Austroads

Research Report
AP-R673-22

Austroads Road Asset Data Standard
Version 4

Network | Classification | Inventory | Condition
Demand | Utilisation | Criticality | Risk | Resilience
Performance | Access | Work and Costs

Austroads Road Asset Data Standard: Version 4

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Abstract

The Austroads Road Asset Data Standard provides road agencies and their suppliers in Australia and New Zealand with a specification for the data that supports common operational activities.

The Data Standard also provides road network funding agencies with a specification to inform structure of reports and submissions requested from road agencies, to enable more equitable evidence-based investment decision-making. Specifically, the Standard establishes a common understanding of the meaning or semantics of the data to ensure appropriate use and interpretation of the data by its stakeholders.

The Standard also provides information on Priority Data Sets that can support harmonisation activities for both local and state road managers. Accordingly, the Standard will benefit any road industry stakeholder who utilises data for road research, policy development, expenditure comparisons, funding approvals, supporting national reforms, national reporting, innovation, shared services, and inter-organisation communications.

Keywords

Asset management, data schema, data sharing, data specification, data standard, road investment, road management

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About Austroads

Austroads is the peak organisation of Australasian road transport and traffic agencies.

Austroads' purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.

Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.

Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:

- Transport for NSW
- Department of Transport Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department for Infrastructure and Transport South Australia
- Department of State Growth Tasmania
- Department of Infrastructure, Planning and Logistics Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- Department of Infrastructure, Transport, Regional Development, Communications and the Arts
- Australian Local Government Association
- Waka Kotahi NZ Transport Agency.

Acknowledgements

Opus International Consultants (Opus) developed and produced the original Standard, with the assistance of GISSA International (GISSA) and representative industry stakeholders, on behalf of Austroads. Revisions of the Standard have been drafted by ARRB and Marsden Jacob, GWI and Angus Draheim Consulting.

The basis for the inventory 'as constructed' data standards has been adopted from R-Spec V3C, which has evolved from initial work undertaken in Australia and more recently in New Zealand by the Transport Analytics Governance Group (TAGG). Austroads acknowledges this contribution and the role that GISSA had in facilitating and producing these previous Standards.

The basis for the classification data standards has been adopted from the 'One Network Road Classification' system developed by The Road Efficiency Group in New Zealand.

Summary

Austroads Road Asset Data Standard

The Data Standard establishes a common understanding of the meaning of the data to ensure correct and proper use and interpretation of the data by its stakeholders. The data specifications are specific to the data that is routinely used for road management and investment purposes. It provides consistency in data definition and format. The Data Standard will assist with road management and investment activities, including asset and service performance assessment, performance benchmarking, road research, policy development, expenditure comparisons, funding approvals, supporting national reforms, national reporting, innovation, shared services, and inter-organisation communications.

This Standard is designed to support asset information management systems for data collection, finance, risk, and information. It is the product of comprehensive consultation across the road industry in Australia and New Zealand. The full standard comprises nearly 1,000 discrete measures. Given the common resourcing constraints of road management bodies, particularly rural remote local governments serving small populations, having all of the Standards' data measures collected, maintained, and readily available is an unrealistic expectation. To that end, Austroads developed a series of priority subsets of the Standard that target the most important data for collection, harmonisation and sharing. These are referred to as the Priority Data Sets (PDS) and are tailored for local, state and territory government road managers.

The Austroads Road Asset Data Standard was developed in response to a need to standardise and harmonise data sets that support common road management and investment activities. This version (4.0) of the Data Standard has been driven by the inclusion of revisions to the PDS that incorporate improved data sets for the provision of third-party reporting for local and state government road managers. Further consultation with a range of stakeholders, particularly in relation to the data for the PDS, also had an impact on this revised version of the Standard.

The Standard allows organisations to determine their desired level of sophistication with respect to both asset inventory recording and asset management planning, and provides the relevant data specification in this regard. This approach is consistent with the fundamental principles of ISO 55000:2014 *Asset Management Systems – Overview, principles and terminology* (ISO 2014a), particularly regarding maximising 'value' from assets.

Background to this Standard

In mid-2015, Austroads made the decision to invest in a phased implementation plan for developing and implementing a Road Asset Data Standard. This involved:

- investigating and quantifying Commonwealth and jurisdictional requirements regarding data scope
- developing a 'straw man' as the proposed harmonised asset data standard
- conducting a gap analysis and impact assessment for road agencies
- preparing a final business case to better quantify costs, benefits and risks.

The Road Asset Data Standard was developed and produced in response to the scope of work outlined above. In association with the development of the Standard, in 2017 an updated business case was prepared which led to a focus on harmonising priority data sets which were identified as promoting the highest benefits through their adoption. The benefits of a targeted approach to data harmonisation and implementation of the Data Standard have been assessed to include:

- improved investment decisions
- improved net benefit from maintenance activities

- improved net benefit from capacity expansion activities
- improved ability to leverage heavy vehicle road reform benefits
- lower data collection and reporting costs
- lower operational costs for government
- improved risk management
- improved ability to leverage new technologies.

Earlier revisions of the of the Austroads Road Asset Data Standard (known as the Data Standard for Road Management and Investment), Versions 2 and 3, adjusted terminology originally adopted from New Zealand and made more generic, or equivalencies and translations were defined to allow a wider acceptance of the Standard. A set of metrics for the PDS (then known as the PHS) and revised data definitions were included in Version 3, including the addition of new data items, addressing gaps in inventory data, and considering issues related to location. The impact of the asset componentisation (Austroads 2018c) on the PDS and Data Standard was considered regarding some of the definitions used in the Data Standard, ensuring consistency is applied.

The current revision of the Data Standard primarily accounts for further revisions to the PDS that have been designed to ensure that these align to the need for road manager reporting. The Data Standard now contains 5 levels of PDS that support local government and State Road Authority reporting requirements. The lowest level (1) support road asset management activities at a core level as a baseline minimum.

This report has been published to provide road asset data specification direction for entities which produce, request and use road asset data, with a view towards staged implementation across the Australian and New Zealand road industry.

Outcome of the Review and Update

Further work needs to be undertaken over the longer term to address remaining issues with the Data Standard. The Data Standard and PDS currently take a ‘functional classification’ approach to the classification of roads using the One Network Road Classification (ONRC) approach developed in New Zealand. It is anticipated that these will be aligned with approaches currently being developed in the National Service Level Standards project being led by the Commonwealth Government. Other considerations, such as government policy objectives (e.g. in the area of community service obligations) and underlying cost structures which are impacted by factors such as location (remoteness) and climatic conditions, are considered out of scope and outside of this project.

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1. Overview

1.1 Purpose

This Standard was developed to provide a common understanding and language for the management and investment in road and associated infrastructure in Australia and New Zealand. It is intended to be used by all road asset owners, managers, road network funding agencies, stakeholders and service providers in the planning, delivery, operation, maintenance, disposal and reporting of asset management functions across the road asset portfolio.

This Standard is specifically designed to provide:

- a common understanding of the meaning of the data
- consistency in data definition and format
- a list of data items that support road management and investment activities
- guidance for appropriate levels of sophistication in asset location referencing, asset data description, and asset planning practices
- guidance on the priority data for harmonisation
- detail on common data items to ensure consistent application.

This Standard is also intended to be used or referenced by:

- organisations involved in provision of funding and investment to road asset owners, and organisations monitoring road network performance
- contractors, service providers or project developers that perform asset management-related services for road organisations including suppliers involved in defining, designing, implementing, commissioning and integrating new or altered assets into the operating network
- software vendors involved in developing, structuring and/or configuring asset management information systems/software solutions.

1.2 Background

The third version of the Data Standard (Austroads 2019) was developed with input from Australian and New Zealand stakeholders. A revised Business Case showed significant benefits in two key areas flowing from a comprehensive adoption of the Data Standard across Australia and New Zealand. These areas related to:

- comparative road network performance reporting, and
- data items that were considered a priority for effective asset and maintenance management when analysing the costs and benefits of improved maintenance and investment strategies with comparable data sets.

The Priority Harmonisation Subset (PHS) of the Data Standard was developed to promote the realisation of the above two key benefit areas. The PHS identified 145 high value data measures to be included in the PHS subset and classified them as either network (N) assets, management (M) assets or both (NM). These measures were identified by an entry in the “PHS” column in the current data standard, as shown in Figure 1.1 below.

Figure 1:1 PHS attribute of data measures

Ref	Name	Code	Definition	Example	Type	Precision	Scale	List	Purpose	Soph	Industry reference	PHS	Metrics
8.3.3.19	Function of the Feature	br_func	Function of the feature	OR – Over Road	A	100		Code List 9.19	D	2			
8.3.20	Number of Spans or Cells	br_spans	Number of spans of the bridge or number of cells of the major culvert	3	I	2			D	2		N	Strucxture/culvert number of spans or cells integer
8.3.3.36 (NEW)	Structure unique Identifier	stru_iden	Structure ID allocated to this asset. This structure ID is provided by the relevant agency. If no structure ID is provided, create an arbitrary ID so this table can be linked with Structure (Bridge/Major Culvert) Component table							2		N	Structure unique ID (alphanumeric)
8.3.21	Feature Structure Type	br_struc	Feature Structure Type	Stock crossing/ underpass	A	100		Code List 9.5	D	2		M	Structure/culvert feature of structure type (alpha)
8.3.22	Cell Material for Major Culvert	br_cel_mat	Populate only if the structure is a major culvert and if Bridge/Major Culvert Components is not used	Pre-cast Concrete	A	30			D	3			
8.3.23	Length	br_len	Total length of the structure in metres	20.5	DC	4	2		D	3		NM	Structure/culvert length (m) numeric one decimal place
8.3.24	Width	br_wid	Total width of the structure in metres	2.45	DC	5	2		D	3		M	Structure/culvert width (m) numeric one decimal place

In response to concerns about the ability of many local government road managers to locate sufficient data sets that align with the PHS, a refinement process has been ongoing. Recent efforts have been focussed at revising a Priority Data Set (PDS) for local government that provides a 'core' set of data covering a minimum dataset to produce useful asset management metrics and for standardised local government reporting. These are supported by a 'Reporting Extension' that provides a greater range of data to support performance measurement and reporting. The Core PDS is comprehensive enough to support important asset management metrics and key reporting requirements (e.g. for Grants Commission, asset valuation).

In order to review the PDS, Austroads took a bottom-up approach by looking at the minimum data required for a prudent road authority to carry out its basic asset management and financial reporting obligations. In particular, the starting point investigates the requirements for inventory reporting and control, financial reporting, asset valuation, asset management, and auditing – both physical and financial. The Core PDS for Local Government provides for the minimum amount of data necessary for a local road authority to meet its statutory reporting needs and to implement sound asset management practices.

However, it is important to note that the prime objective of the PDS is not to be prescriptive about minimum data sets that road managers should collect, but to define the most important data sets to harmonise. The PDS balances the assembly of a practical set of data that most road managers would be able to assemble (if not currently collected or stored, then reasonably feasible to be added over time) with having sufficient data to support useful performance measurement and metrics. Finally, the current PDS reflected in Version 4 of the Data Standard has been adjusted to reflect the data requirements of key 'third-party' reports that local and state governments routinely generate.

1.3 Machine Readable Data Standard

The Data Standard has been translated into several different formats. Three machine-readable versions of the Standard have been created using the following widely understood, platform-independent formats:

- Comma Separated Value (CSV)
- JavaScript Object Notation (JSON)
- Extensible Markup Language (XML).

Having the Standard available in these formats is intended to facilitate the management of the Standard as a data asset. It will enable communication of the Standard to users in a format that is compatible with electronic systems such as databases and enterprise resource planning systems.

1.4 Data Scope

The scope of the data items included in this Standard is confined to those required for effective road management and investment. The data items have been categorised against 14 'Function Groups', which have determined the structure of this Standard. Function Groups include:

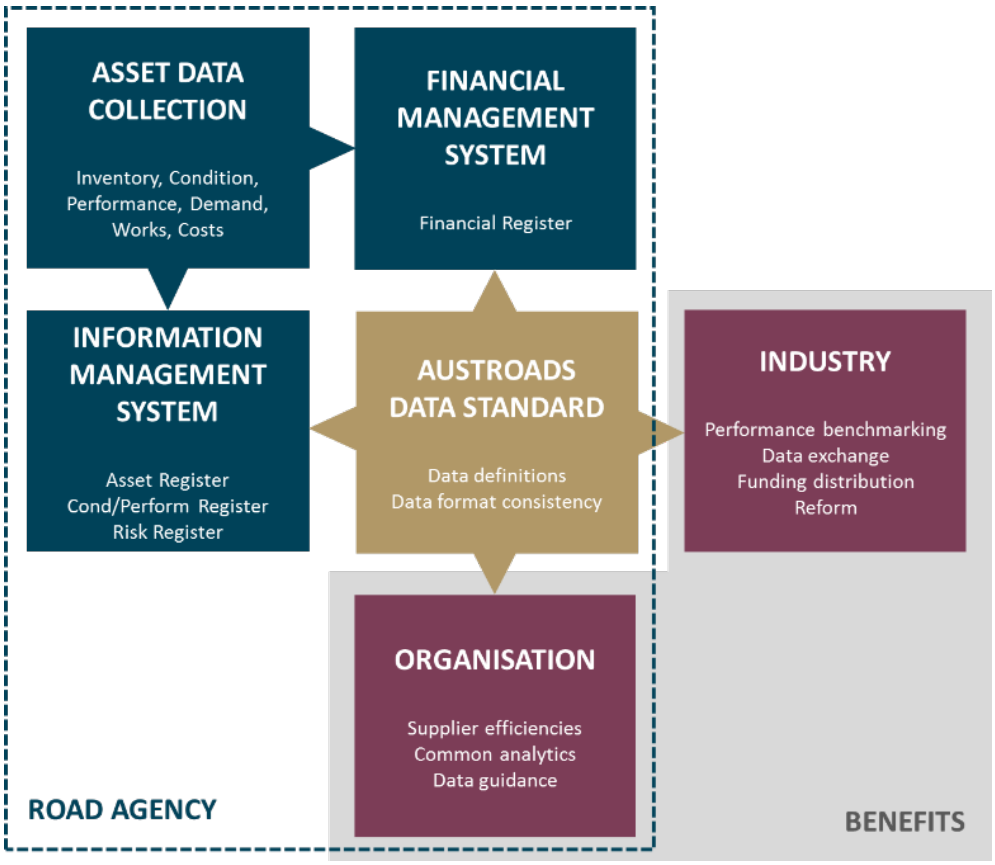
- Network (the road network and its links)
- Classification (the hierarchy and purpose for the links)
- Inventory (the asset register)
- Condition (the condition of the assets)
- Demand (the current road user profiles and vehicle volumes)
- Utilisation (the usage of the assets)
- Criticality (the importance of the assets)
- Risk (the risks associated with the assets)
- Resilience (the ability to restore asset service following an event)
- Performance – asset (the technical performance of the assets)
- Performance – finance (the costs of asset ownership)
- Performance – service (the customer service performance of the assets)
- Access (any road user access restrictions)
- Works and Costs (the physical works plan/achievements and related estimated/actual costs).

1.5 Data Standard Context

It is recognised that organisations use a variety of information systems to store asset-related data. These systems can be broadly categorised into finance data and asset information data. This Standard specifically provides a common specification for data items that feature in financial and asset information management data systems, for the benefit of the organisation and across the industry. The relation of this Data Standard to agency information-gathering processes and the intended users is depicted in Figure 1.2.

This Standard provides structure regarding common data sets to manage assets. It also includes a more extensive data set for organisations operating at higher levels of sophistication in asset management practice.

Figure 1:2 Data Standard context



1.6 Benefits and Impacts

This Standard provides a common specification for road management and investment-related data items to benefit road users and industry.

Austroads believes that the adoption of a common road asset Data Standard can facilitate lower cost outcomes for road managers. It can lead directly to lower data collection costs and training costs for road managers. Widespread adoption of the Data Standard also makes it easier to compare data across road managers. This may enable a range of benefits to be realised which require governments to undertake additional supporting activities or reforms. For example, there is potential for comparable data to be used to deliver:

- improved net benefits from maintenance and capital expansion activities by enabling road managers to learn from other road managers about maintenance strategies and underlying costs
- alternative road funding frameworks based on improved and additional comparable data on maintenance costs and other key factors
- improved net benefits under the Heavy Vehicle Reform by enabling improved data on the costs of maintenance to be combined with road use data obtained from vehicle tracking under the Reform.

The delivery of benefits that involve alternative investment approaches will require some or all road managers to be involved in a common knowledge and analytical platform to enable maintenance and capital expansion-related data contained within the Data Standard to be compared and analysed across road managers. In support of this, Austroads is currently developing a Road Asset Data Standard Platform (RADS Platform) to which road managers will be able to load their road asset data and self-assess the quality of their road asset data. The RADS Platform will also support the automation of various common road asset reports that road managers provide for regulators, grant-conferring bodies, reform agencies and policy-setting bodies.

Moving forward it is anticipated that Austroads will be able to support and enable standard visualisations for road managers for various road asset measures and combinations of measures, create visualisations and reports from uploaded data, and support road managers with the creation of benchmarks and other analytic products from consolidated uploaded data.

Implementing a Data Standard is expected to sponsor new approaches to collecting, recording, storing and, importantly, using road asset data. Austroads is considering a range of activities that will support these elements and deliver benefits from collaboration on standardised road asset data.

1.7 Reporting Data in Terms of this Standard

While this Standard does not define the Asset Management Information System (AMIS) requirements and Asset Register (AR) structure, it is a reference document that provides direction regarding road asset data specifications across a comprehensive set of road management and investment activities. More specifically, this Standard provides a definition for asset data, which is utilised for data analytics and reporting that inform road management and investment decisions. Collecting, storing and organising data against this standard, with a focus on the PDS, can provide efficiencies in sharing and reporting on network data for individual road managers.

1.8 Priority Data Sets

The Priority Data Sets have been established to signal priority areas to focus data harmonisation and collection exercises. Therefore, the PDS for Local Government and a more extensive PDS for State Road Authorities have been articulated as the focus of early implementation efforts.

For Local Government Road managers, the concept of ‘Core’ and ‘Reporting Extension’ PDS has been established. The Reporting Extension Local Government PDS includes further Condition data, Performance (Service), some key Works and Costs data sets, Performance (asset) and Access data. The State Road Authority PDS includes the most important and widely collected road asset data relevant for a Road Authority and supports State/Territory related road asset data reporting and funding information. The categories of PDS are outlined in Table 1:1.

It is important to discuss the relationship between the functional groups in the context of the PDS. Several functional groups are linked to specific inventory data. For example, condition data items are different for pavements than for bridges. As the level of inventory data required increases with the higher PDS levels, the level application of related data items increases. What this means in practice local government road managers when considering the PDS for their networks is that there is a narrower application of the data drawn from other Functional Groups, including Performance, Condition and Works and Cost. When Local Government Road Managers are reviewing their data against the PDS, they should identify first the applicable asset classes and network information. The remaining functional groups within the PDS will relate to those asset classes.

Table 1:1 Data Standard levels and PDS levels

PDS Group	Information
Local Government ‘Core’ PDS	The most useful and widely collected road asset data. Supports minimum asset management and legislated asset management responsibilities.
Local Government ‘Reporting Extension’ PDS	Includes Condition, Performance (service), High utility Works and Costs, Performance (asset) and Access data.
Jurisdiction/State Road Authority	Includes most important and widely collected road asset data relevant for a Road Authority and supports State/Territory related road asset data reporting and funding information.
NA	The remaining data that is not included in any PDS Groups.

1.9 Data Standard Levels

In 2020 Austroads started developing the requirements for the RADS Platform that would give effect to the Data Standard by giving road asset managers an environment to share their asset data and test the quality of their data against the agreed standard.

As part of this process, consideration was given to the preferred system architecture for storing road asset information collected from local and state governments. It became evident that the data measures that made up the PDS fell into two distinct categories that are relevant to the way data is stored and used:

- information that never changed, or only rarely changed, such as segment length or pavement type
- information that was regularly updated. Within this category there were two subcategories
- information linked to specific road assets, such as Condition and Performance (asset) information
- information not linked to specific road assets, such as Works and Costs, Access and Performance (service) information.

Following a review of the feedback supplied, Austroads determined that the application of a 'level' attribute to the data measures in the PDS would be an appropriate aid to assist with the classification of data for storage and analysis purposes. These levels were created as the 'Core' PDS with a 'Reporting Extension' that supports third-party reporting:

- Core PDS information (the never or rarely changing information)
- Reporting Extension, Condition and Performance (asset) information, Works and Costs, Access and Performance (service) information.

In *AP-T355-20 Austroads Data Standard: Priority Data Sets,* an additional level of data outside the core and extensions was defined:

- Extra Data Items of Interest – a collection of data measures identified as 'Extra Data Items of Interest' in AP-T355-20.

For ease of use in electronic systems each of these classifications has assigned a numeric value or level:

- Level 1 – Core PDS
- Level 2 – Reporting Extension
- Level 3 – Reporting Extension
- Level 4 – Extra data items of interest.

The remaining data was categorised into two further levels:

- Level 5 – Information that is likely to be of use to state agencies but not local governments
- Level 6 – The remainder of the data measures.

These levels (1 to 6) have been used internally in the data harmonisation project as a guide to both prioritising the collection of data, and to design storage, archiving and reporting solutions. This categorisation of data levels for use in electronic systems is represented in Table 1:3.

Figure 1:3 Indicative levels by function group

The measures collected in the Data Standard, categorised by their designated functional groups, is shown below.

Table 1:2 Count of data by functional group and Data Standard level

Functional Group	1	2	3	4	5	6	Total
Access			4			11	15
Classification	5					3	8
Condition	1	25		4	4	66	100
Criticality						1	1
Data control						6	6
Demand	7				1	4	12
Inventory	64				2	485	551
Location referencing	13				3	33	49
Network	26			6	1	9	42
Performance (asset)			16		1	12	29
Performance (financial)	10					8	18
Performance (service)		9		1		62	72
Resilience						4	4
Risk						12	12
Utilisation	15					16	31
Works and Costs			21			17	38

These six levels are intended to inform technical data discussions relevant to, and support data upload and transfer discussions in relation to, the Austroads Platform and related processes for road managers and vendors.

