting adjacent areas	3.1
Defect creating danger to the public from defect or adjacent elements	X5	Defects affecting adjacent areas	4
Minor loss of protection likely in the near future	P2	Paint coating and protective system defects	2
Significant loss of protection in the near future	P3	Paint coating and protective system defects	3
Significant loss of protection occurring	P4	Paint coating and protective system defects	4

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Loss of protection may be creating a danger to the public	P4S	Paint coating and protective system defects	4.1
Defect definitely creating a danger to the public	P5	Paint coating and protective system defects	5
No significant defect	1		0
Minor defects of a non-urgent nature	2		0
Defects which should be included for attention within the next annual maintenance period	3		0
Defects where urgent action is required	4		0

Table 14-3 – Additional information for Defect Severity.

Defect Type				
Defect Type Description	**Keycode**	**Message**	**Defect Filter Description**	**Defect Severity Type**
Blowholes (appearance only)	BHA		Concrete workmanship	Appearance related defects
Cold joint (appearance only)	CJA		Concrete workmanship	Appearance related defects
Foreign object (appearance only)	FOA	Material - (S)teel, (T)imber, (P)olystyrene	Concrete workmanship	Appearance related defects
Grout loss (appearance only)	GLA		Concrete workmanship	Appearance related defects
Honeycombing (appearance only)	HCA	Maximum depth (mm)	Concrete workmanship	Appearance related defects
Irregular shuttering (appearance only)	IrSh		Concrete workmanship	Appearance related defects
Poor compaction (appearance only)	PCA		Concrete workmanship	Appearance related defects
Rusty nails/tie wire etc. (appearance only)	RNA		Concrete workmanship	Appearance related defects
Sand pocket or streak (appearance only)	SPockA		Concrete workmanship	Appearance related defects
Segregation of concrete (appearance only)	SegA		Concrete workmanship	Appearance related defects

Shuttering left in place (appearance only)	ShA	Material - (S)teel, (T)imber, (P)olystyrene	Concrete workmanship	Appearance related defects
Surface void (appearance only)	SVoidA		Concrete workmanship	Appearance related defects
Water runs (appearance only)	WRA		Concrete workmanship	Appearance related defects
Bird or animal excrement on the structure (appearance only)	ExA		General defects	Appearance related defects
Graffiti	Graf		General defects	Appearance related defects
Score or scratch	Scr		General defects	Appearance related defects
Running water (appearance only)	WRA		Leaching/Staining	Appearance related defects
Algal growth (appearance only)	AlA		Leaching/Staining	Appearance related defects
Efflorescence (appearance only)	EffA	Colour - (R)ed, (B)rown, (W)hite, (G)rey	Leaching/Staining	Appearance related defects
Exuded gel (appearance only)	GelA		Leaching/Staining	Appearance related defects
Iron pyrites stains (appearance only)	IPA		Leaching/Staining	Appearance related defects
Mould or fungus (appearance only)	FungA		Leaching/Staining	Appearance related defects
Rust stain/streak/spot (appearance only)	RStA		Leaching/Staining	Appearance related defects
Smoke staining (appearance only)	SStA		Leaching/Staining	Appearance related defects
Stalactite/Stalagmite (appearance only)	StalA		Leaching/Staining	Appearance related defects
Water stain (appearance only)	WStA		Leaching/Staining	Appearance related defects
Blowholes	BH		Concrete workmanship	Damage causing defects

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Cold joint	CJ		Concrete workmanship	Damage causing defects
Foreign object	FO	Material - (S)teel, (T)imber, (P)olystyrene	Concrete workmanship	Damage causing defects
Grout loss	GL		Concrete workmanship	Damage causing defects
Honeycombing	HC	Maximum depth (mm)	Concrete workmanship	Damage causing defects
Irregular shuttering	IrSh		Concrete workmanship	Damage causing defects
Poor compaction	PC		Concrete workmanship	Damage causing defects
Rusty nails/Tie wire etc.	RN		Concrete workmanship	Damage causing defects
Sand pocket or streak	SPock		Concrete workmanship	Damage causing defects
Segregation of concrete	Seg		Concrete workmanship	Damage causing defects
Shuttering left in place	Sh	Material - (S)teel, (T)imber, (P)olystyrene	Concrete workmanship	Damage causing defects
Surface void	SVoid		Concrete workmanship	Damage causing defects
Water runs	WR		Concrete workmanship	Damage causing defects
Construction joint crack	CJCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Crack along line of prestressing tendon	TendCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects

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Crack in mortar only	MorCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Crack of uncertain origin or a combination of causes	Cr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Crazing	Cg	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Drying shrinkage crack	DSCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Early thermal crack	ETCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Flexural crack	FlCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Formwork movement crack	FMCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Frost damage crack	FDCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Impact (accident) damage crack	ACr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Map cracking	MCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Plastic settlement (displacement) crack	PDCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Plastic shrinkage crack	PSCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Reinforcement corrosion crack	RCCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Settlement crack	SeCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects

Shear crack	SCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Tension crack	TenCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Torsion crack	TorCr	Maximum width (and depth (mm) for masonry)	Cracks in concrete or masonry	Damage causing defects
Anchor slip	AncSl		Defects in components	Damage causing defects
Broken or fractured	FrCo		Defects in components	Damage causing defects
Cracked	CrCo		Defects in components	Damage causing defects
Debonding	Debo		Defects in components	Damage causing defects
Degraded	Deg		Defects in components	Damage causing defects
Loose	Lse		Defects in components	Damage causing defects
Missing	MissCo		Defects in components	Damage causing defects
Pothole	PH		Defects in components	Damage causing defects
Rusty/Corroded	RCo		Defects in components	Damage causing defects
Rutted	Rut		Defects in components	Damage causing defects
Seized	Sz		Defects in components	Damage causing defects

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Split	Spl		Defects in components	Damage causing defects
Bird or animal excrement on the structure	Exc		General defects	Damage causing defects
Deformed	DefG		General defects	Damage causing defects
Displaced or misaligned	Disp		General defects	Damage causing defects
Distorted	DistG		General defects	Damage causing defects
Friable or degraded concrete or mortar	Fri		General defects	Damage causing defects
Insect attack	Ins		General defects	Damage causing defects
Leaning or tilted	Lean		General defects	Damage causing defects
Ponding (causing damage to element)	Pond		General defects	Damage causing defects
Rotation of element	Rotn		General defects	Damage causing defects
Rotten or decayed	Rot		General defects	Damage causing defects
Settlement	Setl		General defects	Damage causing defects
Sliding or slipped	Slid		General defects	Damage causing defects
Algal growth	Al		Leaching/Staining	Damage causing defects

Calcite Leaching	CLe		Leaching/Staining	Damage causing defects
Efflorescence	Eff		Leaching/Staining	Damage causing defects
Exuded gel	Gel		Leaching/Staining	Damage causing defects
Iron pyrites stains	IP		Leaching/Staining	Damage causing defects
Mould or fungus	Fung		Leaching/Staining	Damage causing defects
Running water	WR		Leaching/Staining	Damage causing defects
Rust stain/streak/spot	RSt		Leaching/Staining	Damage causing defects
Stalactite/Stalagmite	Stal		Leaching/Staining	Damage causing defects
Water stain	WS		Leaching/Staining	Damage causing defects
Concrete Softening	CSoft		Loss of concrete or masonry	Damage causing defects
Exposed aggregate	EA		Loss of concrete or masonry	Damage causing defects
Exposed reinforcement	ER	Reinforcement Section Lost (%)	Loss of concrete or masonry	Damage causing defects
Fire damage	FD	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects
Frost attack	FA	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects

Hollow (delaminated) area	Holl		Loss of concrete or masonry	Damage causing defects
Impact (accident) damage	AD	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects
Incipient spall	ISp		Loss of concrete or masonry	Damage causing defects
Peeling	Peel	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects
Scaling	Sc	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects
Spalled area	Sp	Maximum Depth of Material Lost (mm)	Loss of concrete or masonry	Damage causing defects
Bulging	Bulg		Masonry defects	Damage causing defects
Dropped unit in arch	Drop		Masonry defects	Damage causing defects
Erosion by water	ErWa		Masonry defects	Damage causing defects
Erosion by wind	ErWi		Masonry defects	Damage causing defects
Friable mortar	Fri	Depth (mm)	Masonry defects	Damage causing defects
Missing masonry unit	MissM		Masonry defects	Damage causing defects
Mortar loss	MorL	Depth (mm)	Masonry defects	Damage causing defects
Soft mortar	MorS	Depth (mm)	Masonry defects	Damage causing defects

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Failed repair	FRep	Material - (M)ortar,(C)oncrete,(R)ubbing Up, (I)njection,(S)tone,(B)rickwork, (G) Sprayed Concrete, (P)Pointing	Repairs to concrete or masonry	Damage causing defects
Repair	Rep	Material - (M)ortar,(C)oncrete,(R)ubbing Up, (I)njection,(S)tone,(B)rickwork, (G) Sprayed Concrete, (P)Pointing	Repairs to concrete or masonry	Damage causing defects
Corroded/Rusting	RS		Steelwork defects	Damage causing defects
Corrosion - loss of section	RLoS	Steel section lost (mm)	Steelwork defects	Damage causing defects
Crack	Cr	Length (mm) and maximum width (mm)	Steelwork defects	Damage causing defects
Deformation	DefS	Maximum Deformation (mm)	Steelwork defects	Damage causing defects
Deformation due to corrosion	RDef	Maximum deformation (mm)	Steelwork defects	Damage causing defects
Distortion	DistS		Steelwork defects	Damage causing defects
Fatigue crack	FCr	Length (mm) and maximum width (mm)	Steelwork defects	Damage causing defects
Fire damage	FDS		Steelwork defects	Damage causing defects
Fracture	FrS		Steelwork defects	Damage causing defects

Impact (accident) damage crack	ACrS	Length (mm) and maximum width (mm)	Steelwork defects	Damage causing defects
Impact (accident) damage other	AD		Steelwork defects	Damage causing defects
Lamination	Lam		Steelwork defects	Damage causing defects
Pitting	Pit		Steelwork defects	Damage causing defects
Separation steel/concrete	SCSep	Maximum width (mm)	Steelwork defects	Damage causing defects
Separation steel/other material	SOSep	Maximum width (mm)	Steelwork defects	Damage causing defects
Separation steel/steel	SSSep	Maximum width (mm)	Steelwork defects	Damage causing defects
Wear	Wea		Steelwork defects	Damage causing defects
Corroded/Rusting	RX		Steelwork joint and connection defects	Damage causing defects
Distorted	DistX		Steelwork joint and connection defects	Damage causing defects
Fractured connector	FrX	Type - (H)SFG,(B)olt,(N)ut,(R)ivet,(W)eld	Steelwork joint and connection defects	Damage causing defects
Joint movement	JMov	Type - (S)lip, (R)ubbing	Steelwork joint and connection defects	Damage causing defects
Long bolt or stud	LB		Steelwork joint and connection defects	Damage causing defects
Loose connector	Lse		Steelwork joint and connection defects	Damage causing defects

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Missing connector/weld	MissX	Type - (H)SFG,(B)olt,(N)ut,(R)ivet,(W)eld	Steelwork joint and connection defects	Damage causing defects
Poorly installed connector	CPoor		Steelwork joint and connection defects	Damage causing defects
Short bolt or stud	SB		Steelwork joint and connection defects	Damage causing defects
Weld crack	WCr	Length (mm) and maximum width (mm)	Steelwork joint and connection defects	Damage causing defects
Weld HAZ crack	HAZCr	Length (mm) and maximum width (mm)	Steelwork joint and connection defects	Damage causing defects
Weld porosity	WP		Steelwork joint and connection defects	Damage causing defects
Weld undercut	WU		Steelwork joint and connection defects	Damage causing defects
Blocked	Bld		General defects	Defects affecting adjacent areas
Burrowing	Bur		General defects	Defects affecting adjacent areas
Debris, rubbish, etc. on or adjacent to the structure	Deb		General defects	Defects affecting adjacent areas
Excess fill on or adjacent to structure	HiFl		General defects	Defects affecting adjacent areas
Lack of fill over or adjacent to the structure	LoFl		General defects	Defects affecting adjacent areas
Ponding (affecting adjacent elements)	PondN		General defects	Defects affecting adjacent areas
Scour or scour hole	Sco		General defects	Defects affecting adjacent areas

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Silt accumulation	Silt		General defects	Defects affecting adjacent areas
Vegetation growth on the structure or encroaching on the structure	Veg		General defects	Defects affecting adjacent areas
Blistering	PBl		Paints, coatings and protective systems	Paint coating and protective system defects
Chalking	PCh		Paints, coatings and protective systems	Paint coating and protective system defects
Cracking	PCr		Paints, coatings and protective systems	Paint coating and protective system defects
Fading	PFad		Paints, coatings and protective systems	Paint coating and protective system defects
Fire damage	PFD		Paints, coatings and protective systems	Paint coating and protective system defects
Flaking	PFl		Paints, coatings and protective systems	Paint coating and protective system defects
Other degradation or breakdown	PDeg		Paints, coatings and protective systems	Paint coating and protective system defects
Peeling	PPeel		Paints, coatings and protective systems	Paint coating and protective system defects
Rusting or rust staining from substrate	PR		Paints, coatings and protective systems	Paint coating and protective system defects
Scored or scratched	PScr		Paints, coatings and protective systems	Paint coating and protective system defects
White deposits (zinc based?)	PZ		Paints, coatings and protective systems	Paint coating and protective system defects

Table 14-4 – Additional information for Defect Types.

Appendix A: Condition Grading Guide

The following section clarifies which assets should be assessed using a 1-5 condition grade or a 1, 3, 5 condition grade and provides detailed condition grading criteria for the application of the 5-point condition grading scale to each relevant asset.

Asset Class	Asset Name	5-Point Condition Grading				
		1	2	3	4	5
Ancillary	Bridleway	✔	✔	✔	✔	✔
Ancillary	Combined Cycle Track and Footway	✔		✔		✔
Ancillary	Crisis Signage	✔	✔	✔	✔	✔
Ancillary	Crossover	✔		✔		✔
Ancillary	Cycle Track	✔	✔	✔	✔	✔
Ancillary	Footway	✔		✔		✔
Ancillary	Handrail	✔	✔	✔	✔	✔
Ancillary	Non-Carriageway Surface	✔		✔		✔
Ancillary	Pedestrian Crossing	✔	✔	✔	✔	✔
Ancillary	Salt Bin	✔	✔	✔	✔	✔
Ancillary	Spill Kit	✔	✔	✔	✔	✔
Ancillary	Steps	✔		✔		✔
Ancillary	Stile	✔	✔	✔	✔	✔
Ancillary	Street Furniture	✔	✔	✔	✔	✔
Carriageway Control	Anti-Glare Barrier	✔	✔	✔	✔	✔
Carriageway Control	Block Wall	✔	✔	✔	✔	✔
Carriageway Control	Bollard	✔	✔	✔	✔	✔
Carriageway Control	Brick Wall	✔	✔	✔	✔	✔
Carriageway Control	Carriageway Gate	✔	✔	✔	✔	✔
Carriageway Control	Cattle Grid	✔	✔	✔	✔	✔
Carriageway Control	Fence	✔	✔	✔	✔	✔
Carriageway Control	Fence Gate	✔	✔	✔	✔	✔
Carriageway Control	Hatched Road Markings	✔	✔	✔	✔	✔
Carriageway Control	Kerb	✔		✔		✔
Carriageway Control	Longitudinal Road Markings	✔	✔	✔	✔	✔
Carriageway Control	Node Studs	✔	✔	✔	✔	✔
Carriageway Control	Post (Signs)	✔	✔	✔	✔	✔