Table 1:3 Data Standard levels – PDS relationship

Data Standard Level	Information	PDS Relationship
1	Core Priority Data Set (PDS). The most used and widely collected road asset data. Change to level 1 data is expected to be very limited and infrequent. Level 1 excludes data in the Access, Condition, Performance (asset), Performance (service), and Works and Costs function groups. This data is not expected to change on a regular basis and any change is required to be tracked over time.	This level equates to the Core Local Government PDS
2	Core PDS. The most frequently used Condition and Performance (service) data for reporting.	This level equates to the *'Reporting Extension' Local Government PDS*
3	Core PDS. The most useful Works and Costs, Performance (asset) and Access data.	This level is intended to equate to the *'Reporting Extension' Local Government PDS*
4	Extra data items of interest as defined in *AP-T355-20 Austroads Data Standard: Priority Data Sets*	Levels 4 and 5, when added to Levels 1-3 describe the '*State Road Authority PDS'*.
5	Data identified in the Priority Harmonised Set (PHS) that is not in levels 1-4. Typically state-level information.	
6	All remaining data	Level 6 data items are not picked up in any PDS grouping.

2. Road Management and Investment Practice

Adopting the asset management principles as specified in the ISO 55000 series of standards are fundamental for organisations to clearly define the purpose and expectations of assets as they relate to the wider organisational objectives. This approach is described in International Standard ISO 55001 2014: *Asset Management – Management Systems – Requirements* (ISO 2014b). Accordingly, organisations are encouraged to define their asset management objectives and corresponding strategies, which can be broad in nature. Objectives that are directly related to assets typically fall into one of two categories:

- asset performance (asset preservation – technical levels of service)
- customer service standards (customer experience – customer levels of service).

The asset management objectives are delivered by the organisation's Asset Management System (AMS). The ISO Asset Management Standards (ISO 55000 Series) defines the AMS as "the *set of interrelated or interacting elements of an organisation to establish policies and objectives, and processes to achieve those objectives".* The interacting elements include the assets, people, processes, data & information, and tools that are used to manage assets and the services they deliver.

The data is typically managed using an Asset Management Information System (AMIS). Asset Information Management Systems support cost effective management of physical assets by providing information and tools to assess and determine the optimal time to replace or augment an asset rather than continuing to maintain it, or the best balance of planned and unplanned maintenance.

While the AMS focusses on an integrated 'whole-of-life' approach to managing assets, there is an imperative to do this in a sustainable way without compromising the ability of future generations to meet their obligations. The AMS process is shown pictorially in Figure 2:1.

Figure 2:1 Asset management system

Source: IIMM (IPWEA, Sec. 1.2)

This is the typical process for managing assets from ‘conception to renewal or disposal’, including all the management activities required in between to ensure the required level of service is delivered sustainably in terms of risk, cost, and performance.

Asset management requires effective integration of many key elements supported and coordinated across different disciplines. The *International Infrastructure Management Manual* (Institute of Public Works Engineering Australasia (IPWEA) 2020) describes asset management as “the combination of management, financial, economic, engineering, and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner”. The prime objective is to deliver defined outcomes from infrastructure assets that add value to the organisation and its customers. Value can be defined in different ways depending upon the asset outcomes required. Typical outcomes from asset management include minimising the whole-of-lifecycle cost of assets, minimising asset risk, and maximising customer experience.

The asset management investment planning process identifies the timing and outlays needed to operate, maintain, and replace existing assets. It also includes the consideration of ongoing operating costs of acquiring new (or the adaptation/upgrade of existing assets) in response to changing circumstances. New assets, whether constructed or contributed by others through a development approval process for example, are incorporated into the existing asset portfolio and managed in conjunction with the investment planning process.

2.1 Planning

The asset management objectives define the outcomes that are required from the assets in terms of asset and service performance in line with the organisational objectives. Organisations that focus on asset services tend to configure the asset management system on strategic long-term planning imperatives that maximises the value of assets. A focus on assets typically drives an asset preservation-based planning strategy, which needs to be effectively balanced with the demand-driven, asset development-focussed planning strategy.

The asset management objectives will determine the asset management outputs including the asset and service performance requirements. This planning phase explores the options available to the organisation, including non-asset solutions to deliver the defined asset management objectives. Asset planning is typically undertaken in three broad types: strategic planning, tactical planning, and operational planning.

The strategic planning process is essentially at the heart of asset management, where informed decisions are made for the future based upon an understanding of the required asset outcomes (or levels of service), future asset and service performance, asset-related risk, and the cost to achieve the required asset outputs.

This exercise requires a clearly defined process that identifies:

How risk assessment, prioritisation, and justification process

Who ownership and the key stakeholders involved

When timing for completing the steps in the planning process.

2.2 Acquisition

Acquisition refers to the actions required to acquire new or upgrade of existing assets to provide a higher level of service or a new service that did not exist previously (e.g., a new road to an expanding urban area). This phase explores options such as new construction, inheriting an existing asset, improving an existing asset or buying a new asset. A project options analysis, such as a benefit-to-cost ratio and a triple bottom line approach are typically used to determine the best option for the organisation and its stakeholders. It is important to consider the ongoing cost of operations, maintenance and future renewal in any analysis when comparing options over the same time period.

2.3 Operations

Operations are regular activities that are necessary to provide the service but do not physically alter the asset in any way. Examples include inspection, monitoring and reporting, energy and utility costs such as streetlighting, other examples include street sweeping and roadside slashing and mowing.

2.4 Maintenance

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service standard, including regular ongoing day-to-day work necessary to keep the asset operating. It excludes high-cost capital rehabilitation or renewal activities. Maintenance may include activities that physically alter the asset and are required if the asset is to achieve the expected useful life and typically increases as the asset ages.

Maintenance may be classed as:

- planned, or
- unplanned/reactive.

Good maintenance practice is shifting from short-term reactive maintenance activities to proactive long-term planned asset preservation strategies including related routine and periodic maintenance activities. This approach requires clearly defined levels of service supported by related intervention criteria and response times, which determine the triggers for action.

Renewal/Rehabilitation

Renewal/Rehabilitation restores, replaces an existing asset to its original capacity or service standard. It is expenditure which returns the service capability of the asset up to that which it had originally at the time of acquisition/commission. It is periodically required expenditure, relatively large (material) in value compared to the value of the components or sub-components of the asset being renewed.

Renewal activities allow the service to continue to be used after the original asset has reached the end of its useful life. As it reinstates existing service capacity, it generally has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, e.g., resurfacing or resheeting a material part of the road link, replacing a bridge of the same capacity.

Disposal

Asset disposal occurs when the asset becomes redundant in its current form or function. Either the service is no longer needed, the current assets can no longer provide the service capacity, or technological advances have created a more cost-effective alternative asset. In some cases, the new asset solution may incorporate the current asset in full or part. The Disposal lifecycle activity identifies any significant costs associated with the disposal of an asset when it is removed from service.

Design

The key consideration in the design process is to understand the required level of service. This is typically captured in the form of design criteria that provide the desired outcome from the asset. Given that the asset will be acquired into the asset management system, it is also good practice to undertake an asset management design review, where the ongoing operational, maintenance, and renewal costs are assessed and potentially ‘designed out’ or reduced. This phase aims to maximise the effectiveness of the designed asset.

Useful Life

The longevity of the asset is determined by the quality of materials and the general quality of construction. Accordingly, the construction quality management process and maintenance activities become very important in maximising the service potential of the asset.

A key asset management consideration during the construction phase is the transfer of ‘as-built’ data into the asset owner’s Asset Management Information System. Equally important is the ongoing review and update of the useful life.

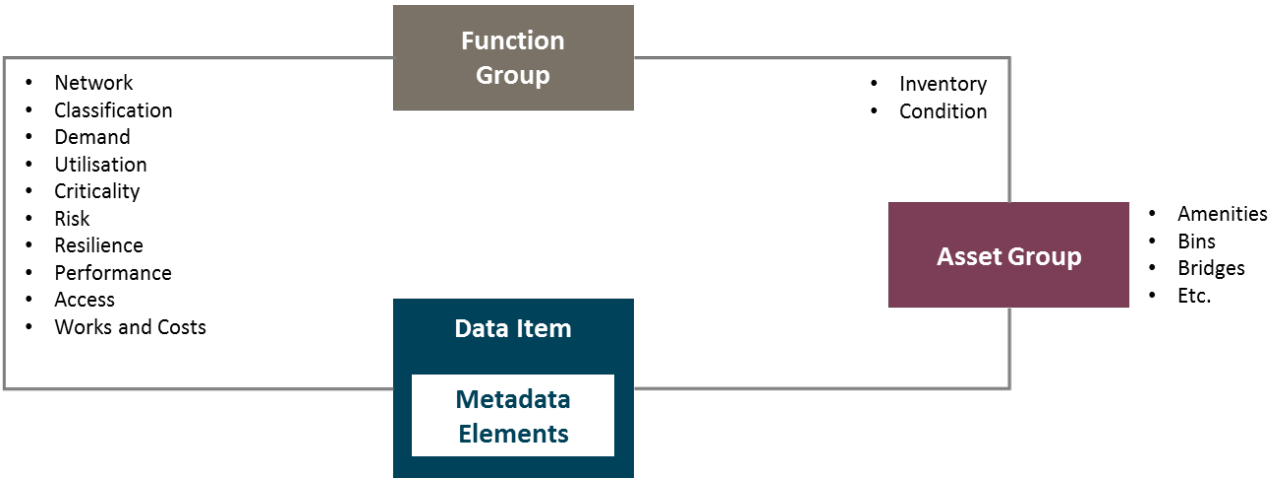
3. Function Groups and Data Items

3.1 Data Specification Structure

The data specifications are structured to allow data management practitioners with varying requirements to navigate to their areas of interest. The data items are grouped in accordance with standard asset management functional practice, and the data items are presented to suit data architecture requirements.

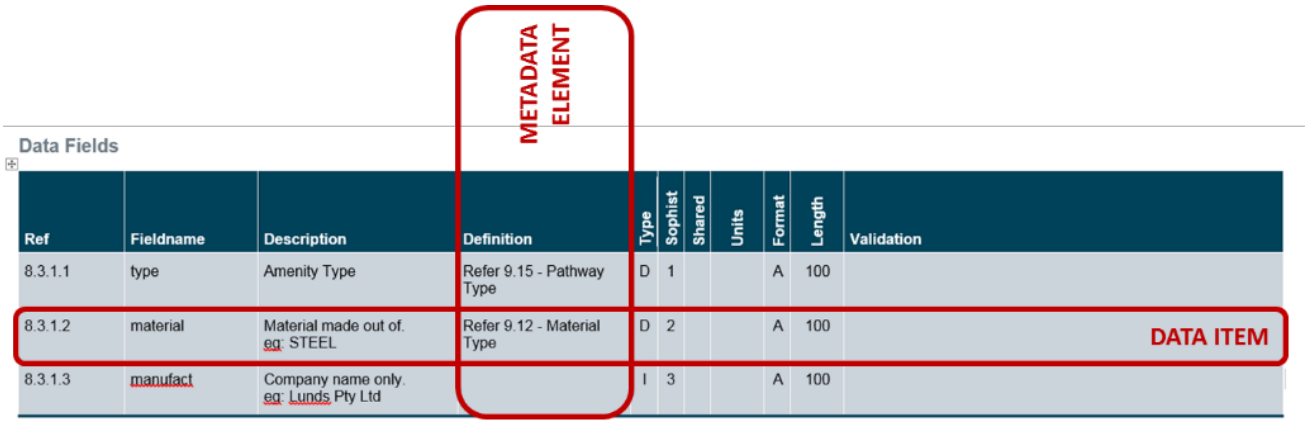
This Standard is primarily structured into function groups. The inventory, and to a limited extent the condition function group, are further broken down by asset types as shown in Figure 3.1. Asset Componentisation is outlined at section 5.3.1 and explains minimum levels of componentisation.

Figure 3:1 Data specification structure



In terms of the data specifications, Data Items are represented in rows and the Metadata Elements are represented by the columns, as shown in Figure 3.2.

Figure 3:2 Data items and metadata elements



3.2 Function Groups

3.2.1 Function Group Scope

This Standard defines the data requirements for a road Asset Management Information System (AMIS) and for reporting to support activities for road management and investment purposes. The function groups are described in Table 3.1.

Table 3:1 Function groups

Function group	Sub-functions	Scope	Examples
Network	• Link • Link section • Network • Node • Road	Roads comprise road link sections that aggregate to form the road network.	Roads segmented by intersections, change in pavement type, and environment.
Classification	• Economic and social • Functional classification	Road links are classified into management categories such as functional use, ranked hierarchy, physical form, or funding.	Highways, arterial roads, collector roads, local roads, life-lines, and freight routes.
Inventory	Common classes • General • Valuation • Additional Specific asset types • Amenities • Bins • Bridges • Earthworks • Fences • ITS assets • Kerb and channel • Land under roads • Landscaping • Lighting • Line marking • Major culverts • Mechanical and electrical • Minor culverts (pipes) • Open drains • Other structures • Parking • Pathways • Pavement • Pits • Public art • Public toilets • Retaining walls • Road barriers • Shelters • Signs	Location of assets relative to the road corridor.	Linear 1D referencing, Geospatial Information System (GIS) 2D referencing, and Built Information Model (BIM) 3D referencing.

Function group	Sub-functions	Scope	Examples
	• Slope treatments • Surfacing, traffic management devices • Traffic signals • Trees • Tunnels • Vehicle crossings		
	• Location referencing – Point – Polyline – Polygon	Description of the asset in terms of scope, attributes, and dimensions.	Material type, size, diameter, width, length.
Condition	• Collection – Timing • Surface • Subjective condition • Visually measured condition • Climate • Pavement – Cracking • Pavement – Deflection • Pavement – Roughness • Pavement – Rutting • Pavement surface – Skid • Pavement surface – Texture • Bridge • Kerb and channel • Pathway/footpaths • Unsealed roads	The measured condition of assets.	Condition rating, condition profiling.
Demand	• Design • Population • Road Use • Traffic Growth	Use demand for an asset.	Traffic growth factors and traffic loading.
Utilisation	• Bicycles • Capacity • Output • Pedestrians • Traffic volumes	The monitoring and recording of classified usage from traffic, cycles, and pedestrians across the road network.	Annual average daily traffic, classified traffic counts.
Criticality	• Output	Identification of the network road links and assets that are a priority to the community they serve.	Life-lines, roads of significance, high priority road links.
Risk	• Consequence • General • Likelihood • Monitoring • Output	The identification, quantification, mitigation, and monitoring of road link and asset risks. This forms the basis for a road focussed risk register.	Risk type, risk exposure, probability of occurrence, and consequence.
Resilience	• Output	The ability for a road link or asset to be restored following an event. This function forms the basis for route management and asset management contingency planning.	Events, outage time, contingency plan, and restoration time.

Function group	Sub-functions	Scope	Examples
Performance (asset)	• Achievement • Asset life • Inventory • Output	Technical performance of an asset.	Pavement deflection.
Performance (finance)	• Development program/project assessment • Investment • Valuation	Financial performance of the assets and services.	Return on expenditure, capital spend, maintaining a small operating surplus, maintaining capital, reporting asset renewal funding ratio.
Performance (service)	• Achievement • Customer experience • Customer safety (condition) • Journey interruptions • Public transport • Road safety • Travel speed • Unplanned incidents • User satisfaction	Performance of an asset from the customer or end user's perspective.	Smooth travel exposure, reliability, journey experience, operating speed, and congestion.
Access	• Identification • Time period	Road access and restrictions.	Vehicle type, vehicle weight, vehicle dimensions, and road geometrics.
Works and Costs	• Forward Works Program (FWP) • Maintenance • Output	Physical work activities and the metrics to measure costs.	Sealing, major patching, resealing, asphalt resurfacing, and bridge repainting.

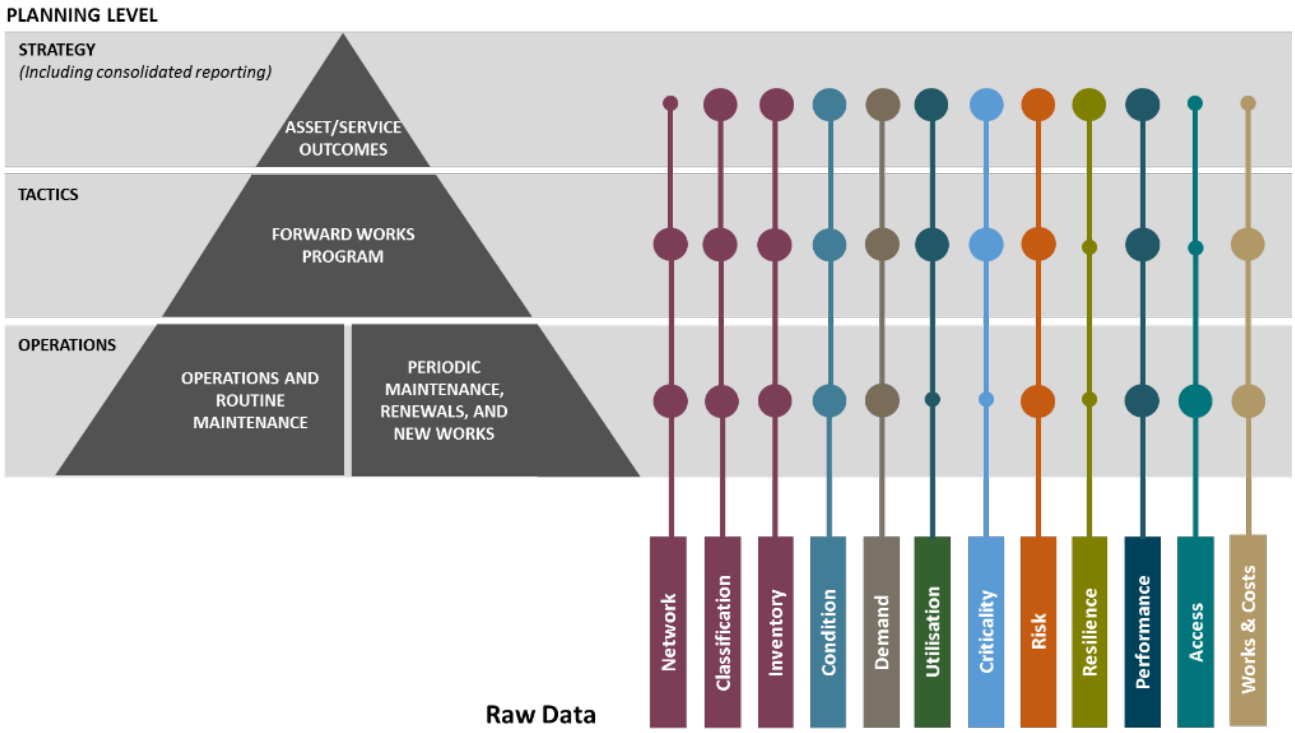
Asset data items presented in this Standard cover the 'whole-of-life' management of assets required to support and substantiate decisions made over the life cycle. These decisions include but are not limited to the following:

- investment management requirements, including asset capitalisation and 'whole-of-life' costs
- asset handover requirements, including asset acceptance information
- asset configuration change requirements, including asset approvals, new assets, configuration and operational changes including changes in asset strategy and concessions to Standards.

A vertically integrated Asset Management System (AMS) creates a framework for effective asset management practice by directly linking the operational activities to the delivery of the asset management objectives. This linkage is sometimes referred to as 'the golden thread' or 'line of sight' in a business context. The AMS allows asset management objectives and outcomes to be understood, asset services to be monitored, asset-related information to be readily shared, and promotes informed decision making.

Figure 3.3 relates the function groups to the three levels of asset management planning activity typically used within an organisation.

Figure 3:3 Asset-related activities and asset data



Note that the smaller circles indicate that the data category has less relevance for that planning level.

Strategy The asset and service outcomes that deliver on the organisation's asset management objectives, including organisation-wide asset portfolio management and investment activities. Strategy has a long-term focus (i.e. 10 years plus). The data requirements that support strategic asset planning and reporting include data items primarily pertaining to classification, inventory, condition, performance, and demand.

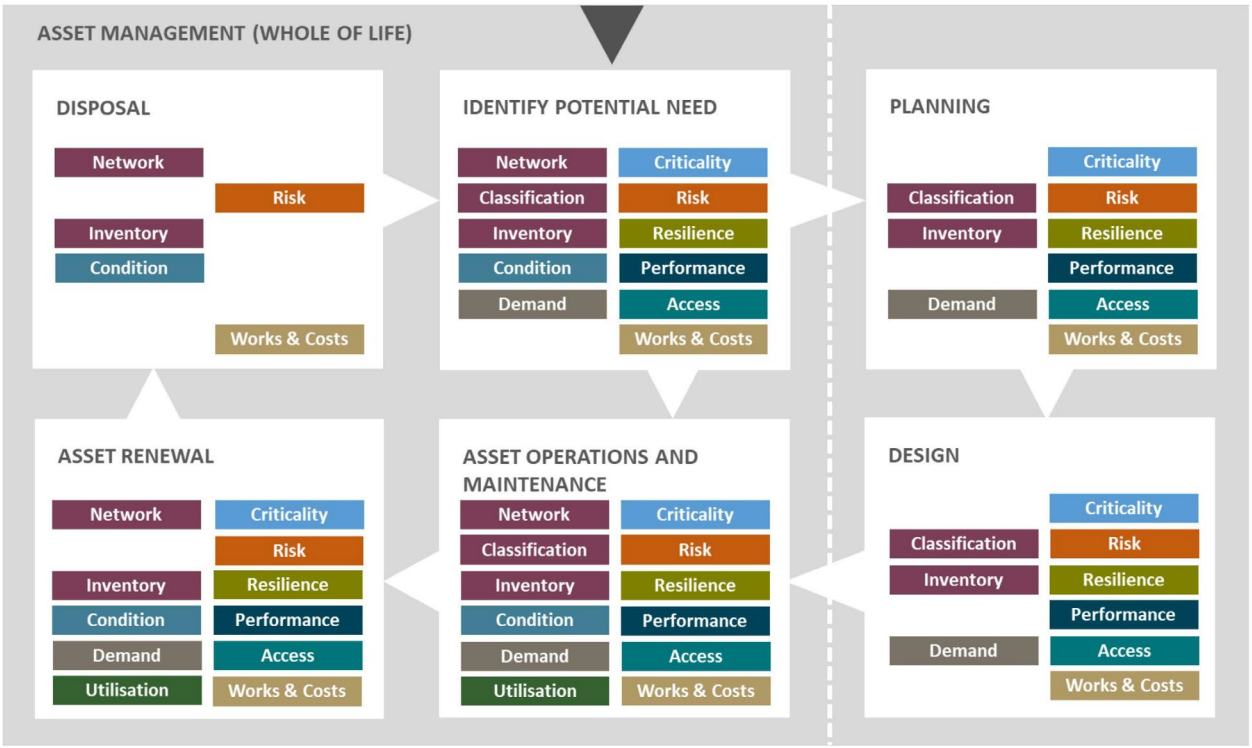
Tactics The tactical activities that manage the assets and related services in order to deliver the required asset management objectives. This includes evidence-based decision-making for developing the forward works program for each asset type. Tactics have a medium-term focus (i.e. up three to ten years). The data requirements that support tactical asset planning and reporting include data items primarily pertaining to network, classification, inventory, condition, performance, demand, and works and costs.