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Carriageway Control	Post (Traffic Signal)	✔	✔	✔	✔	✔
Carriageway Control	Reference Marker	✔	✔	✔	✔	✔
Carriageway Control	Road Studs	✔	✔	✔	✔	✔
Carriageway Control	Sign Face	✔	✔	✔	✔	✔
Carriageway Control	Snow Gate	✔	✔	✔	✔	✔
Carriageway Control	Stone Wall	✔	✔	✔	✔	✔
Carriageway Control	Transverse and Special Road Markings	✔	✔	✔	✔	✔
Carriageway Control	Utility Marker Post	✔	✔	✔	✔	✔
Environmental	Amenity Grassland	✔	✔	✔	✔	✔
Environmental	Climbers or Trailers	✔	✔	✔	✔	✔
Environmental	Ecological/Wildlife Pond	✔	✔	✔	✔	✔
Environmental	Grass Reinforced Wall	✔	✔	✔	✔	✔
Environmental	Grassland with Bulbs	✔	✔	✔	✔	✔
Environmental	Groundcover	✔	✔	✔	✔	✔
Environmental	Heath and Moorland	✔	✔	✔	✔	✔
Environmental	Hedgerow	✔		✔		✔
Environmental	Individual Trees	✔	✔	✔	✔	✔
Environmental	Linear Woodland Belt	✔		✔		✔
Environmental	Marsh and Wet Grassland	✔	✔	✔	✔	✔
Environmental	Open Grassland	✔	✔	✔	✔	✔
Environmental	Rock and Scree	✔	✔	✔	✔	✔
Environmental	Scrub	✔	✔	✔	✔	✔
Environmental	Shrubs	✔		✔		✔
Environmental	Species Rich Grassland	✔	✔	✔	✔	✔
Environmental	Splay/Swath	✔	✔	✔	✔	✔
Environmental	Wildlife Housing	✔	✔	✔	✔	✔
Environmental	Wildlife Underpass	✔	✔	✔	✔	✔
Environmental	Woodland	✔	✔	✔	✔	✔
Pavement	Pavement Section	✔	✔	✔	✔	✔
Road Restraint	Crash Cushion	✔	✔	✔	✔	✔
Road Restraint	End Terminal	✔	✔	✔	✔	✔
Road Restraint	Inspection Cover	✔	✔	✔	✔	✔
Road Restraint	Pedestrian Guard Rail	✔	✔	✔	✔	✔
Road Restraint	Safety Barrier (Concrete)	TBC				
Road Restraint	Safety Barrier (Steel)	✔	✔	✔	✔	✔
Road Restraint	Safety Barrier Gate (Steel)	✔	✔	✔	✔	✔

Part 2 – Requirements and Additional Information

| Road Restraint | Transition (Steel) | ✔ | ✔ | ✔ | ✔ | ✔ |
| Road Restraint | VRS Add On Motorcycle Protection | ✔ | ✔ | ✔ | ✔ | ✔ |

A.1   Ancillary

Combined Cycle Track and Footway/Cycle Track/Footway

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound
2	Superficial damage / deterioration with no loss of performance	• Some minor signs of aging (e.g. minor/ hairline cracking)
3	Some damage / deterioration and performance may be slightly reduced	• Isolated defects such as loose/ cracked paving slabs and concrete.
4	Significant damage / deterioration and performance may be severely reduced	• Extensive loose/ cracked paving slabs and concrete. • Potential trip hazard. • Asset unstable. • Unmaintainable.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

Handrails

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound with no visible damage.
2	Superficial damage / deterioration with no loss of performance	• Localised surface rust and corrosion, up to 25% of asset length. • Superficial damage/ deterioration.
3	Some damage / deterioration and performance may be slightly reduced	• Signs of wood rot. • Significant signs of rust and corrosion, up to 50% of asset length.
4	Significant damage / deterioration and performance may be severely reduced	• Extensive signs of wood rot, rust or corrosion, up to 75% of asset length. • Localised rust and corrosion resulting in visible holes or cracking. • Bent, leaning or unstable which could potentially result in collapse. • Any missing component. • Unmaintainable.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

Steps

Part 2 – Requirements and Additional Information

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound with no visible damage.
2	Superficial damage / deterioration with no loss of performance	• Some minor signs of aging (e.g. minor/ hairline cracking, localised surface rot, rust or corrosion).
3	Some damage / deterioration and performance may be slightly reduced	• Significant surface rust, or wood rot. • Isolated defects such as loose/ cracked flags or concrete.
4	Significant damage / deterioration and performance may be severely reduced	• Extensive signs of surface rust, or wood rot resulting in visible holes or cracking. • Extensive loose/ cracked flags or concrete. • Potential trip hazard. • Asset unstable.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

Stiles

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound with no visible damage.
2	Superficial damage / deterioration with no loss of performance	• Minor signs of aging.
3	Some damage / deterioration and performance may be slightly reduced	• Signs of wood rot. • Cracked or loose rails or posts. • Asset bent or leaning.
4	Significant damage / deterioration and performance may be severely reduced	• Extensive signs of wood rot. • Missing posts or rails. • Asset bent, leaning or unstable which could potentially result in collapse.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

A.2   Carriageway Control

Fence

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects. • Structurally sound with no visible damage.
2	Superficial damage/ Deterioration with no loss of performance	• Minor signs of aging e.g. localised surface rust and corrosion.