Operations The transactional activities that operate and maintain the assets. This includes data collection, road network operational activities, routine maintenance, periodic maintenance, asset renewals/replacements/refurbishments, and new assets. Operations have a short-term focus (i.e. one to three years). The data requirements that support operational asset planning and reporting are contained under all the functional groups provided in this Standard.

3.2.2 Asset Life Cycle and Function Groups

Figure 3.4 presents the typical asset management and asset development activities and their related function groups.

Figure 3:4 Asset related activities and asset data



The purpose for the data depends on the Asset Management (AM) phase as shown in Table 3.2.

Table 3:2 Function groups and asset management life cycle phase

Function group	AM phase	Activities
Network	Planning	• Defining the sections of road that collectively describe the road network and its connectivity.
	Acquisition	• When an asset is acquired, the network definition will need to be updated.
	Operations	• Many operational functions rely on software/systems which in turn rely on an up-to-date network definition.
	Disposal	• When an asset is disposed of, the network definition model will need to be updated.
Classification	Planning	• Defining the road type by form or purpose.
	Design	• The classification may determine the design criteria.
	Operations	• Performing operations in respect to the defined road classification.
Inventory	Planning	• Providing an accurate record of the existing assets, which can be considered for recycling/reuse in a design phase for a refurbished/expanded asset.
	Design	• Different design standards apply to roads of different functional classifications.
	Construction	• Documenting the detailed ‘as-constructed’ assets and components including metadata where appropriate.
	Acquisition	• Capturing the scope of the assets in the asset register.
	Operations	• Accessing the inventory data for operational purposes.
	Disposal	• Removing the disposed asset from the asset register.

Function group	AM phase	Activities
Condition	Planning	• Developing the condition monitoring programs for the assets and components.
	Acquisition	• Capturing the asset condition in a condition register for assets that are not new.
	Operations	• Capturing all condition-related data on the assets and components in a condition register during the life of the asset.
	Disposal	• Condition is a determinant of residual value/risk/cost of disposal/ decommissioning.
Demand	Planning	• Forecasting the future demand for the roadway/footpath based upon historic demand data.
	Design	• The application of the forecast future demand in the design process to ensure that the design is appropriate for the load/volume over an appropriate useful life.
	Operations	• Recording the traffic volume and utilisation data that semantically reflects the traffic demand for the roadway/footpath facility.
Utilisation	Operations	• Recording the usage (vehicles, cyclists, pedestrians) and assessing the utilisation with respect to capacity.
Criticality	Design	• Ensuring alignment and linkage between the asset criticality rating and the associated design requirements.
	Planning	• Observing the criticality rating on road links and assets for design purposes and acquisition considerations.
	Operations	• Prioritising incident response activities by critical road links and prioritising reinstatement works by asset.
Risk	Planning	• Mitigating any risk when planning assets and services.
	Design	• Ensuring that risks are designed out or managed in the design solution.
	Construction	• Recording any risks that arise as a result of construction.
	Acquisition	• Capturing any risks from new assets in the risk register.
	Operations	• Accessing and maintaining the risk register for operational purposes.
	Disposal	• Removing any recorded risks on disposed assets from the risk register.
Resilience	Planning	• Understanding and setting planning criteria that address the specified level of resilience for the critical road links and assets.
	Design	• Balancing the design scope with the required level of resilience as recorded.
	Construction	• Recording the level of resilience provided for in the design and construction of new assets.
	Acquisition	• Recording the level of resilience in all acquired assets.
	Operations	• Applying the level of resilience for operational purposes, including incident response and reinstatement of critical road links.
Performance (asset, service, financial)	Planning	• Defining the existing or required asset and service performance characteristics.
	Design	• Application of the required asset and service performance characteristics.
	Construction	• Documenting the measured asset and service performance characteristics at construction completion.
	Acquisition	• Capturing the delivered asset and service performance achievements for the assets into the asset performance register.
	Operations	• Assessing the performance of the assets and services.

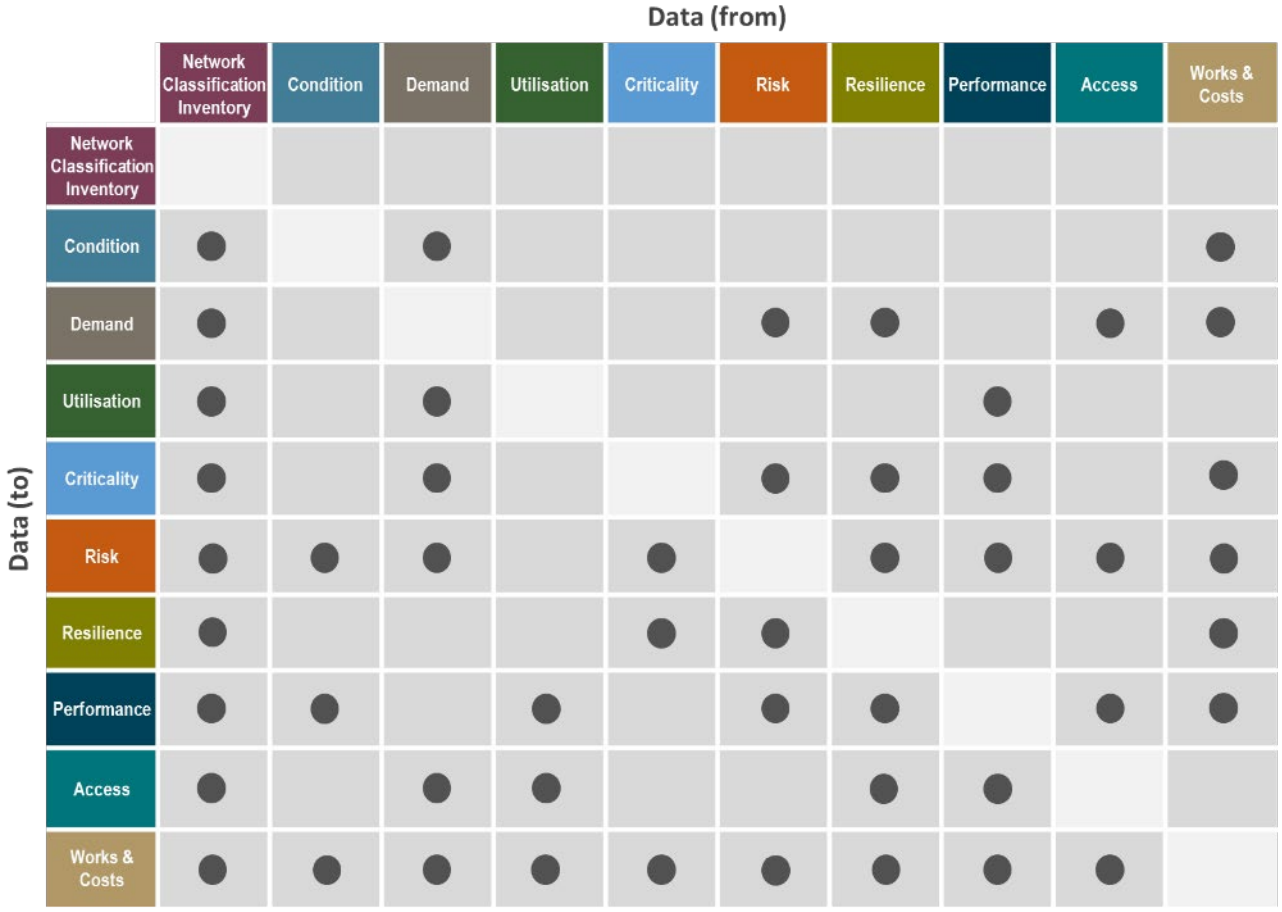
Function group	AM phase	Activities
Access	Planning	• Using the access restriction data for route planning purposes.
	Design	• Augmentation of road network configurations resulting from road design will often result in changes to core access data (e.g. bridge heights).
	Operations	• Using the access restriction data to assist in the operational aspects of managing a road network. This includes transporting over-dimension/over-weight loads and temporary restrictions resulting from incidents.
Works and Costs	Planning	• Using the historic ownership costs from similar assets to assess future costs when planning and justifying new assets. • Analysing historic costs for recurring or intensive maintenance activities, with a view to replacing the asset with a more cost-effective solution.
	Design	• Designing 'out' and designing 'for' operations and maintenance in order to minimise the cost of ownership. • Developing level-of-service requirements for a whole-of-life design approach. • Assessing the cost of ownership resulting from the proposed design.
	Construction	• Assessing the impacts to the designed useful life as a result of the quality of construction and the materials used. • Developing operations and maintenance plans.
	Acquisition	• Transferring and accepting either new or existing assets into the asset management system or the asset register.
	Operations	• Recording the costs to operate and maintain the assets. • Reporting the cost to the asset and services for investment metric and benchmarking purposes. • Updating or revaluing the built assets.
	Disposal	• Removing disposed assets from all future works plans. • Removing disposed assets from the asset/financial registers and associated asset valuation reports.

This Standard has been specifically developed for broad use regardless of the asset management phase.

3.2.3 Function Group Relationships

Some of the function groups presented in this Standard are inter-related, where data is exchanged between function groups. These relationships have been mapped and presented in Figure 3.5.

Figure 3:5 Function group relationships



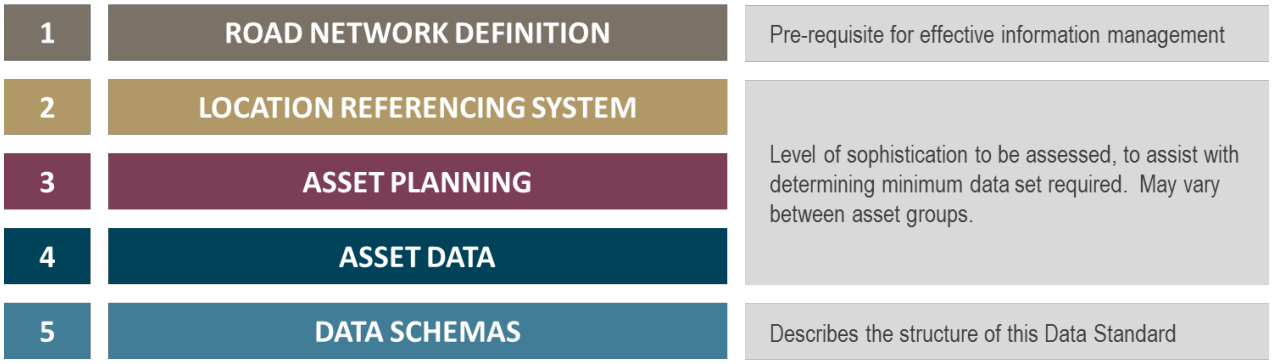
4. Setting the Context

4.1 Using This Standard

This section guides the user through a series of logical steps to establish the relationship between an organisation's road management and investment practice and the relevant data items contained in this Standard. It is recognised that organisations operate at different levels of sophistication, and accordingly this Standard incorporates three broad levels of practice, which are explained in this section. Levels of sophistication have been provided for location referencing, asset management planning, and asset data.

The key steps to using this Standard are shown in Figure 4.1.

Figure 4:1 Using this Standard



4.2 Road Network Definition

4.2.1 Road Network Topology

This Standard allows for various levels of sophistication for collecting, managing, and using inventory data and asset location referencing. The lowest level of asset location referencing uses the road centreline as the principal reference point. Accordingly, this referencing method requires the road network to be defined and geospatially represented as road centreline nodes and links.

This section provides information regarding the simplest method currently used for achieving a network centreline model. Organisations may use a more sophisticated topology model that better represents their road network. However, the principles presented here are still likely to apply. The guidance provided in this section is not intended to be read as a specification.

Austroads (2018b) documented the recent development of the Locational Reference Method (LRM) that gives a model-specific methodology to assign unique references to a location. A review by Austroads (2018a, 2018b) noted the potential inconsistencies in the Data Standard with other data standards, namely the UK Government's *Uniclass 2015* and *buildingSMARTS IFC4*. Further work will be needed in the longer term to harmonise the Data Standard and/or align locational referencing to international approaches.

It is recognised that some organisations create and use static sectioning for their business process and reporting. This type of sectioning generally represents multiple attributes within the one section. However, when the attribute criteria change, it necessitates a change in the network section. By its nature, this approach results in changes to the network model because it utilises aggregation of these sections to derive a network model.

The preferred approach is to divide the individual attributes that are defined within a static section and create an individual layer for this data. For example, if, in the past, link sections have been created based on pavement type, traffic volume, pavement width and speed, then individual layers for the individual data set would be created. In this case separate layers would be created for pavement type, traffic volume, pavement width and speed. The benefit of this approach is that it enables the network model to be dynamically segmented using any individual or combination of data sets.

The definitions for a node and link are:

Node intersection points of links within a road network.

Link in a road network, portion of a road (single links) between two junctions or interchanges or intersections. Its basic characteristics are length, vehicle speeds, travel times, and number of lanes.

Figure 4.2 and Figure 4.3 illustrate the node and link representation.

Figure 4:2 Road network definition model – example road configuration

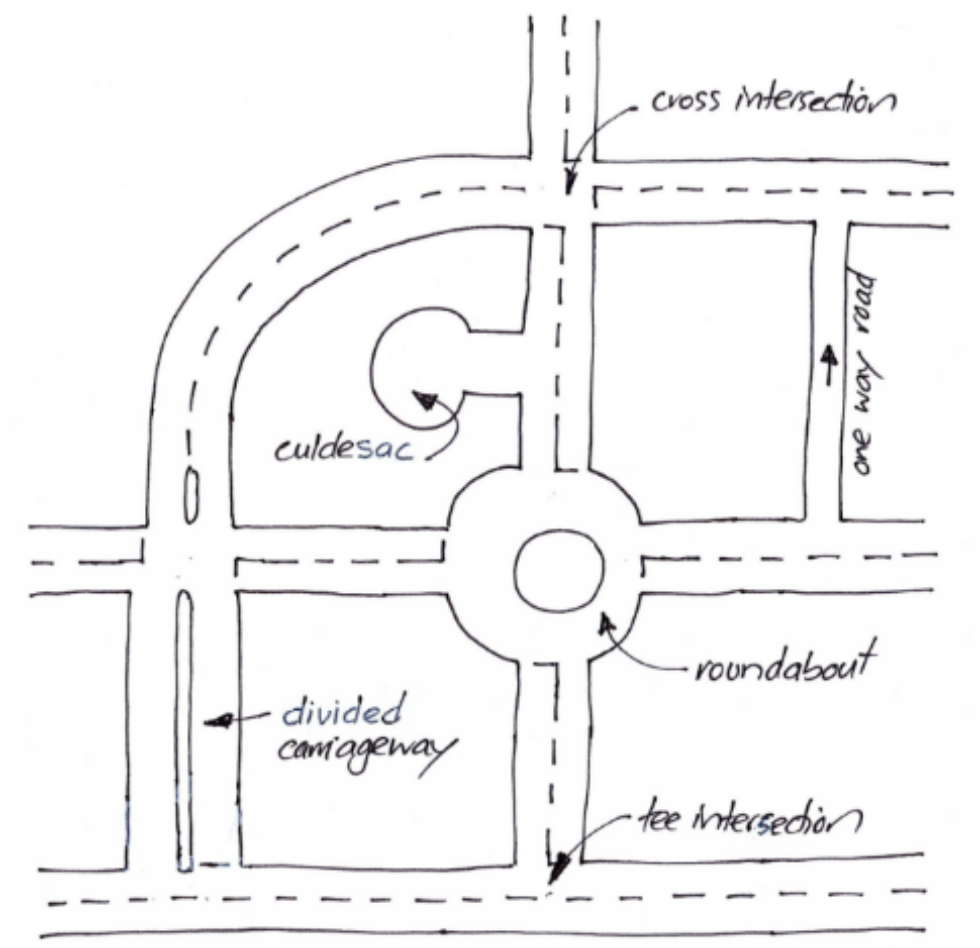
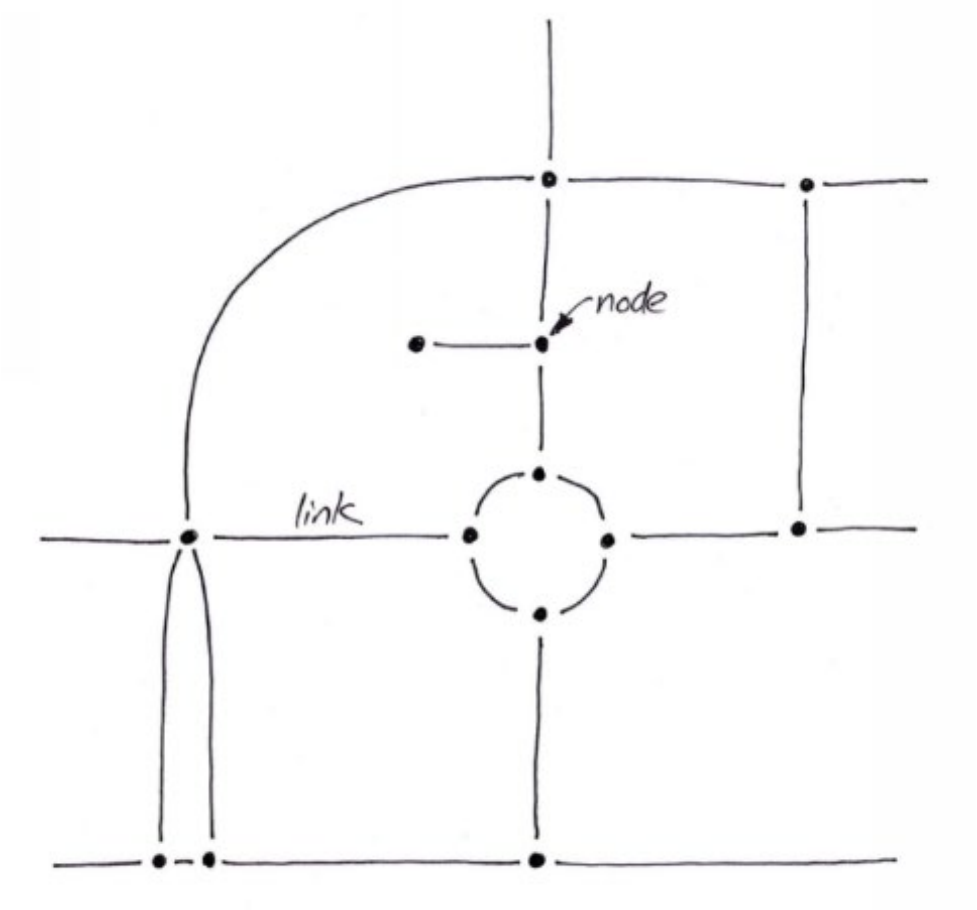


Figure 4:3 Road network definition model – example nodes and links representation



4.2.2 Link Sections

A road link is typically a section of road with homogenous features such as traffic volume and traffic loading, pavement type (sealed, unsealed, structural, bridge), width, number of lanes and urban/rural classification along its length. The following does not specify the criteria for defining or creating link sections, however it does provide practical guidance.

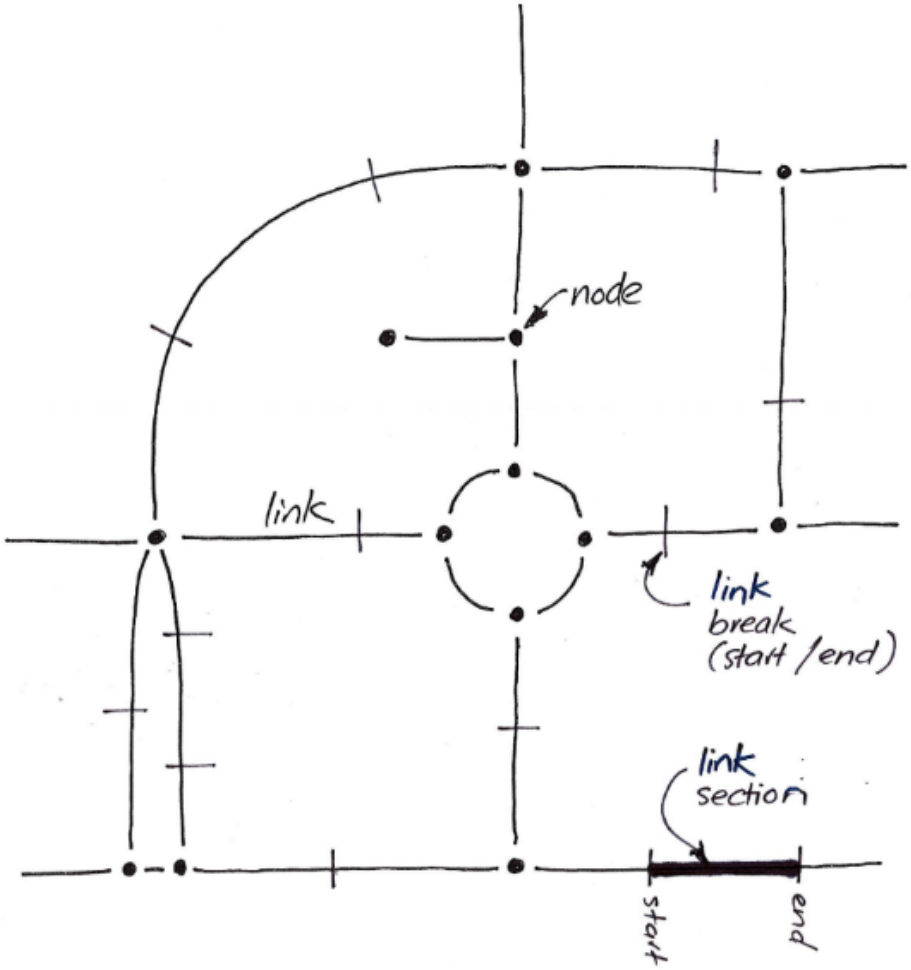
Link sections can be either static or dynamically-determined based upon the criteria applied. Dynamic link sections are more likely to feature in the future as the availability of data expands and the purpose for the link is refined.