3	Some damage/ Deterioration and performance may be slightly reduced	• Signs of wood rot. • Cracked or loose rails or panels. • Asset bent or leaning.
4	Significant damage/ Deterioration and performance may be severely reduced	• Extensive signs of wood rot. • Missing posts, rails or panels. • Asset bent, leaning or unstable which could potentially result in collapse. • Unmaintainable.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Structural failure / collapsed. • Asset missing.

Posts (Signs)

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects. • Structurally sound with no visible damage.
2	Superficial damage/ Deterioration with no loss of performance	• Localised surface rust, paint peeling / cracking, up to 25% of post length.
3	Some damage/ Deterioration and performance may be slightly reduced	• Surface rust, plastic coating bubbling / peeling off, up to 50% of post length. • Post bent of leaning.
4	Significant damage/ Deterioration and performance may be severely reduced	• Localised rust resulting in visible holes or cracking which could potentially lead to collapse. • High levels of surface rust, plastic coating peeling off, up to 75% of post length. • Post bent or leaning which could potentially result in collapse.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Structural failure of post / collapsed. • Asset missing.

Sign Face

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects. • Structurally sound with no visible damage.
2	Superficial damage/ Deterioration with no loss of performance	• Minor dents of scratches affecting up to 25% of sign face.
3	Some damage/ Deterioration and performance may be slightly reduced	• Minor dents or scratches affecting up to 50% of the sign face. • Missing rivet covers. • Sign face may have been patched. • Evidence of graffiti removal.
4	Significant damage/ Deterioration and performance may be severely reduced	• Minor dents or scratches affecting up to 75% of the sign face. • Sign face damaged or fading so unclear to road users. • Major damage. • Peeling sign patches.

5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Failure of the sign plate / collapsed. • Asset missing.

A.3 Environmental

Amenity Grassland

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% grass covering the remaining area.

Climbers or Trailers

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Over 90% coverage across the length of the asset.
2	Superficial damage/ Deterioration with no loss of performance	• Between 70-90% coverage across the length of the asset.
3	Some damage/ Deterioration and performance may be slightly reduced	• Between 50-70% coverage across the length of the asset.
4	Significant damage/ Deterioration and performance may be severely reduced	• Between 30-50% coverage across the length of the asset.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% coverage across the length of the asset.

Ecological/Wildlife Pond

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No encroachment and/or colonisation by inappropriate species. • Clear water area.

Part 2 – Requirements and Additional Information

Grade	Condition	Criteria
		• No silting/drying up of pond.
2	Superficial damage/ Deterioration with no loss of performance	• Superficial encroachment and/or colonisation by inappropriate species. • Some silting/drying up of pond.
3	Some damage/ Deterioration and performance may be slightly reduced	• Moderate encroachment and/or colonisation by inappropriate species. • Moderate silting/drying up of pond.
4	Significant damage/ Deterioration and performance may be severely reduced	• Significant encroachment and/or colonisation by inappropriate species. • Significant silting/drying up of pond.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Critical encroachment and/or colonisation by inappropriate species. • Water is not clear. • Critical silting/drying up of pond.

Grass Reinforced Walls

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% grass covering the remaining area.

Grassland with Bulbs

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Grassland coverage across more than 90% of the area. • Bulb coverage across more than 90% of the intended design or distribution.
2	Superficial damage/ Deterioration with no loss of performance	• Grassland coverage across 70-90% of the area. • Bulb coverage across 70-90% of the intended design and distribution.
3	Some damage/ Deterioration and performance may be slightly reduced	• Grassland coverage across 50-70% of the area. • Bulb coverage across 50-70% of the intended design and distribution.
4	Significant damage/ Deterioration and performance may be severely reduced	• Grassland coverage across 30-50% of the area. • Bulb coverage across 30-50% of the intended design and distribution.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% grass covering the remaining area. • Bulb coverage across less than 30% of the intended design or distribution.

Part 2 – Requirements and Additional Information

Groundcover

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% coverage across the remaining area.

Heath and Moorland

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% coverage across the remaining area.

Hedgerow

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No significant gaps in the hedgerow.
3	Some damage/ Deterioration and performance may be slightly reduced	• Gaps in sections of the hedgerow.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Large gaps in the hedgerow.

Individual Trees

Part 2 – Requirements and Additional Information

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Tree present with no apparent decay or dieback. • A good specimen of its species.
2	Superficial damage/ Deterioration with no loss of performance	• Tree has some obvious decay or dieback. • Is a reasonable specimen of its species.
3	Some damage/ Deterioration and performance may be slightly reduced	• Tree is showing obvious signs or decay or dieback. • Is a poor specimen. • Is not a hazard to property or the road user.
4	Significant damage/ Deterioration and performance may be severely reduced	• Tree has died or has serious dieback. • Is not a hazard to property or the road user.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Trees has failed. • Tree is no longer present.

Linear Woodland Belt

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No significant gaps in the belt of trees and shrubs
3	Some damage/ Deterioration and performance may be slightly reduced	• Gaps in sections of the trees and shrubs.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Large gaps in the belt of trees and shrubs.

Marsh and Wet Grassland

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% coverage across the remaining area.

Open Grassland

Part 2 – Requirements and Additional Information

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% grass covering the remaining area.