A road may be broken down into multiple link sections if any of the following criteria change along its length, such as:

- the number of lanes changes, i.e. from 2 to 3 (at the start of a passing lane)
- the speed limit changes to greater than 70 km/hr (urban to rural)
- the width changes by more than 2.5 m over a significant length (typically > 100 m)
- traffic volumes and/or composition change significantly, such as at major intersections
- the road changes in surface type i.e. sealed to unsealed, or thin surface flexible to bridge.

Link section data includes dimension and road section characteristics and provides the principal framework for all road corridor assets to be attached to. Link breaks define the start or end of each link section.

Figure 4:4 Road network definition model – example link sections



Road length is an aggregation of the link sections for that road. However, there are different groups of links that need to be considered.

4.2.3 Relative Lengths

This Standard consistently applies a common principle for the relative relationship between roads, link sections, and assets. Basic rules for defining the length of these entities, in terms of link sections are:

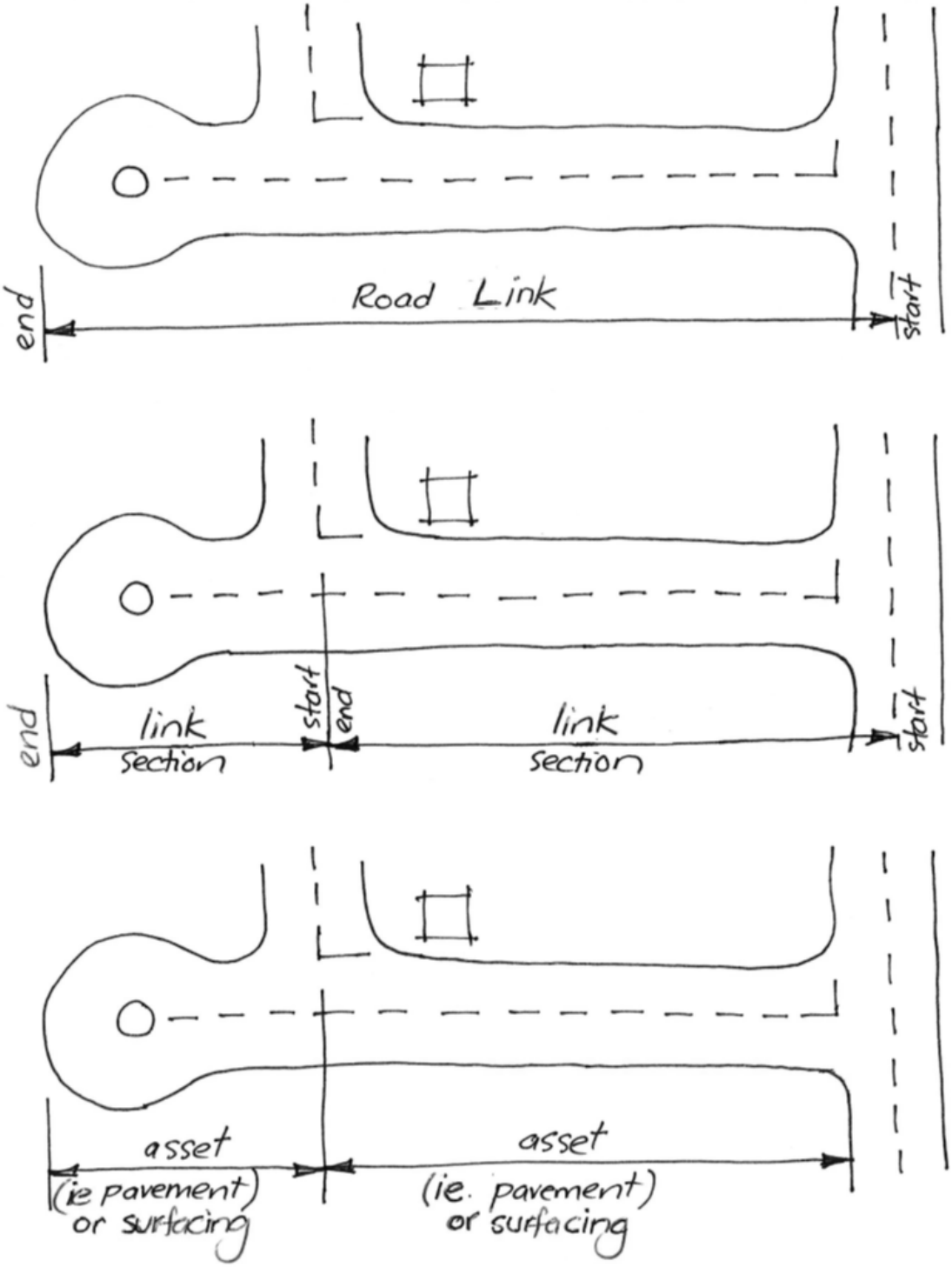
Road Link Length the aggregated length of the link sections along the same road.

Link Section Length a section of road that represents homogeneous features, such as the road surface width or road classification.

Asset Length the measured length of physical assets that are attached to roads and link sections such as retaining walls, road pavement, and footpaths. Note that asset lengths do not need to be contained within an individual link section length, provided the Asset Information Management System is configured to allow asset registration against contiguous lengths of link sections along a road.

Figure 4.5 provides a visual representation of these three entities.

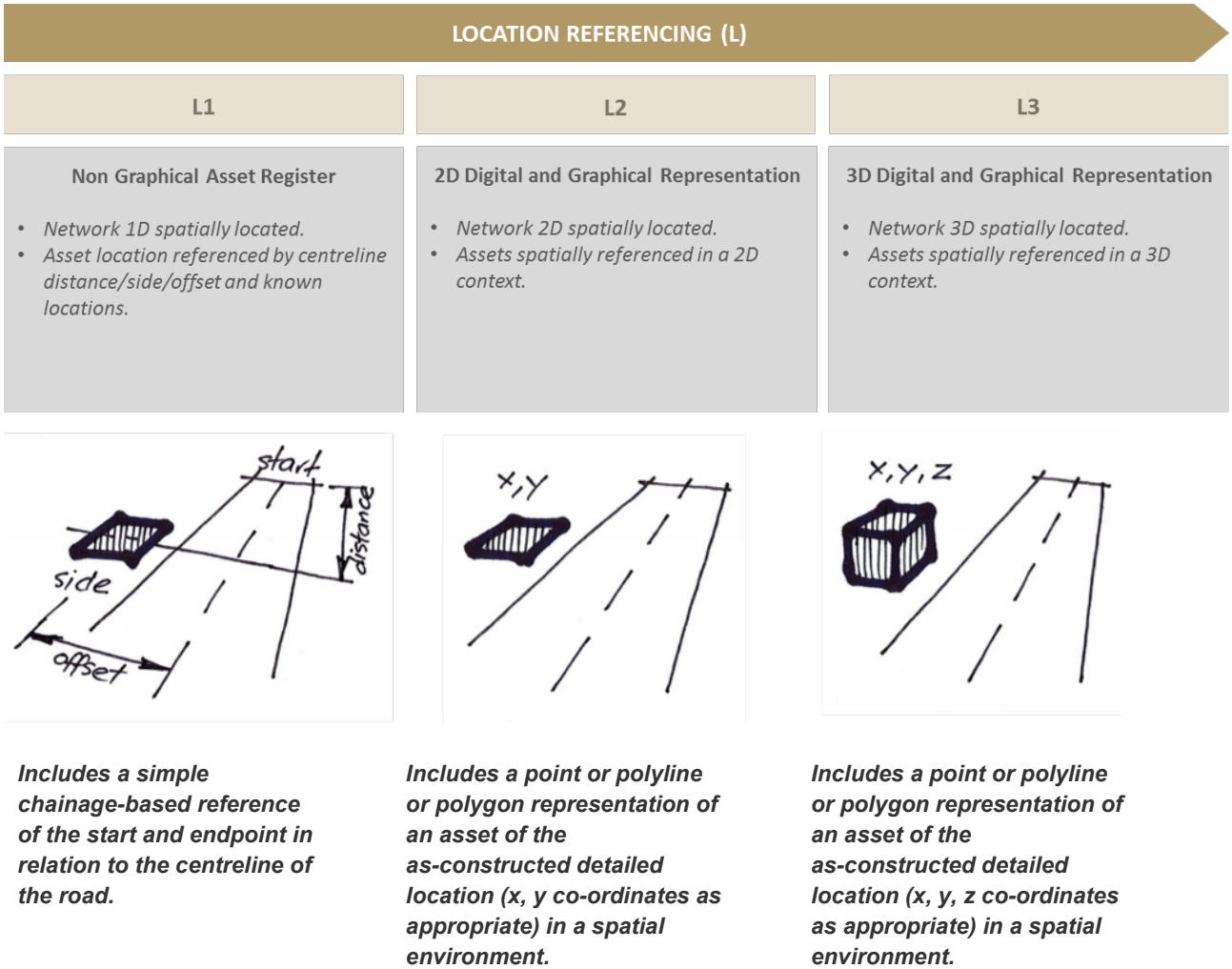
Figure 4:5 Road link features



4.3 Location Referencing System

It is recognised that road agencies use different levels of sophistication in their location referencing, based upon their resources, capabilities, technology, and the required accuracy for asset planning purposes. There are broadly three methods of location referencing. The methods are not mutually exclusive. All three systems have been incorporated into this Standard.

Figure 4:6 Practice sophistication (location referencing)



Organisations are encouraged to maintain their existing location referencing systems regardless of whether or not this system is deemed to exceed the minimum required level of sophistication. Spatial referencing is likely to be universally used by all stakeholders in the future and is already the basis for location referencing for existing 'as-constructed' data capture processes (e.g. R-Spec and ADAC).

4.4 Asset Planning

Data requirements are a function of the Asset Management System requirements. They are determined in part by the Asset Management Planning practice. Within an organisation, the Asset Management Planning practice is typically determined by the asset management objectives that need to be delivered and the corresponding decision-making process. The International Standard ISO 55001:2014 *Asset Management – Management Systems*, provides the requirements for asset planning and the related planning instruments that support the organisation's asset-related service objectives.

For many organisations, the current planning process is a consequence of past practice and may not represent desired practice. Maturity in the planning process evolves over time, typically in response to delivering organisational objectives and improvements in planning capability. Other determinants include resources, capabilities, technology, and budget approval processes.

The asset planning process is inclusive of:

- asset preservation planning, covering maintenance and renewal activities, focussed on maintaining service levels of the existing portfolio of assets
- asset development planning, covering both improvement and expansion activities, focussed on increasing the asset portfolio to enhance service levels by augmenting existing assets and creating new assets.

It is recognised that road agencies operate at different levels of sophistication for asset planning, which can broadly be grouped into three categories.

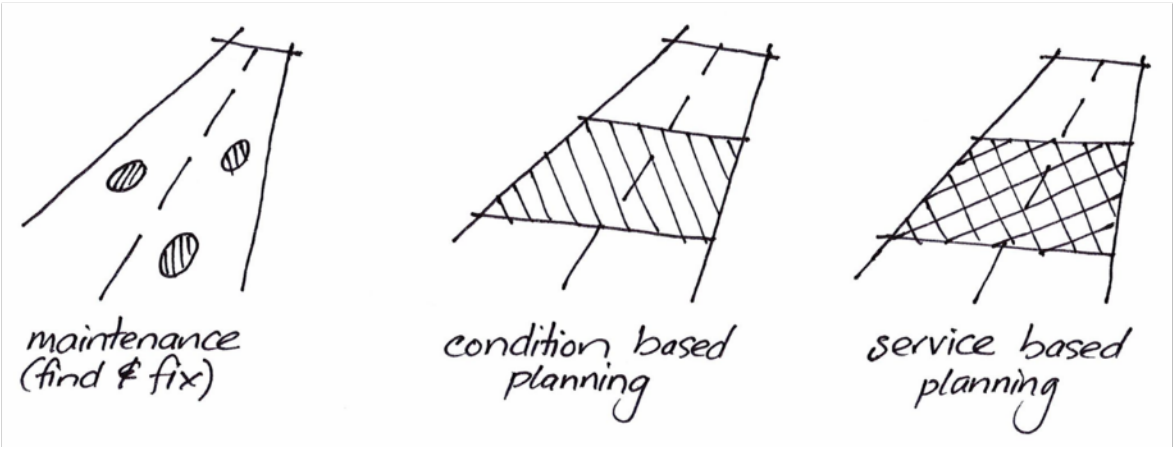
1. Reactive
2. Proactive
3. Optimised.

Each level of sophistication requires incrementally more detailed and different data to inform the decision-making process. All three planning practices have been incorporated into this Standard (Figure 4.7).

Figure 4:7 Practice sophistication matrix (asset planning)

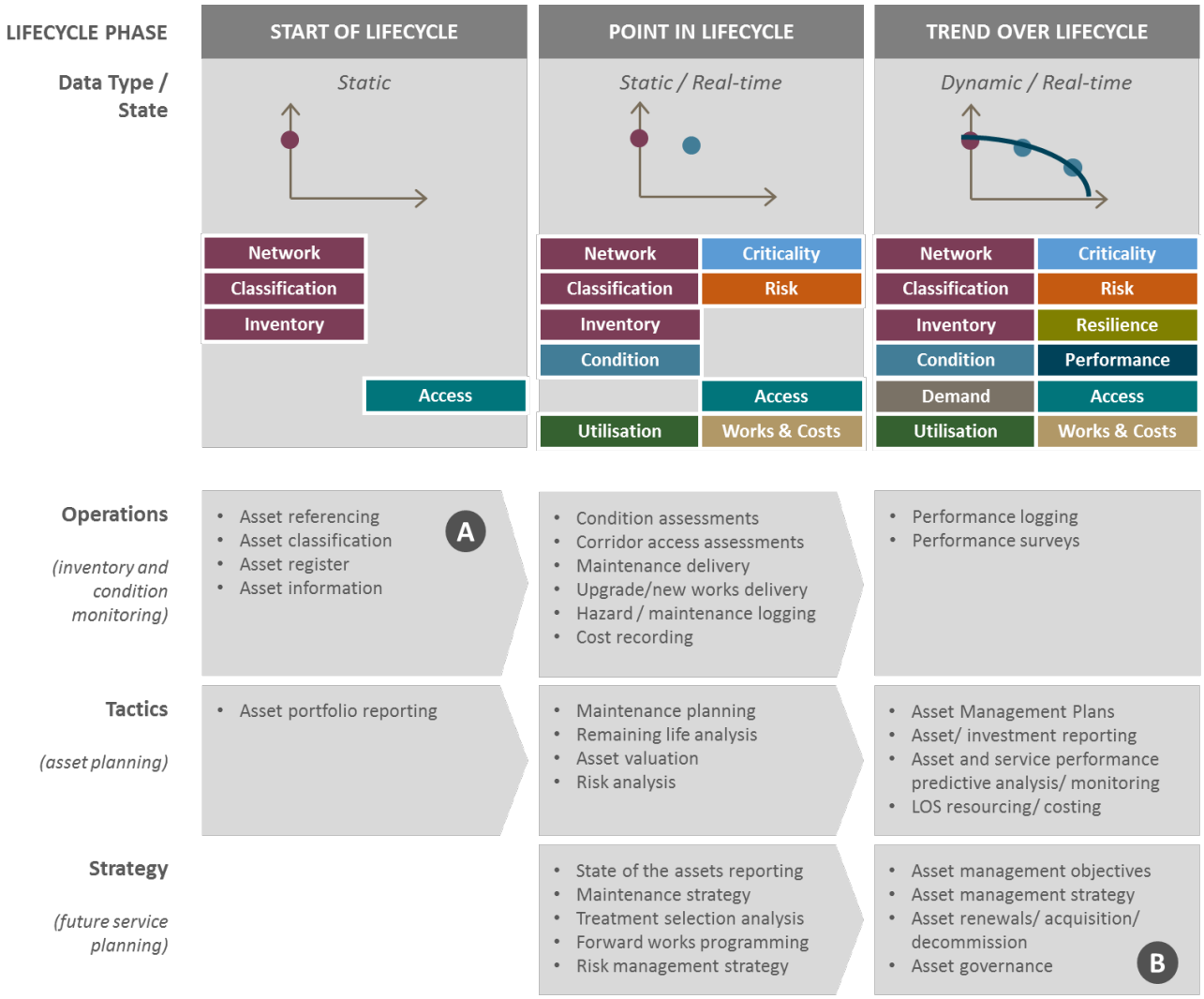
ASSET PLANNING (P)

P1	P2	P3
Reactive (Limited Asset Planning) • *Defect identification and repair.* • *No planned asset preservation works.* • *No quantitative analysis.* • *Guided by top management.* • *Politically driven prioritisation of development projects.* • *Development projects announced in advance of robust planning.* • *Business Cases completed retrospectively after a commitment has been made.* • *Development projects are planned without consideration of life cycle cost implications.* • *Development projects are planned independently of renewal program needs.*	**Proactive Asset Planning** • *Asset condition assessments.* • *Asset management objectives defined.* • *Asset / service performance analysis.* • *Asset level of service defined.* • *Asset management strategies.* • *Prioritised asset works.* • *Prioritisation of development projects is driven by documented selection criteria.* • *Development projects announced only following robust planning and business case approval.* • *Development project business cases include consideration of life cycle cost implications.* • *Renewal program needs considered prior to approval of development projects.*	**Optimised Asset Planning** • *Asset services defined.* • *Asset demand analysis.* • *Asset service analysis.* • *Asset investment options and strategy.* • *Asset portfolio optimisation.* • *Asset linkage to organisational objectives.* • *Development project planning phase announced, contingent on business case and funding.* • *Required increases in operations, maintenance and renewal programs established for whole of development project forward pipeline.* • *Investment processes balance renewal program needs with development project needs, to optimise risk and network level service outcomes.*



An asset planning matrix is shown in Figure 4.8, which was developed in conjunction with stakeholder organisations to identify the potential outcomes from improving asset management practices. This figure shows how an organisation can evolve from simply reacting to asset defects (e.g., reactive maintenance) to developing a more planned approach to delivering services from assets that link to the organisation's objectives (A to B).

Figure 4:8 Asset planning models



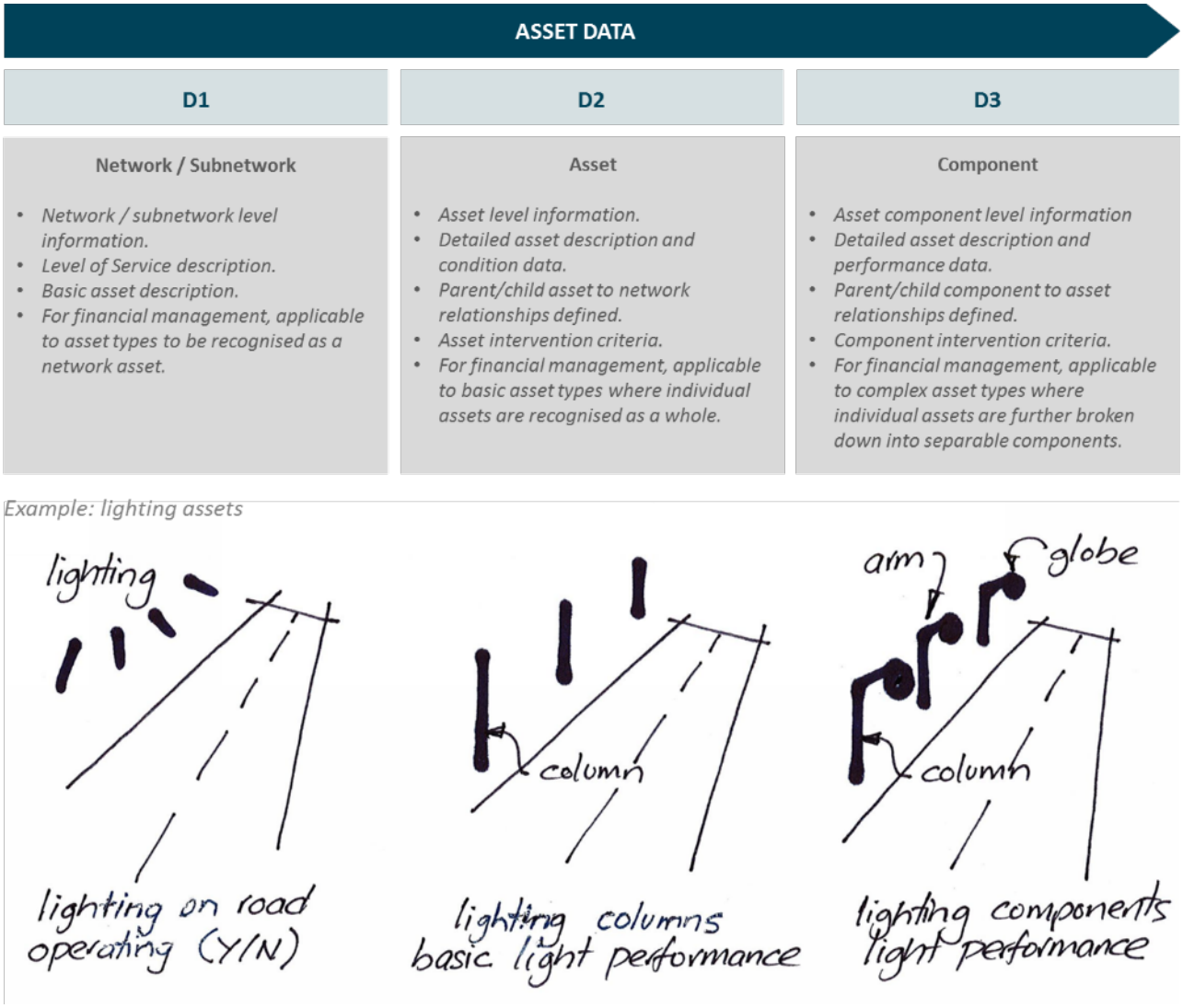
This matrix includes both function group, as it relates to asset life cycle, and level of data application in terms of operations, tactics, and strategy (including organisational-level reporting).

4.5 Asset Data

Asset data needs typically align with the asset planning processes and asset-related reporting requirements. Accordingly, this Standard presents three levels of sophistication that support different levels of asset planning practice, these being network, asset, and component (Figure 4.9). The data associated with each level is progressively more detailed as the level of sophistication increases.

As a guiding principle, data should be collected which is sufficient, but is no more than necessary to implement the business requirements of the organisation, including reporting. In some instances, this might require collecting only network-level data (D1) and in other instances component-level data (D3).

Figure 4:9 Practice sophistication matrix (asset data)



4.6 Data Schemas

4.6.1 Function Groups

This Standard has structured asset data tables under fourteen function groups that collectively support common activities across road management and investment responsibilities. Accordingly, the data items within each function group have been developed by considering their:

- purpose and use within the function group
- integration with other function groups to support inter-operability
- context relative to other data items.

As described in Section 3.2 and detailed in Section 8, this Standard is structured around the following function groups:

1. Network
2. Classification
3. Inventory

4. Condition
5. Demand
6. Utilisation
7. Criticality
8. Risk
9. Resilience
10. Performance (Asset)
11. Performance (Financial)
12. Performance (Service)
13. Access
14. Works and Costs.

4.6.2 Data Items

To assist information management and data specialists with a quick reference guide, Appendix A captures all of the individual data items in alphanumeric order. This approach allows efficient identification of individual data items, as an alternative means to navigation of the full text of this Standard.

4.6.3 Asset Management and Investment Activities

To ensure completeness and integration of the data items across the various function groups, asset management and investment activities have been defined. This approach has identified the core business activities that occur within road agencies and allows the data requirements to be clearly identified. It is convenient when an asset management and investment activity is the starting point for locating data specification details.

Appendix B uses a matrix structure to map the function groups detailed in Section 8 against the following core road management and investment activities:

- Network definition
- Information management
- Corridor management
- Maintenance management
- Road safety management
- Asset financial management
- Asset management data analytics, modelling, planning, and optimisation
- Asset Management System (ISO 55001: Asset Management – Management Systems – Requirements, ISO 2014b)
- Asset reporting and communication
- Asset and project development.

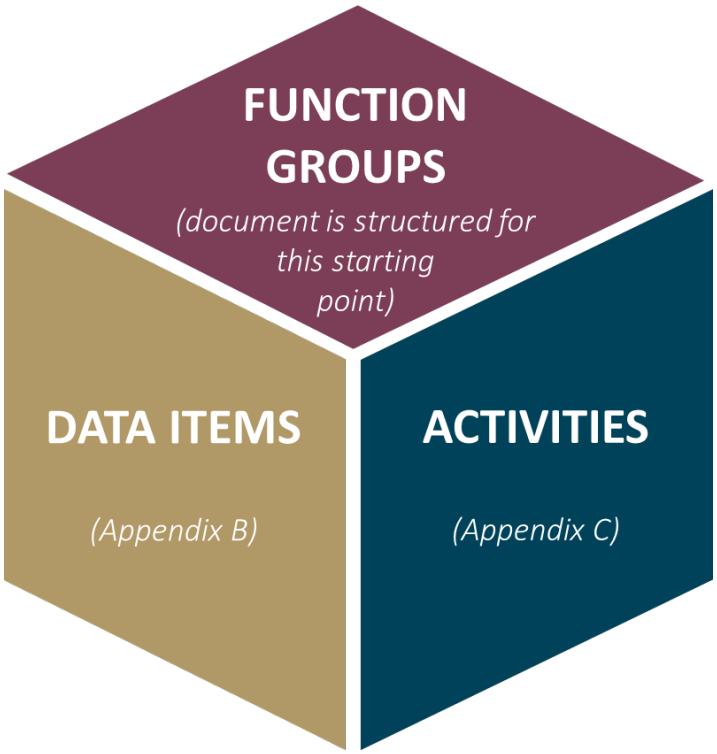
4.6.4 Logical Navigation to Data Specifications

As shown in Figure 4.10, this Standard has been structured to allow the user to locate desired data items via the three different navigation methods as follows:

- Function groups

- Data items
- Activities.

Figure 4:10 Data Standard navigation options



Function Groups	Section 8 of the document is structured by function groups.
Data Items	Appendix B contains a listing of the unique data items regarding the related function groups and asset types where applicable.
Activities	Appendix C contains a listing of road management and investment activities with a reference to related function groups.

4.7 Data Relationship

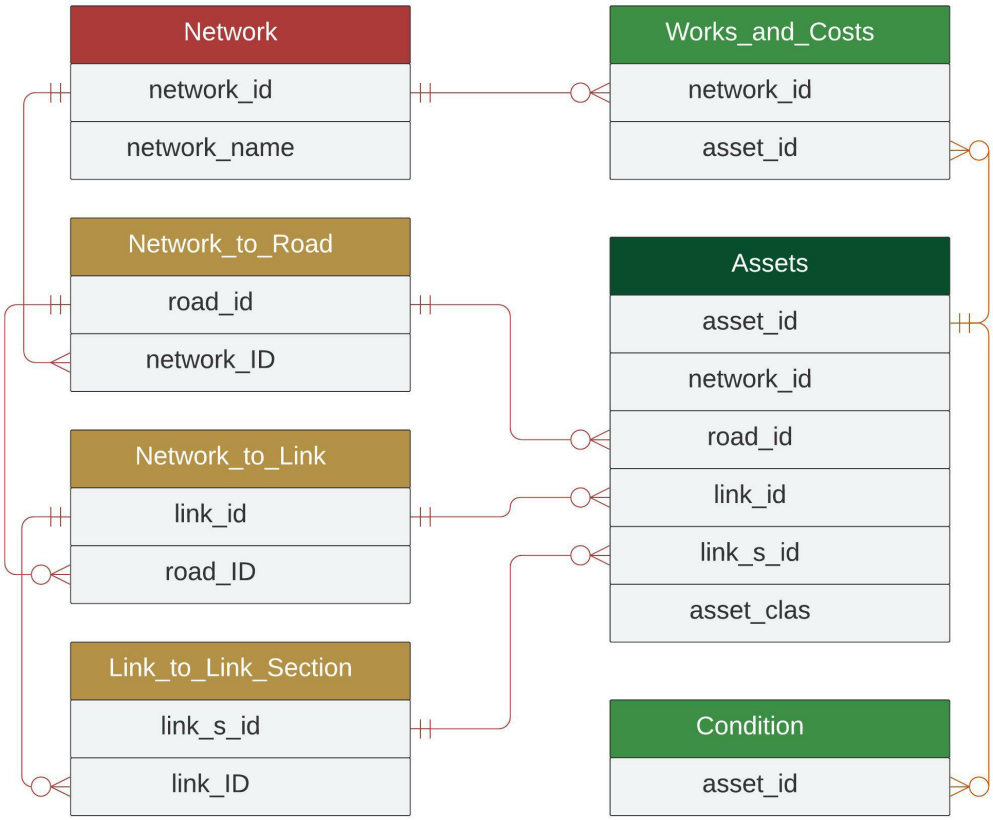
In the collection, management and storage of road asset data it is important to appropriately structure the relationships between the data classes. The following outlines a non-exhaustive set of data relationship rules that can aid in the organisation of road asset data aligned to the Data Standard. The data item codes discussed below can be found at Appendix B.

- **Assets**
  - An asset cannot exist in isolation, it must have a 'parent'
  - An asset's parent can be either a road, link or link section
  - The asset record must contain the relevant parent ID (see Table 8.1: Ref 8.1.12: Road ID; Ref 8.1.9: Link ID; Ref 8.1.19: Link section ID:)
  - All assets require an asset identification (see Table 8.4: Ref 8.3.1: Unique asset identifier).
- **Link Section**
  - A link section is a type of asset

  - If an asset has an asset type of ‘link section’, it must have a Link section ID (See Table 8.1: Ref 8.1.19: link_s_id)
  - An entry for the Link Section ID must exist in the Link-to-Link Section table
- **Road**
  - If an asset does not have a Link ID or a Link section ID, it must have a Road ID
  - An entry for the Road ID must exist in the Network_to_Road table
- **Condition**
  - Must be the ‘child’ of an asset
- **Works and Cost**
  - Can either be the child of an asset or the child of a network

These relationships are important for structuring tables and storing, analysing and sharing Data Standard data. Figure 4:11 further outlines some key data relationships.

Figure 4:11 Data relationships



4.8 Data Confidence

Several data control items that support the use of the data are outlined in Table 7.7 and Section 8.2. These provide critical or important details about the data, including when the data was collected, its precision, the collection standard that was utilised as relevant etc. As Austroads continues to support industry adoption of the Data Standard and collection of Priority Data Sets for collaboration, analysis and reporting, the attribution of the confidence levels that can be applied to data sets becomes more critical. This version 4.0 of the Data

Standard includes Data Confidence (see Table 7.7: Ref 7.2.4), as determined by the method of data creation, in the general tables. Data confidence can be assigned as one of:

- assessed
- guessed
- measured
- unknown.

Austroads acknowledges that the domain of data providence and confidence as it relates to different functional groups requires significant further development and engagement. It is anticipated that future editions will contain more sophisticated approaches.

4.9 Asset Data Life Cycle

Data for asset management and investment purposes is created and collected in phases that correspond to the general life cycle of asset data:

Data Creation Data creation typically refers to the development of the inventory data that forms part of the asset register. Data creation should be informed by clearly documented data specifications. For road assets, inventory data is typically created by either translating the as-constructed documentation or by field identification and measuring of the existing assets.

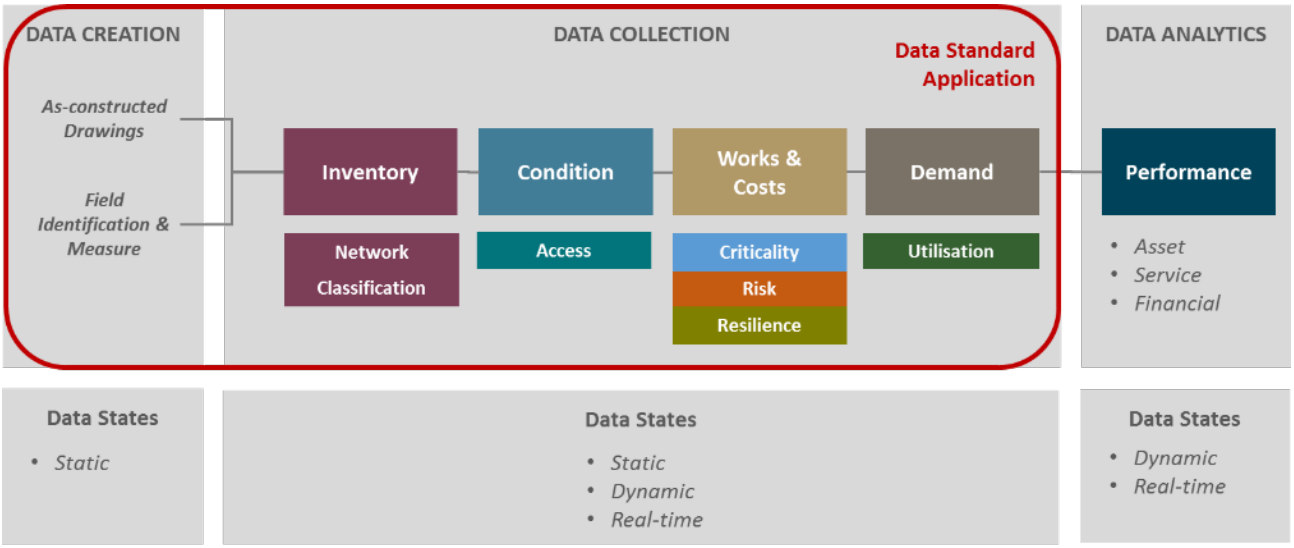
Data Collection Data collection typically refers to the data required for asset management planning purposes. Data collection should be informed by clearly documented data specifications. This data is collected following asset acquisition (operations and maintenance phase) and provides the base data for analysis of asset condition, utilisation, and performance.

Data Analysis Data analytics refers to the science of examining the raw data with the purpose of drawing conclusions about that information. This information directly informs the asset planning decision process.

Data Maintenance Data maintenance refers to the ongoing storage, updating, and reporting of data and applies to all phases.

Figure 4:12 presents the three key data phases and their relevant function groups.

Figure 4:12 Data phases supporting decision-making



Road data can exist in three distinct states depending upon the data type:

Static Data	Data that does not change over time (e.g. fixed inventory such as pavement formation).
Dynamic Data	Data that changes over time, however is measured periodically (e.g. condition data).
Real-time Data	Data that is being measured on a continuous basis and is dynamically changing (e.g. live traffic congestion or average speed monitoring).

5. Priority Data Sets

This section discusses some of the data required to meet the management and reporting requirements of road managers. The Data Standard levels are indicated in the tables by the assignment of a number between 1 and 6 in the PDS field. The following sections identify elements of the PDS that support fundamental management and reporting objectives.

5.1 Data Collection and Collaboration Considerations

There are several issues relating to how the PDS is implemented that will impact on the value and consistency of data being reported. These considerations include:

- **Road Segment length:**
  - Optimal segment spacing should be considered to provide adequate network information whilst minimising data needs.
  - Treat intersections to avoid double counting.
  - Segments should, as far as possible, be homogenous. Renewal works carried out on only part of a segment will result in a range of different parameters applying to various parts of the asset. This can be minimised by not selecting excessive segment lengths.
  - It is critically important to understand that the segment length is the actual centreline distance between nodes and not the calculated straight-line distance between nodes.
- **Bridge Inventory:**
  - Bridges and culverts should be treated as road segments having nodes at each end and recording the centreline length.
  - Other parameters such as the bridge material, number and length of spans and number of lanes are a critical element in providing data for both asset management and heavy vehicle access assessments.
  - Additional bridge data on other vehicle restrictions (including bridge width, number of lanes and physical height restrictions) have been included in the PDS.
- **Cost Reporting:**
  - The PDS provides for appropriate cost reporting, covering operations, maintenance and capital expenditure.
  - It is important that all expenditure is recorded against appropriate assets rather than allocated to a high-level account that provides no detail as to what was carried out and where the cost was incurred.
  - A new item, Depreciable Amount (defined as Gross Replacement Cost less Residual Value), has been added to the revised PDS.
- **Asset Management:**
  - Asset componentisation plays a critical role in ensuring that physical data and financial data are linked so that the performance of individual assets, groups of assets and network assets can be monitored and managed. The revised PDS has been developed with these outcomes in mind.
  - Many local governments do not have recorded traffic data. An initial approach for small to medium councils might be to assume that a range of similar roads in their networks provide for similar traffic volumes and vehicle types. Where actual data exists, this should be used.

5.2 Core Local Government Priority Data Set

The following sections discuss some of the data required to meet the management and reporting requirements of local government road authorities. This section outlines how the Core Local Government PDS supports fundamental management and reporting objectives. Within the Data Standard tables, PDS level 1 indicates that the data is part of the Core Local Government PDS.

5.2.1 Inventory Reporting

The minimum level of data reporting needed to define the network includes information on road lengths and types, and the location and condition of bridge and culvert structures. Once these attributes are adequately recorded, then it is possible to link all the other assets that form the full extent of the network's assets.

5.2.2 Road Segments

At the most basic level, each road segment can be defined by two points connected by a straight line. The two endpoints can be defined by (x,y) coordinates, allowing mapping of the network in two dimensions. The data standard requires an elevation component (z), and while many councils will be unable to supply an elevation at nodes, it is considered that this is a critical element to be planned for in the future. Therefore, it is not in the Core PDS, but where possible should be collected and made available for collaboration.

For this segment-level information to be able to provide accurate information on the centreline length of the network, consideration needs to be given to how the relationship between the calculated distance between nodes and the actual pavement length is to be managed. This is particularly important in areas with changing vertical alignment and/or winding horizontal alignment. In these cases, the centreline length will be significantly greater than the calculated direct distance between nodes.

Two possible solutions to this problem are:

- reduce the node separation to ensure that the sum of the calculated node to node lengths is representative of the actual centreline length, or
- record an actual centreline length between nodes.

The first method results in a vastly increased number of nodes and a proportionate increase in data storage requirements. Unless the node separation becomes impractically small, the actual length of the network will be underestimated, particularly in hilly terrain. Therefore, the PDS instead includes a method that allows for the selection of node separation to balance utility and data storage needs, while providing a much more accurate assessment of the network length. This is achieved in the in the Core Local Government PDS by recording the Chainage at the start of the street segment (see Table 8:30: Ref 8.3.14.3) and the Chainage at the end of the street segment (see Table 8:30: Ref 8.3.14.4).

5.2.3 Bridge Inventory

Bridges and major culverts are an essential element of the road network and are often the determining factor in assessing heavy vehicle access applications. Floodways and causeways are not currently identified elements in the Data Standard. The minimum inventory data should include start and end coordinates (x, y, z), the number of cells or spans, and the total deck area and type.

The PDS includes the recording of load restrictions but does not include detailed structural information which would allow an assessment of the bridge load capacity to be made (it may be included when clarity on national models for automated bridge assessment are agreed). The bridge data in the PDS includes basic data on other vehicle restrictions such as bridge width, number of lanes and physical height restrictions.

5.2.4 Cost Reporting

The Core Local Government PDS provides for appropriate cost reporting, covering both capital works and recurrent expenditure. It is important that all expenditure is recorded against appropriate assets rather than allocated to a high-level account that provides no detail as to what was carried out and where the cost was incurred.

It is also important to understand that the allocation of costs against particular assets and for specific activities will provide a sound basis for asset valuation and the determination of depreciation and asset performance indicators.

As noted above, all necessary cost information is included in the PDS. In addition, maintenance and renewal expenditure is appropriately identified and allocated. These costs are important if the road authority is to meet its statutory reporting requirements as set out in Australian Accounting Standard AASB 116 *Property, Plant and Equipment*.

5.2.5 Asset Valuation

AASB 116 requires that:

> *31 After recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluations shall be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period.*
>
> *34 The frequency of revaluations depends upon the changes in fair values of the items of property, plant and equipment being revalued. When the fair value of a revalued asset differs materially from its carrying amount, a further revaluation is required. Some items of property, plant and equipment experience significant and volatile changes in fair value, thus necessitating annual revaluation. Such frequent revaluations are unnecessary for items of property, plant and equipment with only insignificant changes in fair value. Instead, it may be necessary to revalue the item only every three or five years.*

The Core Local Government PDS specifically includes Valuation data (see Table 8.4 and Table 8.89). This data should be recorded at the component level which provides two advantages:

- the location and distribution of capital across the network is known
- when revaluations are carried out on a rolling basis over one, three or five years, an annual revaluation programme can be readily established.

5.2.6 Asset Depreciation

AASB 116 requires that:

> *50 The depreciable amount of an asset shall be allocated on a systematic basis over its useful life.*
>
> *51 The residual value and the useful life of an asset shall be reviewed at least at each financial year-end and, if expectations differ from previous estimates, the change(s) shall be accounted for as a change in an accounting estimate in accordance with AASB 108 Accounting Policies, Changes in Accounting Estimates and Errors.*
>
> *52 Depreciation is recognised even if the fair value of the asset exceeds its carrying amount, as long as the asset's residual value does not exceed its carrying amount. Repair and maintenance of an asset do not negate the need to depreciate it.*

53 The depreciable amount of an asset is determined after deducting its residual value. In practice, the residual value of an asset is often insignificant (most frequently zero) and therefore immaterial in the calculation of the depreciable amount.

54 The residual value of an asset may increase to an amount equal to or greater than the asset's carrying amount. If it does, the asset's depreciation charge is zero unless and until its residual value subsequently decreases to an amount below the asset's carrying amount.

Clause 53 above is significant in terms of the financial management of road pavement assets. In simple terms, a road is made up of four components:

1. Land under the road
2. Sub-base
3. Base course
4. Wearing course.

Land under the road is non-depreciable. Once acquired, it may change in value depending on adjacent property values. The sub-base and base course may have an initial design life of, say, 60 and 20-years respectively. Their useful life is often found to be in excess of this (e.g., 100 and 50-years) from acceptance of a lower condition intervention (level of service) due to affordability or other priorities. At the end of their useful life, they will have no value. The depreciable amount in year one is equal to the gross replacement cost and depreciation is expensed at 1% and 2% respectively per year in this particular example

Similarly, the wearing course, may have an initial design life, say, 10-years. As time passes, the in-service useful life may be considerably more, say 20-years. The depreciable amount in year one is equal to the gross replacement cost and depreciation will be expensed at 5%.

The key thing to note here is useful life and design life are two fundamentally different terms and concepts that are applied in different ways and cannot be used interchangeably when determining the fair value and depreciation of road assets.

Theoretically they could, and invariably are, the same at the commission date but as circumstances change over time the useful life tends to be (much) longer than the design life the asset was initially designed for.

A new item, Inventory – Depreciable Amount – Gross Replacement Cost less Residual Value, has been added to the PDS.

Depreciable Amount is the cost of an asset (or other amount substituted for cost) less its residual value (AASB116) The Depreciable Amount excludes the value of any non-depreciating assets, such as earthworks and land, included in the financial statements.

The Depreciable Amount cannot be greater in value than the Replacement Cost.

5.3 Asset Management Information Systems

The development of a sound road inventory and the factual reporting of costs provides little basis for good asset management if the two systems are not properly linked. These links should be built into a single integrated information system. The means of achieving this and the benefits to the road manager are briefly discussed in the following sections.