Rock and Scree

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Less than 10% colonisation by unsuitable vegetation across the area.
2	Superficial damage/ Deterioration with no loss of performance	• Colonisation by unsuitable vegetation across 10-30% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Colonisation by unsuitable vegetation across 30-50% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Colonisation by unsuitable vegetation across 50-70% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• More than 70% colonisation by unsuitable vegetation across the area.

Scrub

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.

Part 2 – Requirements and Additional Information

Grade	Condition	Criteria
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% coverage across the remaining area.

Shrubs

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Low and multi-stemmed structure.
3	Some damage/ Deterioration and performance may be slightly reduced	• Becoming trees or losing shape. • Self-setting or losing coherence.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Recognised as trees. • Dense and becoming dominant or becoming indistinct from woodland.

Species Rich Grassland

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Coverage across more than 90% of the area.
2	Superficial damage/ Deterioration with no loss of performance	• Coverage across 70-90% of the area.
3	Some damage/ Deterioration and performance may be slightly reduced	• Coverage across 50-70% of the area.
4	Significant damage/ Deterioration and performance may be severely reduced	• Coverage across 30-50% of the area.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% grass covering the remaining area.

Wildlife Housing

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Excellent physical condition.
2	Superficial damage/ Deterioration with no loss of performance	• Good physical condition.
3	Some damage/ Deterioration and performance may be slightly reduced	• Moderate physical condition (i.e. signs of wear).
4	Significant damage/ Deterioration and performance may be severely reduced	• Poor physical condition.

Part 2 – Requirements and Additional Information

Grade		Criteria
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Destroyed or missing.

Wildlife Underpass

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Excellent physical condition.
2	Superficial damage/ Deterioration with no loss of performance	• Good physical condition.
3	Some damage/ Deterioration and performance may be slightly reduced	• Moderate physical condition (i.e. signs of wear).
4	Significant damage/ Deterioration and performance may be severely reduced	• Poor physical condition.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Destroyed, broken or missing.

Woodland

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• Over 90% canopy cover. • Good density and age structure. • Is typical for the location/habitat.
2	Superficial damage/ Deterioration with no loss of performance	• Between 70-90% canopy cover. • Reasonable density. • Normally distributed age structure.
3	Some damage/ Deterioration and performance may be slightly reduced	• Between 50-60% canopy cover. • Dense density. • Missing age classes.
4	Significant damage/ Deterioration and performance may be severely reduced	• Between 30-50% canopy cover. • Thin density. • Single age class.
5	Significant damage/ Deterioration/ Missing/ Failed and no longer fulfils its intended purpose	• Less than 30% canopy cover. • Sparse density. • No age structure.

A.4   Pavements

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound with no visible damage

3	Some damage / deterioration and performance may be slightly reduced	• Some damage / deterioration
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

A.5   Road Restraint

End Terminals

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects • Structurally sound with no visible damage
2	Superficial damage / deterioration with no loss of performance	• Localised surface rust, up to 25% of asset length • Superficial damage / deterioration
3	Some damage / deterioration and performance may be slightly reduced	• Surface rust, up to 50% of asset length • Any rust that is likely result in holes by next inspection • Bent or leaning
4	Significant damage / deterioration and performance may be severely reduced	• High levels of surface rust, up to 75% of asset length • Localised rust resulting in visible holes or cracking in a beam or post • Bent or leaning which could potentially result in collapse • Any missing component
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed • Asset missing

Pedestrian Guardrail

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects. • Structurally sound with no visible damage.
2	Superficial damage / deterioration with no loss of performance	• Localised surface rust, up to 25% of asset length. • Superficial damage / deterioration.
3	Some damage / deterioration and performance may be slightly reduced	• Signs of wood rot. • Surface rust, up to 50% of asset length. • Any rust that is likely to result in holes by next inspection. • Bent or leaning.

4	Significant damage / deterioration and performance may be severely reduced	• High levels of surface rust, up to 75% of asset length. • Localised rust resulting in visible holes or cracking. • Bent or leaning which could potentially result in collapse. • Any missing component.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed. • Asset missing.

Safety Barriers (Steel)

Grade	Condition	Criteria
1	As New/ No deterioration/Meeting management plan	• No defects. • Structurally sound with no visible damage.
2	Superficial damage / deterioration with no loss of performance	• Localised surface rust, up to 25% of asset length. • Superficial damage / deterioration.
3	Some damage / deterioration and performance may be slightly reduced	• Surface rust, up to 50% of asset length. • Any rust that is likely to result in holes by next inspection. • Bent or leaning.
4	Significant damage / deterioration and performance may be severely reduced	• High levels of surface rust, up to 75% of asset length. • Localised rust resulting in visible holes or cracking in beam or post. • Bent or leaning which could potentially result in collapse. • Any missing component.
5	Significant damage / deterioration / missing / failed and no longer fulfils its intended purpose	• Structural failure / collapsed. • Asset missing.

Appendix B: Cyclic Maintenance Activities

The following table lists the cyclic maintenance activity record tables, the applicable activity defined in GM 701 and which assets they apply to in the ADMM.