5.3.1 Asset Componentisation

Asset componentisation plays a critical role in ensuring that physical data and financial data are linked so that the performance of individual assets, groups of assets and network assets can be monitored and managed. Austroads Research Report AP-R577-18, *Minimum Levels of Componentisation for Road Infrastructure Assets Guideline* (Austroads 2018c) summarises the advantages of componentisation:

> *Organisations responsible for managing data as input to financial reporting also use this data for other business purposes, such as financial management, inputs to performance metrics, preparing asset management plans and informing planning for forward programs. In consideration of this, it is recognised that there is value associated with componentising infrastructure assets for multiple business purposes. This guideline follows the established understanding that organisations will derive benefits when financial management and asset management principles and practices are aligned. This understanding is core to documents such as ISO 55001 and the International Infrastructure Management Manual.*
>
> *Business benefits expected to be realised by individual organisations include:*
> - *improved data integration,*
> - *increased reporting efficiencies,*
> - *greater transparency and evidence for financial valuation reporting,*
> - *improved availability of financial information to inform forward planning processes,*
> - *greater confidence in financial information to inform performance metrics, and*
> - *improved data analytics to inform optimised decision making by top management.*

There will also be benefits for the wider road sector through consistent reporting and cross-organisation knowledge-sharing initiatives, as well as enabling of more equitable national reform initiatives. The Core Local Government PDS has been developed with these outcomes in mind.

5.4 Traffic Data

Traffic data (AADT, ESA KM etc) is significantly limited or incomplete across many road networks. This restricts systematic reporting or analysis of the expected growth of traffic into the future, or the type and proportion of heavy vehicles. Such information is essential for preparing pavement designs and predicting when growing traffic volumes will reach the point where upgrades are required to meet expected levels of service.

Where resources constrain the ability to collect extensive network traffic data, an initial approach can be to assume that a range of similar roads in a network provides for similar traffic volumes and vehicle types. Where actual data exists, this should be used. Over time these assumptions can be tested against actual road segment performance and maintenance expenditure to improve the overall network performance.

5.5 PDS Reporting Extension

This data set includes a range of condition data for pavements and bridges that were previously within the Priority Harmonisation Subset. It has not been included in the Core Local Government PDS in recognition of the fact that many of these data sets are not typically available within many local governments, and are not necessarily critical to core asset management tasks. However these extra data fields support a range of performance measures and reporting functionality. Several of the pavement condition data sets link to reporting for the Heavy Vehicle Infrastructure Rating project.

The data within this Extension PDS includes:

- visually assessed condition – cracking
- visually assessed condition – rutting

- percentage area affected by cracking
- pavement deflection
- rutting (inner wheel path, outer wheel path, between right and left wheel paths)
- bridge condition (percentage of asset at grades 1-4).

The Reporting Extension PDS also contains a focus on forward works program data elements from the Works and Cost functional group. It includes Performance (Asset) data items that are often included in network performance reporting and analysis. Finally, it includes data related to access restriction that was previously within the PHS.

5.6 Road Authority Priority Data Sets

State and Territory Road Authorities have a wide range of reporting requirements for road asset data. National and state-level linking of the Data Standard to reporting requirements is seen as an important driver in support of uniform adoption. Road agencies have several reporting requirements that draw upon much of the data in the Austroads Data Standard.

These include, but are not limited to:

- Commonwealth Grants Commission
- National Partnership Agreement on Land Transport Infrastructure Projects (Notes to Administration)
- Heavy Vehicle Infrastructure Asset Registers
- National Transport Commission – Investment and Charges Regulatory Requirements
- Key Freight Routes.

Austroads has developed a Priority Data Set focused on Road Agency Reporting data, and to assist in aligning data definitions, metadata requirements and data granularity (i.e. the spacing at which data samples are gathered on road sections or across a road network) for data sets important for road management, investment and associated reform agendas. This is expected to provide efficiencies for State government data collection and manipulation, and to streamline reporting processes.

5.6.1 Road Classification

Road Classification is an important data element in support of good performance measurement and comparison, and for reporting. Currently there is no nationally agreed Road Classification for Australia. The Data Standard has used the New Zealand ‘One Network Road Classification’ (ONRC) scheme while national policy discussions consider approaches that might be suitable for national application in Australia. The ONRC scheme is paraphrased in the Table 5:1. Many organisations use different classification schemes which are partially able to be mapped against the ONRC scheme.

While the PDS currently refers to the New Zealand One Network Road Classification system as a comprehensive system, and has retained it for completeness, Austroads is not endorsing this as a required reporting element for State Road Authorities.

Table 5:1 Outline of 'One Network Road Classification' Road Class Definitions

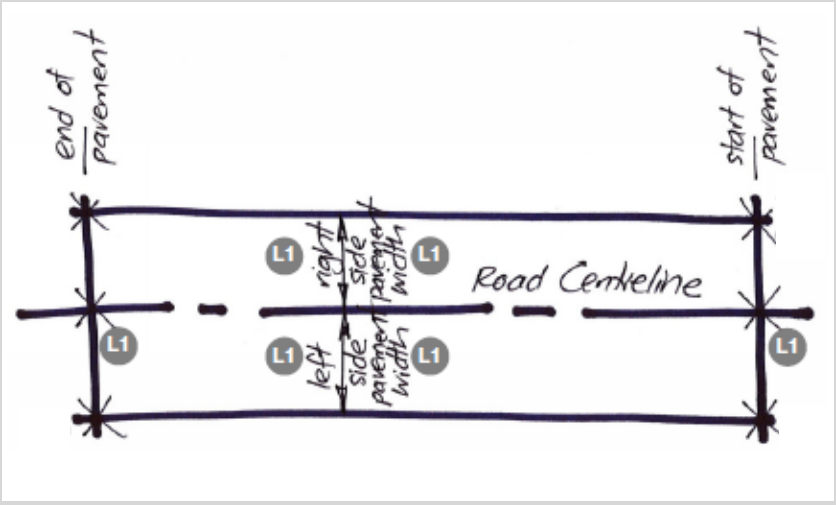
Classification	Utilisation (AADT) Urban/Rural	Heavy Vehicles	Linking Places (Population)	Descriptor
National (High Volume)	>35,000/20,000	>1200	>100k	These roads make the largest contribution to the social and economic wellbeing by connecting major population centres, major ports or international airports, and have high volumes of heavy commercial vehicles or general traffic.
National	>25,000/15,000	>800		
Regional	>15,000/10,000	>400	>30k	These roads make a significant contribution to social and economic wellbeing, linking regionally significant places, industries, ports or airports. They may be the only route available to important places in a region, performing a 'lifeline' function
Arterial	>5000/3000	>300	>10k	These roads make a major contribution to the social and economic wellbeing of a region and connect to regionally significant places, industries, ports and airports. They are major connectors between regions and, in urban areas, may have substantial passenger transport movements
Primary Collector	>3000/1000	>150	>2k	These are locally important roads that provide a primary distributor/collector function, linking significant local economic areas or population areas
Secondary Collector	>1000/200	>25	>250	These are roads that provide a secondary distributor/collector function, linking local areas of population and economic sites. They may be the only route available to some places within this local area.
Access	<1000/200	<25	<250	This is often where journeys start and end. These roads provide access and connectivity to many daily journeys (home, shops, school, etc). They also provide access to the wider network.
Access (Low Volume)	<200/50			

6. Data Classes

6.1 Data Class Definition

Each data class presented in this Standard is defined by the data class metadata elements presented in Table 6.1.

Table 6:1 Data class metadata elements

Metadata element name	Definition
Reference number	Each class has a unique reference number. E.g. 8.3.13
Name	The name of the Asset Type. E.g. pathways.
Definition and comment	The document contains an extended definition and comment about the Class as the preamble under each data class. E.g. 'The portion of a road (typically granular layers) placed above the design subgrade level for the support of vehicular traffic, and upon which the pavement surface (wearing course) is applied.'
Valid location types	The valid locations that can be used for this Class, if relevant. E.g. a bridge can be located and defined linearly or spatially.
Graphic	A graphic further explains the Class and may contain metadata about some of the data items. E.g. where to measure the length. 

6.2 Data Class Attributes (Data Item)

Each Data Class has a defined set of attributes or data items, where each attribute is defined by the metadata elements shown in Table 6.2. This ensures that each attribute is well understood and consistently interpreted.

The definitions for each data type are provided in Table 6.3.

Table 6:2 Data class attributes metadata elements

Metadata element name	Short code	Definition
Data Item Reference number	Ref	Each Item is uniquely identified by a reference number, 9.9.9, or 9.9.9.9. As well as being unique, this identifies the document section where the item is located.
Data Item Name	Name	A meaningful (lower case) name for the data item, e.g. 'number of lanes'. Note that generally this does not include the name of the class (so not 'carriageway number of lanes'). Abbreviations are avoided but may be included when very well known – these are explained in the definition part of the metadata.
Short code	Code	Legacy data stores and applications may have a restriction on the number of characters that can be used, so optionally some data consumers may need a consistent short code. E.g. lane_no. The separating character is always '_'. There is a maintained code glossary (e.g. number is always shortened to 'no' and not sometimes to 'num'). The length of these codes is limited to TEN characters including any underscores. This code may be effectively meaningless to a person or may be commonly used by Subject Matter Experts.
Description	Description	A generally relatively short description of the item. E.g. 'A sequential number for every lane on a carriageway'.
Example	Example	Sometimes it is useful to include some sample values. E.g. '1, 2 or 3' would reinforce the definition for lane number.
Data type	Type	A classification identifying one of various types of data, such as alphanumeric, integer or Boolean. The list of Data Types is defined in Table 6.3.
Number Precision	Precision	Is the number of digits in a numerical value. For example, the number 123.45 has a precision of 5.
Number Scale	Scale	Scale is the number of digits to the right of the decimal point in a number. For example, the number 123.45 has a scale of 2.
Data Item Units	Units	Only where relevant, the unit of measure for the item, for example metres, centimetres, kilometres.
List of values	List	A list of allowable values will be provided for data items where the item must be constrained to one of a set of values. E.g. the list of allowable materials that a deck can be constructed from (i.e. allowable list of values).
Key Purpose for Data Item	Purpose	A category of the main purpose the data is used for. This is either: L Location D Descriptive P Planning (forecasting the future asset state and financial liability) I Optional descriptive data – 'Information'.
Sophistication	Soph	The assessed level of sophistication as defined in Section 4. This is a guide only and organisations will need to determine whether the data item is applicable for its asset management practice. Either 1, 2 or 3.
Industry Standard	Industry Standard	The most relevant industry standard, which in most cases also formed the basis for the related data items.
Priority Data Set / Data Standard Levels	PDS	Priority Data Sets. Data item identified as a priority for implementation by Road Agencies for industry benefit and effective asset management practice. Codes represent: Level 1: LG Core PDS Level 2: LG Reporting Extension PDS (includes condition, performance, service) Level 3: LG Reporting Extension PDS (high utility works and costs, performance (asset) and access data) Level 4: Extra data items of interest Level 5: SRA PDS Level 6: The remainder of the data measures

Table 6:3 Data types definition

Name	Short code	Technical specification	Precision	Scale	Definition
alphanumeric	AN(m)	varchar(m)			[a-z], [A-Z], [0-9], [-] Letter and digits where m is the maximum number of characters allowed. E.g. AN(4) could be 34AB but not 456ABC.
alpha	A(m)	varchar(m)			[a-z], [A-Z], [-] Alphabetical (letters only), where m is the maximum number of characters allowed. E.g. A(4) could be Fred but not Freda.
decimal	DC(p,s)	number(p,s)			Fixed precision and scale numbers with precision (p) and scale (s). Precision is the maximum total number of decimal digits that will be stored, both to the left and to the right of the decimal point. It applies to numeric fields. Length is the maximum length of characters applied to non-numeric fields. Scale is the number of decimal digits that will be stored to the right of the decimal point. This number is subtracted from 'p' to determine the maximum number of digits to the left of the decimal point. E.g. Decimal (5,2) is 999.99 maximum.
integer	I	integer			Positive whole numbers only.
date	D	date			Format DD/MM/CCYY.
date time	DT	datetime			Format DD/MM/CCYY: HH:MM: SS.
money	Mo	number (12,2)	8	2	Dollars and cents.
boolean	B	Boolean			Boolean has two defined values, typically True, False, expressed as Yes (Y) or No (N) in this Standard.
metres	M	number (8,2)	8	2	A numeric data type used when the units are always measured in metres.
well known text	WKT	wkt			The standard text mark-up language for spatial reference system, representing either a single point, polyline or polygon (multi points, lines and polygons are excluded).

NOTE that for attributes the m, p and s are specified as separate metadata elements, but can be displayed as one.

7. Data Item Specifications (Common Classes)

The data items presented in this section apply to all function groups in Section 8. These common classes have been separated for clarity.

The level of sophistication for the provision of location referencing data is not considered to be cumulative. Therefore, if an organisation is operating at level 3, it is not necessary to provide the requirements for levels 1 and 2. The level of detail at a higher level is capable of providing that for the lower level. For example, level 3 can provide the requirements for level 2 and/or 1.

7.1 Object Locations

All assets (objects) are represented spatially as a point, polyline, or polygon, depending on the extent of the asset. The appropriate graphical representation has been specified for each asset type in the Inventory section of this Standard. The common class data set outlined in subsections 7.1.1 to 7.1.3 and described in Tables 7.1 through to 7.6 provides the specification for each graphical representation.

7.1.1 Points

Table 7:1 Inventory location references – points

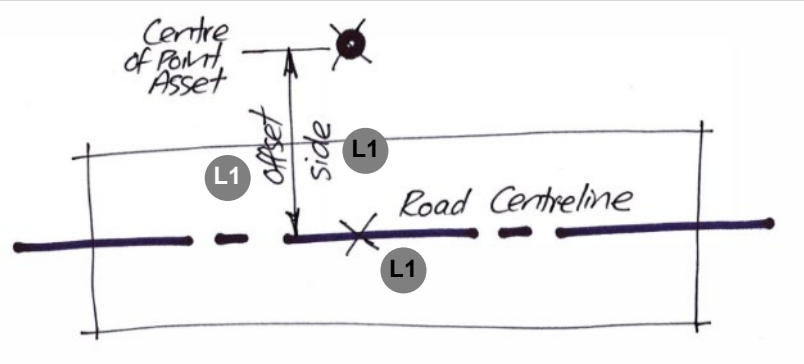
Soph	Location data (point)	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline	
	Side	Either left, right or centre of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 7:2 Inventory location references – points – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.1.1	Location description	loc_desr	Location description if not attached to a road, such as Park name, property address		A	100	None		L	1		
7.1.1.2	Location distance	loc_dist	Distance to the asset from the road origin		I	6	None		L	1		Point location distance to asset from origin (m), integer
7.1.1.3	Side	loc_side	Side of the road the asset is located on relative to the defined network orientation	Left	A	10	None	Code List 9.47	L	1		
7.1.1.4	Offset	loc_offset	Distance from road centreline in metres		DC	3	1		L	1		
7.1.1.5	Projection	loc_proj	Projection the data is reported in including zone if appropriate	NZTM2000 or MGA94 Zn 54	AN	100	None		L	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.1.6	Vertical datum	loc_vert_point	Vertical height datum used to report the data	AHD	AN	100	None		L	2		
7.1.1.7	X coordinate	loc_x	Y coordinate locator point at end of asset		DC	9	2		L	2		Point X coordinate at asset end (degrees) to six decimal places, numeric
7.1.1.8	Y coordinate	loc_y	Original coordinate system prior to transformation		DC	9	2		L	2		Point Y coordinate at asset end (degrees) to six decimal places, numeric
7.1.1.9	Z coordinate	loc_z	Z coordinate (elevation) locator point at centre of asset		DC	9	2		L	3		Point Z coordinate at asset centre (degrees) to six decimal places, numeric

7.1.2 Polylines

Table 7:3 Inventory location references – polylines

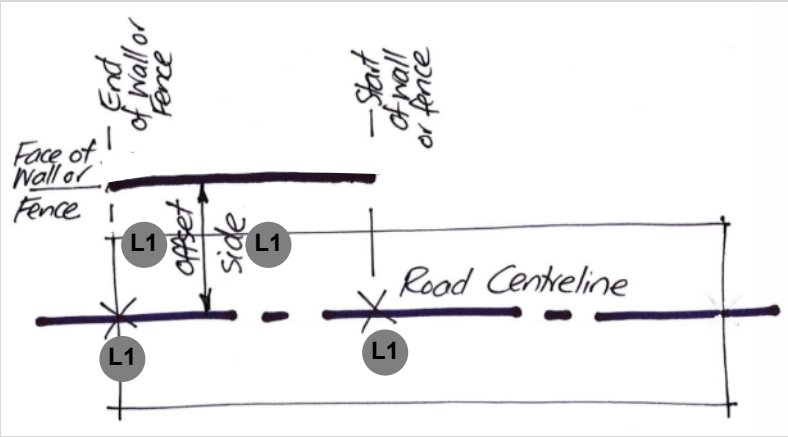
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset	Linear distance along road centreline	
	End of asset	Linear distance along road centreline	
	Side	Either left or right of the road centreline	
	Start of asset offset measurement	Dimension between the road centreline and the asset	
	End of asset offset measurement	Dimension between the road centreline and the asset	
L2	Road ID	The unique road identifier	
	Polyline (asset)	X, Y geometric data	
L3	Road ID	The unique road identifier	
	Polyline (asset)	X, Y, Z geometric data	

Table 7:4 Inventory location references – polylines – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.2.01	Location description	loc_desr	Location description if not attached to a road, such as Park name, property address		A	100	None		L	1		
7.1.2.02	Start location	loc_s	Distance to the asset start point relative to the network orientation		I	6	None		L	1		
7.1.2.03	End location	loc_e	Distance to the asset end point from the road origin		I	7	None		L	1		
7.1.2.04	Side of road start	loc_s_si	Side of the road the asset start is located on relative to the defined network orientation	Left	A	10	None	Code List 9.47	L	1		
7.1.2.05	Side of road end	loc_e_si	Side of the road the asset end is located on relative to the defined network orientation	Left	A	10	None	Code List 9.47	L	1		
7.1.2.06	Start lateral offset	loc_dis_s	Lateral offset measured from the road centreline at its start location, in the increasing direction of travel		DC	3	1		L	1		
7.1.2.07	End lateral offset	loc_dis_e	Lateral offset measured from the road centreline at its end location, in the increasing direction of travel		DC	3	1		L	1		
7.1.2.08	Start width	loc_wid_s	Width in metres of the asset at the start displacement		DC	5	2		L	1		
7.1.2.09	End width	loc_wid_e	Width in metres of the asset at the end displacement		DC	5	2		L	1		
7.1.2.10	Projection	loc_proj	Projection the data is reported in including zone if appropriate	NZTM2000 or MGA94 Zn 54	AN	100	None		L	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.2.11	Vertical datum	loc_vert_polyline	Vertical height datum used to report the data	NZVD 2009	AN	100	None	AHD,NZVD2009	L	2		Polyline vertical datum used to report data, alphanumeric
7.1.2.12	X coordinate start	loc_x_s	X coordinate locator point at start of asset		DC	9	2		L	2		X coordinate at start of asset (degrees), numeric to six decimal places
7.1.2.13	Y coordinate start	loc_y_s	Y coordinate locator point at start of asset		DC	9	2		L	2		Y coordinate at start of asset (degrees), numeric to six decimal places
7.1.2.14	X coordinate end	loc_x_e	X coordinate locator point at end of asset		DC	9	2		L	2		X coordinate at end of asset (degrees), numeric to six decimal places
7.1.2.15	Y coordinate end	loc_y_e	Y coordinate locator point at end of asset		DC	9	2		L	2		Y coordinate at end of asset (degrees), numeric to six decimal places
7.1.2.16	Z coordinate start	loc_z_s	Z coordinate locator point at centre of asset		DC	9	2		L	3		Z coordinate start at centre of asset (m), numeric to one decimal place
7.1.2.17	Z coordinate end	loc_z_e	Z coordinate locator point at centre of asset		DC	9	2		L	3		Z coordinate end at centre of asset (m), numeric to one decimal place

7.1.3 Polygons

Table 7:5 Inventory location references – polygons

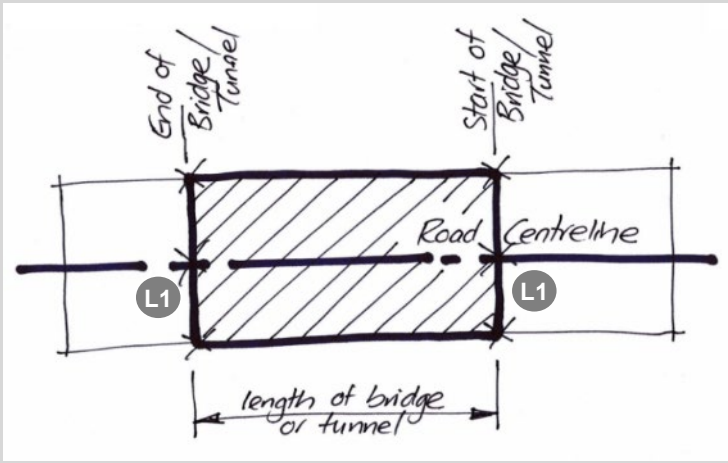
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Asset start	Linear distance along road centreline	
	Asset end	Linear distance along road centreline	
	Side	Either left or right of the road centreline	
	Asset width (left)	Measurement of asset width on left side of road centreline	
	Asset width (right)	Measurement of asset width on left side of road centreline	
L2	Road ID	The unique road identifier	
	Polygon (asset perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (asset perimeter)	Polygon geometric data (X, Y, Z)	

Table 7:6 Inventory location references – polygons – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.3.01	Location description	loc_desr	Location description if not attached to a road, such as Park name, property address		A	100	None		L	1		
7.1.3.02	Start location left	loc_l_s	Distance to the asset start point, left hand side, relative to the defined network orientation		I	6	None		L	1		
7.1.3.03	Start location right	loc_r_s	Distance to the asset start point, right hand side, relative to the defined network orientation		I	6	None		L	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.3.04	End location left	loc_l_e	Distance to the asset end point from the road origin, on the left-hand side		I	6	None		L	1		
7.1.3.05	End location right	loc_r_e	Distance to the asset end point from the road origin, on the right-hand side		I	6	None		L	1		
7.1.3.06	Start lateral offset left	loc_l_s_of	Lateral offset measured from the centreline to the left corner at its start location. Side is determined by the direction of increasing distance along the link		DC	3	1		L	1		
7.1.3.07	Start lateral offset right	loc_r_s_of	Lateral offset measured from the centreline to the right corner at its start location. Side is determined by the direction of increasing distance along the link		DC	3	1		L	1		
7.1.3.08	End lateral offset left	loc_l_e_of	Lateral offset measured from the centreline to the left corner at its end location asset. Side is determined by the direction of increasing distance along the link		DC	3	1		L	1		
7.1.3.09	End lateral offset right	loc_r_e_of	Lateral offset measured from the centreline to the left corner at its end location. Side is determined by the direction of increasing distance along the link		DC	3	1		L	1		
7.1.3.10	Projection	loc_proj	Projection the data is reported in including zone if appropriate	NZTM2000 or MGA94 Zn 54	AN	100	None		L	2		
7.1.3.11	Vertical datum	loc_vert_polygon	Vertical height datum used to report the data	AHD	AN	100	None		L	2		Polygon vertical datum used to report data, alphanumeric

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.1.3.12	X coordinate start left	loc_x_s_l	X coordinate locator point at start of asset left hand side		DC	9	2		L	2		
7.1.3.13	Y coordinate start left	loc_y_s_l	Y coordinate locator point at start of asset left hand side		DC	72	None		L	2		
7.1.3.14	X coordinate start right	loc_x_s_r	X coordinate locator point at start of asset left hand side		DC	9	2		L	2		
7.1.3.15	Y coordinate start right	loc_y_s_r	Y coordinate locator point at start of asset right hand side		DC	9	2		L	2		
7.1.3.16	X coordinate end left	loc_x_e_l	X coordinate locator point at end of asset left hand side		DC	9	2		L	2		
7.1.3.17	Y coordinate end left	loc_y_e_l	Y coordinate locator point at end of asset left hand side		DC	9	2		L	2		
7.1.3.18	X coordinate end right	loc_x_e_r	X coordinate locator point at end of asset right hand side		DC	9	2		L	2		
7.1.3.19	Y coordinate end right	loc_y_e_r	Y coordinate locator point at end of asset right hand side		DC	9	2		L	2		
7.1.3.20	Z coordinate start left	loc_z_s_l	Z coordinate (elevation) locator point at start of asset left hand side		DC	7	2		L	3		
7.1.3.21	Z coordinate start right	loc_z_s_r	Z coordinate (elevation) locator point at start of asset right hand side		DC	7	2		L	3		
7.1.3.22	Z coordinate end left	loc_z_e_l	Z coordinate (elevation) locator point at end of asset left hand side		DC	7	2		L	3		
7.1.3.23	Z coordinate end right	loc_z_e_r	Z coordinate (elevation) locator point at end of asset right hand side		DC	7	2		L	3		

7.2 Data Control

It is important to assess and make note of the accuracy of the data at the time of recording.

Table 7:7 Data control – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
7.2.1	Data date	dat_date	The date the data was originally collected and recorded		D	100	None		P	1		
7.2.2	Data owner	dat_owner	The owner of the data		AN	100	None		P	1		
7.2.3	Data source	dat_source	The original source of the data		AN	100	None		P	1		
7.2.4	Data confidence	dat_confid	The implied confidence of the data as determined by the method of data creation		A	100	None	Code List 9.9	P	1		
7.2.5	Data editor	dat_editor	The person who entered the data into the database		AN	100	None		P	1		
7.2.6	Data edit date	dat_edit	The date the data was last edited		D	100	None		P	1		

8. Data Specifications (Data Classes)

8.1 Network Definition

Overview

All road agencies need to define their road network in terms of the road links and their connectivity. This network model provides the basis for route planning and referencing network-related data that cannot be directly associated with road-based assets.

Scope

This section outlines the data items that describe the road network, including the links and link sections that form the basis for the network. The road network model is the prime location reference for most asset-related function groups. Section 4.2 provides guidance on how to define the road network, including detailed information on a topologic model.

Table 8:1 Network definition – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.1	Network Name	network_name	Name of the road network	City Council								
8.1.2	Node ID	node_id	Unique reference identifier for the network node	1234567	I	10	None		L	1		Polygon vertical datum used to report data, alphanumeric
8.1.3	X coordinate start node	node_x_s	The X coordinate locator point that defines the start node of a road		DC	9	2		L	1		Polygon vertical datum used to report data, alphanumeric
8.1.4	Y coordinate start node	node_y_s	The Y coordinate locator point that defines the start node of a road		DC	9	2		L	1		Polygon vertical datum used to report data, alphanumeric

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.5	Z coordinate start node	node_z_s	The Z coordinate (elevation) locator point that defines the start node of a road		DC	7	2		L	1		Polygon vertical datum used to report data, alphanumeric
8.1.6	X coordinate end node	node_x_e	The X coordinate locator point that defines the end node of a road		DC	9	2		L	1		Node X end coordinate degrees, numeric) to six decimal places
8.1.7	Y coordinate end node	node_y_e	The Y coordinate locator point that defines the end node of a road		DC	9	2		L	1		Node Y end coordinate degrees, numeric to six decimal places
8.1.8	Z coordinate end node	node_z_e	The Z coordinate (elevation) locator point that defines the end node of a road		DC	7	2		L	1		Node Z end coordinate degrees, numeric to one decimal place
8.1.9	Link ID	link_id	Unique reference identifier for the network link between two nodes. Every link must have a start node and an end node		I	10	None		L	1		
8.1.10	Link traffic flow	link_tflow	The flow direction of traffic on the link. This can either be one or two-way flow. One-way flow can be in the increasing or decreasing direction. The increasing direction is denoted by the direction of travel from the start node to the end node	One way decreasing	AN	50	None	Code List 9.61	L	1		
8.1.11	Link length	link_len	The actual distance between the start and end node for a road. This is the link length		I	6	None		D	1		
8.1.12	Road ID	road_id	Unique reference identifier for an existing road		I	10	None		L	1		Road unique reference ID, integer

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.13	Road name	road_name	Road name spelled in full, no abbreviations for type of road. For subdivision roads, the proposed name can be available from the organisation it will be vested to	Jones Drive	A	10	None		L	1		Road name, alpha
8.1.14	Road length	road_len	Total length of road network, measured in kilometres. Divided carriageways in excess of 200 m are considered separate roads in forward and reverse directions		I	7	None		P	1		Road total length (km) in road network, integer
8.1.15	Lane kilometre length	lanekm_len	Total length of road network, measured in lane kilometres. Hard shoulders are not considered a lane, unless they are signed for periodic use during peak periods		I	7	None		P	2		Road total length (lane-km) in network, integer
8.1.16	Number of major structures	no_str_tot	Total number of major structures across the road network, including bridges and major culverts		I	6	None		P	1		
8.1.17	Number of bridge structures	no_str_bri	Total number of bridges across the road network		I	6	None		P	1		Total number of bridges in network, integer
8.1.18	Number of major culvert structures	no_str_cul	Total number of major culverts across the road network		I	6	None		P	1		Total number of major culverts in network, integer
8.1.19	Link section ID	link_s_id	A link that is broken into more than one part creates a link section. Each link section has a unique ID to identify it. Where only one link exists between nodes there is no link section, or link section ID		I	10	0		L	1		Link section unique ID, integer

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.20	Link section start displacement	link_s_s	The start displacement of the link section as determined by the network orientation		I	6	0		L	1		Link section start displacement (m), integer
8.1.21	Link section end displacement	link_s_e	The end displacement of the link section as determined by the network orientation		I	6	0		L	1		Link section end displacement (m), integer
8.1.22	Link section length	link_s_len	The length of the link section calculated by deducting the link section end displacement from the link section start displacement		I	6	0		D	1		Link section length (m), integer
8.1.23	Link section average width	unit	The weighted average width of the link section measured between edge of pavement to edge of pavement for unsealed roads. For sealed roads from edge of seal to edge of seal where no kerb is present, or kerb face to kerb face		DC	3	1		D	1		Link section average width (m), numeric to one decimal place
8.1.24	Link section uniform width	link_s_uni	An indicator that represents the consistency in the link section width. Where the measured width variation is less than 1.0 m use uniform, and if greater use varying		A	1	0	U-uniform width, V-varying width	D	1		
8.1.25	Reserve width left from centreline	res_wid_l	The lateral offset distance from the road centreline to the left side of the corridor reserve boundary. Side is determined by the network orientation	10.5	DC	3	1		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.26	Reserve width right from centreline	res_wid_r	The lateral offset distance from the road centreline to the right side of the corridor reserve boundary. Side is determined by the network orientation	10.5	DC	3	1		D	1		
8.1.27	Number of lanes left of centreline	links_lanl	Number of trafficable lanes within the link section, left of the centreline	2	I	1	0		D	1		Link section number of lanes left of centreline, integer
8.1.28	Number of lanes right of centreline	links_lanr	Number of trafficable lanes within the link section, right of the centreline	2	I	1	0		D	1		Link section number of lanes right of centreline, integer
8.1.29	Average lane width left of centreline	links_lwl	Average width of trafficable lanes, within the link section, left of the centreline		I	2	1		D	1		
8.1.30	Average lane width right of centreline	links_lwr	Average width of trafficable lanes, within the link section, right of the centreline	2	I	2	1		D	1		Link section average lane width right of centreline (m), numeric to one decimal place
8.1.31	Separate link sections for traffic flow direction	links_div	Identifies if the carriageway for vehicle flow in the opposite direction is separated by means of a physical barrier(divided), or undivided (no physical barrier)		A	1	None	D – divided, U – undivided	D	1		Link section separate links for traffic flow (divided/undivided), alpha
8.1.32	Traffic flow direction	traf_dir	One way or two-way traffic	O – One way	A	1	None	Code List 9.61	D	1		Link section traffic flow direction (one way or two way), alpha

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.1.33	Traffic setting	traf_set	Urban or rural indicator for the link section		A	1	None	U – posted speed limit < or =70 km/hr, R – posted speed limit > 70 km/hr	D	1		Link section traffic setting/location, alpha
8.1.34	Type of pavement construction	pave_const	The type of pavement on the link section		A	3	None	Code List 9.70	D	1		Link section type of pavement construction, alpha
8.1.35	Ownership organisation	owner	The link section that defines the ownership location of a road		A	30	None		D	1		Link section ownership organisation name, alpha
8.1.36	Operator organisation	operator	The link section that defines the operator location of a road		A	30	None		D	1		
8.1.37	Maintainer organisation	Maintainer	The link section that defines the maintainer location of a road		A	30	None		D	1		
8.1.38	Maintenance contract reference	maint_con	The link section that defines the maintenance location of a road		AN	10	None		D	2		
8.1.39 (NEW)	Sealed Shoulder Kilometre Length	sealshkm_len	Total length of sealed shoulders of nominal width in road network in kilometres		None	1	None		None	1		Road sealed shoulder total length (km) in network (integer)
8.1.40 (NEW)	Unsealed Shoulder Kilometre Length	unsealeshkm_len	Total length of unsealed shoulders of nominal width in road network in kilometres		None	1	None		None	1		Road unsealed shoulder total length (km) in network (integer)

8.2 Classification

Overview

Classification for a transport network/system attributes a functional priority or status level within the network to each component link. Any network will generally include links classified at most levels across this spectrum within it. In this Standard, the New Zealand One Network Road Classification (ONRC) has been used as an example of a classification system (NZ Transport Agency 2016a, 2016b).

Scope

The naming system for each status level used varies across national, state and local authorities, but the approach in each case will apply the highest level to network links that are strategic, with high volumes and that deliver economic or community benefits. At lower levels, the links provide almost purely local access that delivers local or private benefits. Between these two extremes are identified levels that combine and acknowledge compromises between general benefits (through traffic flow) and local benefits (property access) at differing levels.

Higher order links tend to be costlier to maintain and operate but comprise a far smaller percentage by length of the network. The priority at the higher order links is to support economic outcomes through traffic flow, at the expense of access and local use. In lower order links, access and local use increases, at the expense of through-traffic flow efficiency. Increased priority is given to shared access and dedicated space for non car-based travellers, such as pedestrians and cyclists, as the classification hierarchy decreases.

Data items are provided for different organisational activities and are structured by intended use:

- In a land use planning context, classification is used to define the purpose of the link and then attach suitable development limits or rules that support or protect that purpose.
- In a network modelling context, classification is used to describe the way a road is expected to support the network operation. The levels of classification will reflect expected operational performance.
- In a funding context, although all network components may justify some funding, higher level classification can be used to justify higher investment, more significant improvements, more urgent/responsive maintenance, and closer monitoring.

Review

The first row of Table 8.3 (Ref 8.2.1) shows that the definition for the classification of roads based on the ONRC developed by NZTA was altered to ‘Road classification’. In Australia the road classification may need to have more sub-categories to allow for a level of disaggregation that achieves a range of objectives other than functional. Some of these objectives include using road classification to assist:

- allocating road funds and establishing investment priorities
- establishing, maintaining and monitoring levels of service
- comparing the impact of various maintenance strategies on the network

- comparing the deterioration performance of different road categories
- establishing road networks for different vehicle types.

Taking into consideration these objectives, the key features that should be included in a road classification system are likely to include:

- road use data (such as AADT, ESA-km, GVM-km, %HV), posted speed limit, and urban/rural location that are contained in the Data Standard and PHS
- government policy objectives such as those outlined in Austroads (2017) for community service obligations in achieving a targeted level of service on key freight routes, strategic routes and emergency service routes
- factors that differentiate road and bridge funding by their maintenance and capacity expansion costs, such as types of construction, climate and remoteness.

It is proposed to use an approach that meets the above objectives to form a traffic-based road classification system using banding of these metrics into different traffic ranges and taking account of other road use characteristics. This could be undertaken in a later version of the Data Standard and PDS and made available for review by the stakeholders.

Additional research/study should be undertaken on road classification in Australia to meet the above objectives, and that can apply to different jurisdictions with road classes that do not currently align to those in Table 8.3.

Table 8:2 summarises a range of the 'building block' metrics that could be used to establish a 'road classification' system for application across the whole road network.

Table 8:2 Summary of possible building blocks of metrics for 'road classification'

Data type	Definition of metric	Potential application
Road use	AADT (annual average daily traffic)	Can define traffic ranges
	%HV (percentage heavy vehicles)	Can define specific heavy vehicle freight routes
	ESA-km (equivalent standard axle kilometres)	Can define traffic load and heavy vehicle freight routes
	GVM-km (gross vehicle mass kilometres)	Can define gross loads for critical bridge routes
	PCU-km (passenger car unit kilometres)	Can define space capacity (width and alignment) ranges
Climatic region	TMI (Thornthwaite Moisture Index (1948))	General measure of climate (benevolent to aggressive)
	Annual rainfall (mm)	Measure of potential aggressive environment
	Marine/non-marine exposure	Measure of corrosive environment
Geology/soil type	Non-reactive soil (stable)	Stable soils are a sound foundation for the infrastructure
	Reactive soil (unstable)	Unstable soils are problematic for the infrastructure
General service	Posted speed limit	Can define level of service
	Location – urban, rural and remote	Impact of location on costs

The data types for climate and geology are additional dimensions to the usual road use metrics applied to a functional road classification. The climate and geological metrics represent a potential alternative means of road classification based on climatic regions and geological conditions that influence the varying costs of maintenance and construction across the road network. The general service data for posted speed limit and location cover factors that impact on construction and maintenance costs across the road network.

Other considerations such as government policy objectives (e.g. social factors in the area of community service obligations, or special access to services) and underlying cost structures which are impacted by factors such as location (remoteness) and climatic conditions should also be examined.

Table 8:3 Classification – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
Functional												
8.2.1	Functional classification – One Road Classification System	ctype_onrc	The road classification for the carriageway section as defined in the One Network Road (ONRC) Classification system (further work required for Australia's road classification)	National	A	6	None	Code List 9.20	D	1		Functional classification based on AADT, %HV, posted speed limit and urban/rural location etc, (alpha)
Economic and Social												
8.2.2	Estimated population served by road	pop	The estimated population served by the road as determined by a catchment analysis (numeric value)		I	7	None		D	1		
8.2.3	Criticality	crit_conn	A Boolean function returning positive if the route has been identified by the road manager as serving a critical social, economic or functional need. Road links to remote regions or is sole connectivity in urban areas; or roads that have no alternative routes	Y – Yes	B	1	None	Y or N	D	1		
8.2.4	Freight value in motion	fr_sig_val	The estimated gross value of freight using the route per annum. Freight value > $3B	Y – Yes	B	1	None	Y or N	D	1		
8.2.5	Freight weight in motion	fr_sig_wgt	The estimated gross mass of freight using the route per annum (in metric tonnes)		I	2	None		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.2.6	Airport access passengers in motion	air_pass	The estimated number of airport passengers using the route per annum (numeric value)		I	8	None		D	1		
8.2.7	Tourist route	Tourism	A Boolean function returning a positive where a route is either a) identified as a scenic or tourist route in a regional tourist strategy or b) provides access to five tourist destinations designated in a regional tourist strategy. Road serves top five tourist destinations or has regional/local significant tourist destinations or significant scenic routes	Y – Yes	B	1	None	Y or N	D	1		
8.2.8	Hospital access road	Hospitals	A Boolean function returning positive where a route is a primary or secondary access to a hospital, ambulance depot or other medical centre that provides emergency response. Road provides access to tertiary or regional hospitals	Y – Yes	B	1	None	Y or N	D	1		

8.3 Inventory

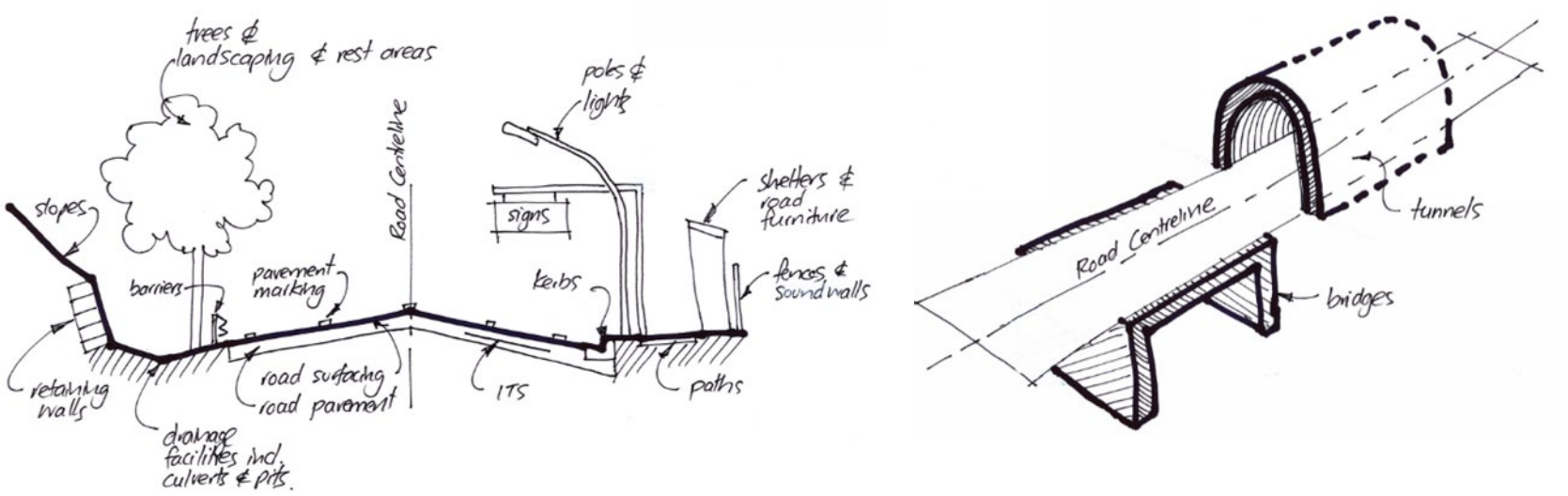
Overview

Inventory is the basic information about assets that includes describing the location, type and attributes of the asset. Asset inventory information is fundamental to making informed asset management decisions, and its associated reporting. Asset inventory elements and associated components are therefore critical for aggregated asset reporting, service standards, asset performance measurement or asset management activities.

Scope

Road corridors comprise different asset types, and each has a number of characteristics describing the various components. This data is used to create the Asset Register and in the context of this project will be referred to as the Inventory. Inventory data is required as a result of subdivision development, works or programs such as minor or major capital works, renewals and maintenance activities. It is 'as constructed' data that is provided as a record, at a particular point in time.

Figure 8:1 Typical assets on a road corridor



The data items that are common to all asset types have been separately identified as common classes.