GM 701 Asset Type	GM 701 Cyclic Maintenance Activity	ADMM Cyclic Maintenance Activity Record Table	Applicable ADMM Assets
0400 - Road Restraint Systems	Tighten or replace screws and bolts and re-tension barrier.	Tension and Tighten Activity Record	Safety Barrier (Steel)
0500 - Drainage and Service Ducts	Clean surface by hydro mechanical means – (high pressure rotating water jets and powerful suction to recover disturbed silt).	Surface Cleaning Activity Record	Reservoir Pavements
	Clear all material that could impair operation and ensure fit for operation.	Clearing Material (Drainage) Activity Record	Bifurcation or Storm Overflow
			Catchpit
			Flow Control Device
			Inlet
			Interceptor
			Manholes
			Oil Separator
			Other Special Chamber
			Outfall
			Outlet
			Syphon
			Vortex Separator
	Low pressure/high volume combined kerb and drainage system jetting and proving. Clear slot drains. Sweep/clear concrete 'V' channel.	Cleaning, Jetting and Sweeping Activity Record	Combined Kerb & Drainage Channel
			Combined Pipe & Channel
			Drainage Channel Block
			Edge Channel
			Linear Drainage Channel
			Surface Water Channel
	Clear/re-cut grips and counterfort drains, clear weed growth and debris.	Clear Grips and Drains Activity Record	Counterfort Drain
			Grip
			Grip Inlet
	Clear ditches by removing all material that could impair operation.	Clear Ditches Activity Record	Ditch
	Clear outfalls by removing all material that could impair operation.	Clear Outfalls Activity Record	Infiltration Basin
			Outfall

Part 2 – Requirements and Additional Information

	Clean priority soakaways/Clean non-priority soakaways.	Clear Soakaway Activity Record	Soakaway Borehole
			Soakaway Chamber
			Soakaway Trench
	Remove any accumulated silt that is impairing the drainage operation.	Remove Silt Activity Record	Wetlands
	Clear silt and all material that could impair operation.	Clear Silt and Material Activity Record	Pollution Containment Pond
			Pond
			Retention Pond
			Sediment Pond
	Cycle isolation valves.	Cycle Isolation Valves Activity Record	Pollution Containment Pond
			Pond
			Retention Pond
			Sediment Pond
			Interceptor
			Vortex Separator
	Clear/empty silt and debris from catch pits.	Clear Silt and Debris Activity Record	Catchpit
	De-silt and remove all material that could impair operation.	De-Silt Culvert Activity Record	Culvert
	Gully emptying including clearing of covers. Gully covers cleared.	Empty Gully Activity Record	Gully
	Clean / empty trapped material from interceptors.	Clean Interceptor Activity Record	Interceptor
	Clear manholes by removing all material that could impair operation.	Clear Manholes Activity Record	Manholes
	Edge scrapes and cut back and remove all build up from edge of carriageway through to filter material that could impair operation.	Material Removal Activity Record	Combined Sub Surface (FD)
			Filter Drain
			Narrow Filter Drain
	Weed Spray.	Weed Spray Activity Record	Combined Sub Surface (FD)
			Filter Drain
			Narrow Filter Drain
	Undertake a grass cut of all areas of the grassed surface water drainage system to maintain the grass sward at a maximum of 75mm in height.	Grassed Surface Water Cut Activity Record	Grassed Surface Water Channel
	Remove any litter, debris and sediment that could impair operation Undertake a grass cut of the swale to maintain the grass sward between 100 mm and 200mm in height.	Remove Litter/Grass Cut Activity Record	Detention Basin
			Infiltration Basin
			Swale
1200 - Traffic Signs and Road Markings	Clean bollards.	Clean Bollard Activity Record	Bollard
	Clean all post faces and reference numbers.	Clean Reference Marker Activity Record	Reference Marker
	Clean all traffic sign faces and reference numbers.	Clean Sign Face Activity Record	Sign Face
1300 - Lighting	Bulk lamp clean and change.	Lamp Replacement/Cleaning Activity Record	Lighting Unit

Part 2 – Requirements and Additional Information

3000 - Landscape and Ecology	Remove all material that could impair operation.	Cleaning Material (Environmental) Activity Record	Wildlife Housing
			Wildlife Underpass
	Maintain affected property to control the spread or increase of identified instances of Injurious Weeds.	Control Spread of Injurious Weeds Activity Record	Amenity Grassland
			Bridleway
			Combined Cycle Track and Footway
			Cycle Tracks
			Footway
			Grass Reinforced Walls
			Grassland with Bulbs
			Groundcover
			Heath and Moorland
			Hedgerow
			Individual Trees
			Linear Woodland Belt
			Non-Carriageway Surface
			Open Grassland
			Rock and Scree
			Scrub
			Shrubs
			Species Rich Grassland
			Splay/Swath
			Steps
			Woodland
	Maintain affected property to control the spread or increase of identified instances of invasive plant species	Control Spread of Invasive Weeds Activity Record	Amenity Grassland
			Bridleway
			Combined Cycle Track and Footway
			Cycle Tracks
			Footway
			Grass Reinforced Walls
			Grassland with Bulbs
			Groundcover
			Heath and Moorland
			Hedgerow
			Individual Trees
			Linear Woodland Belt
			Non-Carriageway Surface
			Open Grassland
			Rock and Scree
			Scrub
			Shrubs

Part 2 – Requirements and Additional Information

			Species Rich Grassland
			Splay/Swath
			Steps
			Woodland
	Trim hedgerows, maintain and preserve clear carriageway width, sight lines and stopping distance, including junctions, access points, curves and bends.	Hedgerow Cut Activity Record	Hedgerow
	Maintain habitat integrity, vegetation clearance to the maximum level of water storage, seek guidance of an ecologist.	Maintain Habitat Integrity (Water Bodies) Activity Record	Ecological/Wildlife Ponds
			Marsh and Wet Grassland
	Maintain in line with current statutory body requirements	Maintain Habitat Area/Boundaries Activity Record	Habitat Area
			Habitat Boundaries
	Maintain habitat integrity, including removal of undesirable species.	Remove Undesirable Species Activity Record	Hedgerows
	Maintain habitat integrity, including removal of scrub encroachment.	Remove Scrub Encroachment Activity Record	Woodland
	Maintain in line with EMP.	Maintain with EMP Activity Record	Linear Woodland Belt
			Woodland
	Maintain design requirements / amenity function.	Maintain Shrubs Activity Record	Shrubs
	Maintain in line with current species-specific legislation and current mitigation guidance	Maintain Species Areas/Locations Activity Record	Species Areas
			Species Locations
	Maintain habitat integrity, including removal of scrub encroachment and tree saplings throughout.	Maintain Heath and Moorland Activity Record	Heath and Moorland
	Maintain habitat integrity, including removal of scrub encroachment.	Maintain Habitat Integrity (Grassland/Vegetation) Activity Record	Amenity Grassland
			Grass Reinforced Walls
			Grassland with Bulbs
			Open Grassland
			Shrubs
	Removal of scrub encroachment.	Remove Scrub Encroachment (Rock and Scree) Activity Record	Rock and Scree
	Maintain habitat integrity including removal of scrub encroachment and undesirable weed species.	Maintain Habitat Integrity of Grassland Activity Record	Species Rich Grassland
	Thin / coppice.	Thin/Coppice Activity Record	Woodland
	Undertake amenity cut of amenity grass areas, including gate way features, village verges and special landscape features.	Amenity Grass Cut Activity Record	Splay/Swath
	Maintain and preserve sight lines and stopping distance, including junctions, access	Sight Line Cut Activity Record	Hedgerow
			Linear Woodland Belt
			Scrub

Part 2 – Requirements and Additional Information

	points, curves, bends and central reserve.		Shrubs
			Splay/Swath
			Woodland
	Maintain and preserve CCTV camera operational visibility splays.	CCTV Visibility Splay Cut Activity Record	Hedgerow
			Linear Woodland Belt
			Scrub
			Shrubs
			Splay/Swath
			Woodland
	Maintain and preserve road users visibility of road traffic signs and signals.	Signs and Signals Visibility Cut Activity Record	Hedgerow
			Individual Trees
			Linear Woodland Belt
			Scrub
			Shrubs
			Splay/Swath
			Woodland
	Ensure illumination/lumination from lighting is not obscured.	Illumination Grass Cut Activity Record	Hedgerow
			Individual Trees
			Linear Woodland Belt
			Scrub
			Shrubs
			Splay/Swath
			Woodland
	Remove obstructions and / or maintain vegetation to facilitate safe access for inspection and maintenance of feeder pillars and technology equipment.	Access to Electronic Equipment Cut Activity Record	Scrub
			Shrubs
			Splay/Swath
	Grass cut the central reserve.	Central Reserve Cut Activity Record	Splay/Swath
	Remove obstructions and maintain vegetation to provide safe access to and use of footways, cycle tracks, bridleways, footpaths and paved pedestrian areas.	Access to Non-Motorised Areas Cut Activity Record	Hedgerows
			Individual Trees
			Linear Woodland Belt
			Scrub
			Shrubs
			Splay/Swath
			Woodland
	Remove obstructions and/or maintain vegetation to facilitate safe use of customer facilities. This includes but not limited to emergency roadside telephones and emergency refuge areas.	Access to Customer Facilities Cut Activity Record	Hedgerows
			Individual Trees
			Linear Woodland Belt
			Scrub
			Shrubs
			Splay/Swath
			Woodland
	Undertake 2m wide swathe cut of all highway verges to ensure	Swathe Cut Activity Record	Splay/Swath

Part 2 – Requirements and Additional Information

		strip remains unobstructed by vegetation throughout the year (in addition to visibility splay maintenance).		
		Remove vegetation affecting the stability, integrity or operation of structures or other affected property assets.	Structure of Property Cut Activity Record	Hedgerows
				Individual Trees
				Linear Woodland Belt
				Scrub
				Shrubs
				Splay/Swath
				Woodland
4000 - Sweeping and Cleaning		Full sweep.	Sweeping Activity Record	Pavement Section
				Non-Carriageway Surface
		Litter pick to maintain to grade A.	Litter Cleaning (Non-Carriageway Surface) Activity Record	Non-Carriageway Surface
		Litter pick to maintain to grade A.	Litter Cleaning (Grassland/Vegetation) Activity Record	Amenity Grassland
				Grass Reinforced Walls
				Grassland with Bulbs
				Groundcover
				Heath and Moorland
				Hedgerows
				Individual Trees
				Linear Woodland Belt
				Open Grassland
				Rock and Scree
				Scrub
				Shrubs
				Species Rich Grassland
				Splay/Swath
				Woodland
		Clean and maintain toilet blocks.	Clean Toilet Block Activity Record	Toilet Block