Table 8:4 Inventory common classes – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.1	Unique asset identifier	asset_id	The unique asset identifier		AN	20	None		D	1		A general unique asset ID, alphanumeric
8.3.2	Asset class	asset_clas	The asset type or group	Structure	A	20	None	Code List 9.2	D	1		A general asset class, alpha
8.3.3	Contractor or supplier's unique asset ID	cont_id	The contractor or suppliers Unique ID for the asset		AN	10	None		D	1		
8.3.4	Owner of the asset	owner	The link section that defines the ownership location of a road	Frankston City Council	A	100	None		D	1		A general name of owner of asset, alpha
8.3.5	Data source	dat_source	The original source of the data	As Designed drawings	AN	50	None		D	1		
8.3.6	Project or contract Id that created the asset	works_id	The project or contract ID that created the asset		AN	20	None		D	1		
8.3.7	Permit number	permit_no	For WA Consortium members, this refers to Western Australian Planning Commission reference number. Other jurisdictions to use local references as appropriate		AN	20	None		D	1		
8.3.8	As constructed plan number	plan_no	As Constructed drawing plan number	6080R212	AN	20	None		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.9	Subdivision or project name	works_name	Subdivision or Project Name. Field can be used for either a subdivision or capital works project	Rockbank Rise	AN	100	None		D	1		
8.3.10	Work type that created the asset	works_type	The type of work that has created the asset		A	1	None	P - Project S - Subdivision	D	1		
8.3.11	Construction organisation name	const_co	Construction Company name only	Jamieson Construction	A	100	None		D	1		
8.3.12	Design company name	design_co	Design Company name only	Fred Charles & Associates	A	100	None		D	1		
8.3.13	Subdivision stage or project number	stage_no	Subdivision or Project Stage Number. Field can be used for either a subdivision or capital works project	7 or 3B	AN	10	None		D	1		
8.3.14	Design life at construction	life_cons	The design life expected at the time of construction/ installation		I	3	None		P	2		A general design life at construction (years), integer
8.3.15	Construction date	const_date	Date the asset was constructed/ built/installed		D	8	0	dd/mm/yyyy	P	2		B valuation construction date, dd/mm/yyyy
8.3.16	Construction cost	const_cost	Construction cost in Australian/New Zealand Dollars. Currency is to be relevant to the jurisdiction	1000000	Mo	10	2		P	2		B valuation construction cost $AUD/NZ, numeric

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.17	Operation status	asset_stat	Current operational state of the asset.	ABN – Abandoned	A	30	0	Code List 9.3	P	2		B valuation operational status, alpha
8.3.18	Financial currency	Currency	Currency used to estimate costs	AUD (Australian Dollars)	Mo	10	2	AUD or NZD	P	2		
8.3.19	Valuation type	value_type	Valuation type	RC – Replacement Cost	A	4	None	Code List 9.73	P	2		B valuation valuation type, alpha
8.3.20	Assessed cost in Australian/ New Zealand Dollars	Value	Assessed cost in Australian/New Zealand Dollars. Currency is to be relevant to the jurisdiction	1000000	Mo	10	2		P	2		B valuation assessed cost $AUD/NZ, numeric
8.3.21	Unit cost	cost_unit	Cost per unit of the asset	130.25	Mo	10	2		P	2		
8.3.22	Valuation year	value_year	The date the valuation was undertaken	ddmmyyyy	D	8	None		P	2		B valuation date valuation was made, dd/mm/yyyy
8.3.23	Comments	comments	Any additional comments that relate to this asset		AN	250	None		I	3		
8.3.24	Photo reference	photo_ref	Reference photograph of asset	dd/mm/ccyy [description].jpg	AN	100	None		I	3		
8.3.25	Data editor	added_by	The person who added the data to the asset register		A	20	None		I	3		
8.3.26	Data added date	added_date	The date the data was added to the asset register	ddmmyyyy	D	8	None		I	3		
8.3.27	Vesting date	vest_date	The date the asset was vested (ownership transfer) to the road agency	ddmmyyyy	D	8	None		I	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.28	Vesting source	vest_org	The organisation gifting (vesting) the asset to the road agency		A	20	None		I	3		
8.3.29	Depreciable amount		Gross Replacement cost less residual value	AUD (Australian Dollars)	Mo	10	2		P	1	AASB 116	

8.3.1 Amenities

An amenity is any feature or facility that is provided in a location and is not covered by the other asset types (e.g. a gas BBQ).

Table 8:5 Amenities – location references

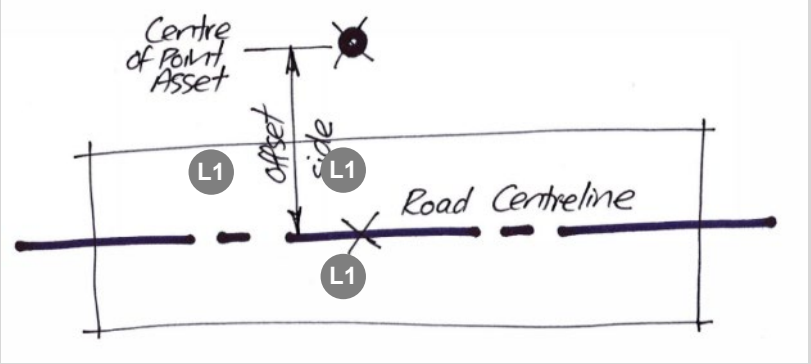
Soph	Location data (point)	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:6 Amenities – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.1.1	Type	amen_type	Amenity type		A	100	None	Code List 9.28 ??	D	1		
8.3.1.2	Material	amen_mat	Material made out of	Steel	A	100	None	Code List 9.27	D	2		
8.3.1.3	Manufacturer	amen_manuf	Company name only	Lunds Pty Ltd	A	100	None		I	3		
8.3.1.4	Model number	amen_model	Model number	JK-001-A	AN	30	None		I	3		

8.3.2 Bins

A bin is any receptacle that is used to store litter and is emptied at a determined frequency. It is often placed on the footpath or grass berm area.

Table 8:7 Bins – location references

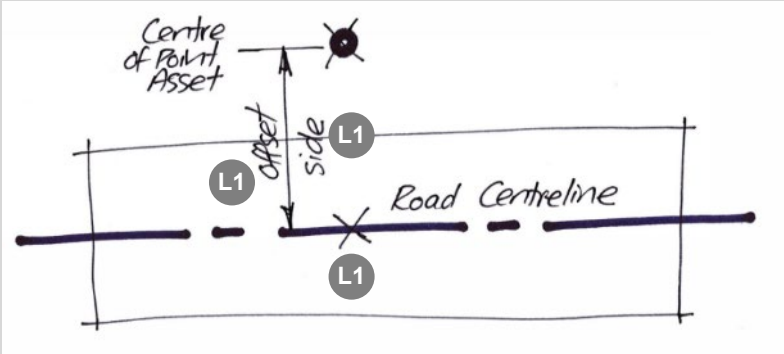
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:8 Bins – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.2.1	Capacity	bin_cap	Bin capacity in litres	240	I	3	None		D	1		
8.3.2.2	Type	bin_type	Bin type	SR	A	100	None		D	1		
8.3.2.3	Bin intended use	bin_use	The intended use of the bin. Recycle, waste, glass only, green clippings etc.	Recycle	A	20	None	Code List 9.4	P	1		
8.3.2.4	Liner present	bin_liner	A bin liner is present	N - No	B	1	None	Y or N	I	2		
8.3.2.5	Manufacturer	bin_manuf	Manufacturing company name only	BIF Pty Ltd	A	100	None		I	3		
8.3.2.6	Material	bin_mat	Material the bin is made out of	Steel	A	100	None	Code List 9.27	I	2		
8.3.2.7	Model number	bin_model	Model number	Ef-456-S	AN	30	None		None	3		
8.3.2.8	Supplier	bin_suppl	Bin Supplier	Visy	AN	100	None		I	3		

8.3.3 Bridges/Major Culverts

Bridges are defined as a structure designed to provide passage for road users over an obstacle by spanning it.

Major Culverts are one or more adjacent pipes that convey surface water run-off, or a stream, below the formation level of a road. Major culverts have a cross sectional area of more than 3.4 square metres.

Table 8:9 Bridge – location references

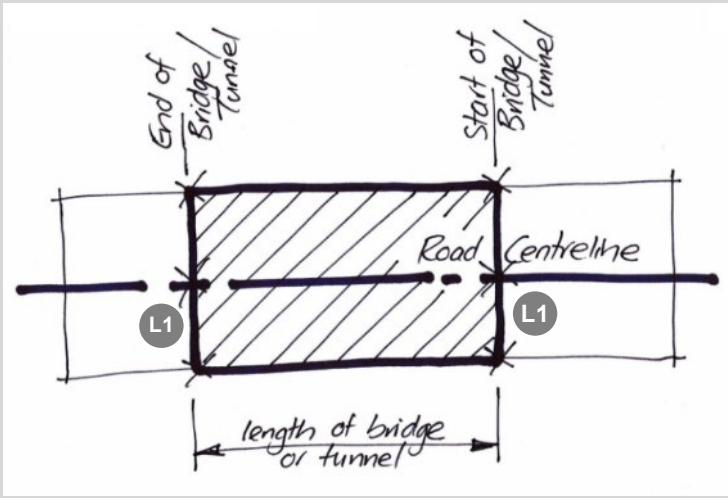
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of bridge	Linear distance along road centreline/ spatial	
	End of bridge	Linear distance along road centreline/ spatial	
	Bridge width (left)	Measurement of bridge width on left side of road centreline	
	Bridge width (right)	Measurement of bridge width on right side of road centreline	
L2	Road ID	The unique road identifier	
	Polygon (bridge perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (bridge perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:10 Major culverts – location references

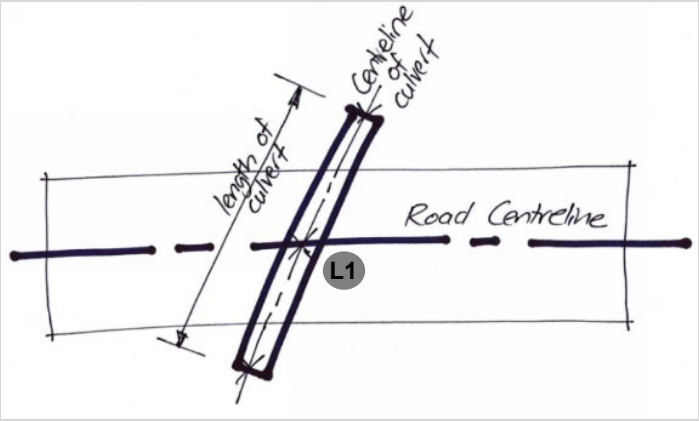
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centre of culvert	Linear distance along the road centreline	
L2	Road ID	The unique road identifier	
	Polyline (culvert centreline)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (culvert centreline & invert levels)	Polyline geometric data (X, Y, Z)	

Table 8:11 Structures (bridge and major culverts) – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.3.1	Bridge width left of centreline	br_wid_l	The lateral offset distance from the road centreline to the left-hand extent of the bridge. Side is determined by the direction of increasing distance along the link		DC	3	1	??	L	1		
8.3.3.2	Bridge width right of centreline	br_wid_r	The lateral offset distance from the road centreline to the right-hand extent of the bridge. Side is determined by the direction of increasing distance along the link		DC	3	1		L	1		
8.3.3.3	Waterway name	ww_name	Populate the waterway name if a waterway passes through the culvert or beneath the bridge		A	100	0		L	1		
8.3.3.4	Beam material	beam_mat	For a bridge the material the beam is constructed of. Populate only if Bridge/Major Culvert Components is not used	CONC – Concrete	A	100	0		D	1		
8.3.3.5	Column or pile material	br_col_mat	For a bridge the material the column or pile is constructed of. Populate only if Bridge/Major Culvert Components is not used	CONC – Concrete	A	100	0	Code List 9.27	D	1		
8.3.3.6	Deck material	br_dek_mat	For a bridge the material the deck is constructed of. Populate only if Bridge/Major Culvert Components is not used	Wood	A	100	0	Code List 9.27	D	1		Structure/culvert deck material (alpha)
8.3.3.7	Earthquake rating	br_eq_rate	Earthquake rating of the structure		DC	6	2		D	1		
8.3.3.8	Foundation material	br_fnd_mat	Foundation material		A	100	0		D	1		
8.3.3.9	Foundation type	br_fnd_typ	Foundation type		A	30	0		D	1		
8.3.3.10	Entrance gate	br_gate	The bridge has a gate at the entrance	Y – Yes	B	1	0	Y or N	D	1		
8.3.3.11	Number of beams	br_beam_no	Number of beams	6	I	2	0		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.3.12	Number of columns or piles	br_col_no	Number of columns or piles	8	I	2	0		D	1		
8.3.3.13	Number of piers	br_pier_no	Number of piers	4	I	2	0		D	1		
8.3.3.14	Pier material	br_pie_mat	Pier material. Populate only if Bridge/Major Culvert Components is not used	CONC – Concrete	A	100	0		D	1		
8.3.3.15	Safety rail material	br_rai_mat	Safety rail material	Steel	A	30	0		D	1		
8.3.3.16	Safety rails present	br_rail	The structure has safety rails	Y – Yes	B	1	0	Y or N	D	1		
8.3.3.17	Cell type for major culvert	br_cel_typ	If a major culvert the type of culvert structure. Populate only if Bridge/Major Culvert Components is not used	Box	A	30	0	Code List 9.31	D	2		Structure/culvert major culvert cell type (alpha)
8.3.3.18	Vertical clearance	br_clear	Distance between water feature and the bridge at the high-water mark in metres. In the event of inland water at high water mark or tidal water at high tide. Populate only for a bridge if it is over a watercourse		DC	6	2		D	2		
8.3.3.19	Function of the feature	br_func	Function of the feature	OR – Over Road	A	100	0	Code List 9.19	D	2		
8.3.3.20	Number of spans or cells	br_spans	Number of spans of the bridge or number of cells of the major culvert	3	Mo	10	2		D	2		Structure/culvert number of spans or cells integer
8.3.3.21	Feature structure type	br_struc	Feature Structure Type	Stock crossing/ underpass	A	100	0	Code List 9.5	D	2		Structure/culvert feature of structure type (alpha)
8.3.3.22	Cell material for major culvert	br_cel_mat	Populate only if the structure is a major culvert and if Bridge/Major Culvert Components is not used	Pre-cast Concrete	A	30	0		D	3		
8.3.3.23	Length	br_len	Total length of the structure in metres	20.5	DC	4	2		D	3		Structure/culvert length (m) numeric one decimal place

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.3.24	Width of structure	br_wid	Total width of the structure in metres	2.45	DC	5	2		D	3		Structure/culvert width (m) numeric one decimal place
8.3.3.25	State or national heritage listing	br_heritag	The structure is in the state or national heritage listing	Y - Yes	B	1	0	Y or N	P	1		
8.3.3.26	Vehicular load limit	br_ld_lim	Vehicular gross load limit on the structure	250	I	5	0		P	1		Structure/culvert vehicle gross load limit (kg) integer
8.3.3.27	'Abutment Material'	br_abu_mat	Abutment material. Populate only if Bridge/Major Culvert Components is not used	CONC – Concrete	A	100	0		I	2		
8.3.3.28	Area	br_area	Area of the component in square metres if the dimensions are not uniform	25.35	DC	6	2		D	1		
8.3.3.29	Height	br_hei	Height of the component in mm	2300	I	4	0		D	1		
8.3.3.30	Length	br_co_len	Length of the component in metres	6.23	DC	4	2		D	1		
8.3.3.31	Number of components	br_comps	Number of same type of components with the same dimensions and material	4	I	2	0		D	1		
8.3.3.32	Width of component	br_wid_co	Width of the component in metres	2.45	DC	5	2		D	1		
8.3.3.33	Element type	br_co_type	Component type	TB – T Beam	A	30	0	Code List 9.7	D	3		
8.3.3.34	Component material	br_co_mat	Component material	Wood	A	100	0	Code List 9.27	D	3		
8.3.3.35	Component code	br_co_code	Structure component code according to the Bridge Inspection Manual used in each jurisdiction	1S – Steel box girder	AN	6	0	Code List 9.6	I	3		
8.3.3.36 (NEW)	Structure Unique Identifier	stru_iden	Structure ID allocated to this asset. This structure ID is provided by the relevant agency. If no structure ID is provided, create an arbitrary ID so this table can be linked with Structure (Bridge/Major Culvert) Component table		None	None	None		None	3		Structure unique ID (alphanumeric)

8.3.4 Minor Culverts

Minor culverts consist of one or more adjacent pipes or an enclosed channel that conveys surface water run-off, or a stream, below the formation level of a road. Minor culverts have a cross-sectional area of less than 3.4 square metres.

Table 8:12 Culverts (minor) – location references

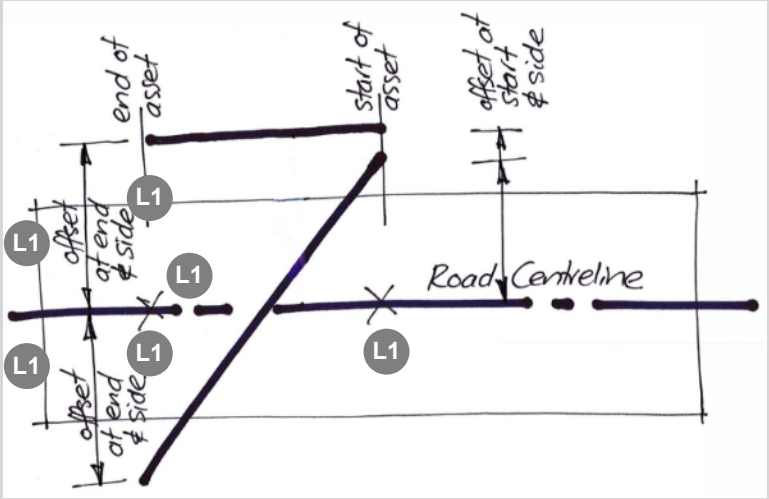
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of culvert/pipe section	Linear distance along road centreline/ spatial	
	End of culvert/pipe section	Linear distance along road centreline/ spatial	
	Start side	Side of road centreline	
	End side	Side of road centreline	
	Start offset measurement	Dimension between the road centreline and the culvert/pipe centreline	
	End offset measurement	Dimension between the road centreline and the culvert/pipe centreline	
L2	Road ID	The unique road identifier	
	Polyline (culvert/pipe centreline)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (culvert/pipe centreline & invert levels)	Polyline geometric data (X, Y, Z)	

Table 8:13 Culverts (minor) – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.4.1	Downstream pit number	cul_pit_dn	Downstream Pit Number. This number must form part of the Pipe section number		AN	15	0		L	1		
8.3.4.2	Downstream X coordinate	cul_dn_x	Downstream end-of-pipe X Coordinate. Will be used in the computation check of the pipe length		DC	9	2		L	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.4.3	Downstream Y coordinate	cul_dn_y	Downstream end-of-pipe Y Coordinate. Will be used in the computation check of the pipe length		DC	9	2		L	2		
8.3.4.4	Upstream X coordinate	cul_up_x	Upstream end-of-pipe X Coordinate. Will be used in the computation check of the pipe length		DC	9	2		L	2		
8.3.4.5	Upstream Y coordinate	cul_up_y	Upstream end-of-pipe Y Coordinate. Will be used in the computation check of the pipe length		DC	9	2		L	2		
8.3.4.6	Internal pipe diameter or width	cul_dia	Internal pipe Diameter of the pipe or Width if the pipe is non-circular	450	I	4	0		D	1		
8.3.4.7	Non-circular pipe height	cul_hei	Pipe Height. Needs to be populated for non-circular pipes	450	I	4	0		D	1		
8.3.4.8	Pipe section length	cul_len	Pipe section length in metres	100.55	DC	5	2		D	1		
8.3.4.9	Pipe material	cul_mat	Pipe material	RC	A	100	0	Code List 9.27	D	1		
8.3.4.10	Unique number derived from pit numbers	cul_pit_no	Downstream Pit Number. This number must form part of the Pipe section number	37-38A	AN	30	0		D	1		
8.3.4.11	Pipe type	cul_type	Pipe type	Pipe, open, culvert, subsoil	A	100	0	Code List 9.32	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.4.12	Pipe configuration	cul_config	This field ONLY needs to be populated when the pipe configuration inside a SWALE trench or Culvert contains more than 1 (one) pipe	Example 1. – Configuration of conduits/pipes in culverts 3x150 i.e. 3 conduits/ pipes @ 150 mm diameter each. Example 2. – Configuration of conduits/pipes in culverts 3 x 150 x 300 i.e. 3 conduits/ pipes @ 150 mm diameter/width by 300 height each	AN	50	None		D	2		
8.3.4.13	Structure location	cul_in_out	This field ONLY needs to be populated when an inlet or outlet structure (culvert) exists. Describe extent of inlet, outlet or other features	Outlet backflow prevention valve. Outlet energy reducing device	A	50	None		D	2		
8.3.4.14	Pipe shape	cul_shape	Shape of the pipe		A	10	None	Code List 9.31	D	2		
8.3.4.15	Upstream pit number	cul_up_pit	Upstream Pit Number. This number must form part of the Pipe section number		AN	15	None		D	2		
8.3.4.16	2nd pipe diameter	cul_dia_2	Populate ONLY when the pipe type is non-circular and has two diameters. For egg shaped pipes(W1 = Dia, Width; W2 = Width2;H = Height)	200	I	4	None		D	2		
8.3.4.17	Downstream invert level	cul_dn_inv	Downstream end-of-pipe Invert Level. When recording the invert levels, it stands to reason that the downstream invert level must be smaller than the upstream invert level		DC	5	2		D	3		
8.3.4.18	Relined or renewed material	cul_in_mat	Relined or renewed material	Fibreglass	A	30	None		I	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.4.19	Relining or renewal method	cul_in_met	Relining or renewal method	CUREDIP – Cured in place	A	100	None	CUREDIP – Cured in place SLUPVC – Slip lined with uPVC & grouted				
8.3.4.20	Upstream end-of-pipe invert level	cul_up_inv	Upstream end-of-pipe Invert Level. When recording the invert levels, it stands to reason that the downstream invert level must be smaller than the upstream invert level		DC	5	2		D	3		

8.3.5 Fences

A fence is defined as a permanent structure that encloses an area, often constructed with posts connected by rails. It can be provided for protection for an area, security or to define a boundary.

Table 8:14 Fences – location references

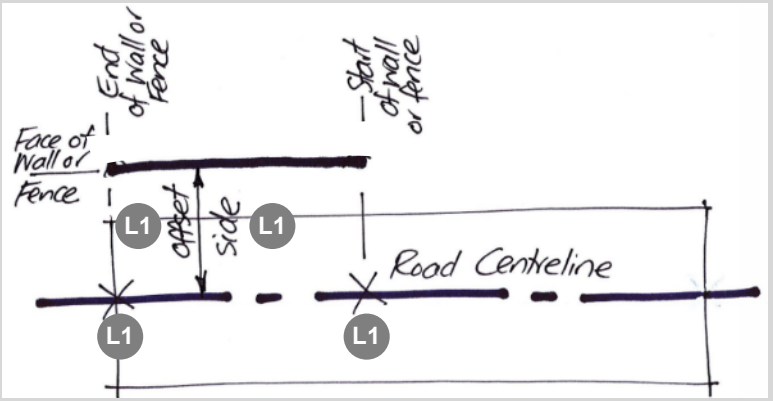
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of fence section	Linear distance along road centreline/ spatial	
	End of fence section	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Start of fence offset measurement	Dimension between the road centreline and face of fence	
	End of fence offset measurement	Dimension between the road centreline and face of fence	
L2	Road ID	The unique road identifier	
	Polyline (face of fence)	X, Y geometric data	
L3	Road ID	The unique road identifier	
	Polyline (face of fence)	X, Y, Z geometric data	

Table 8:15 Fences – data items

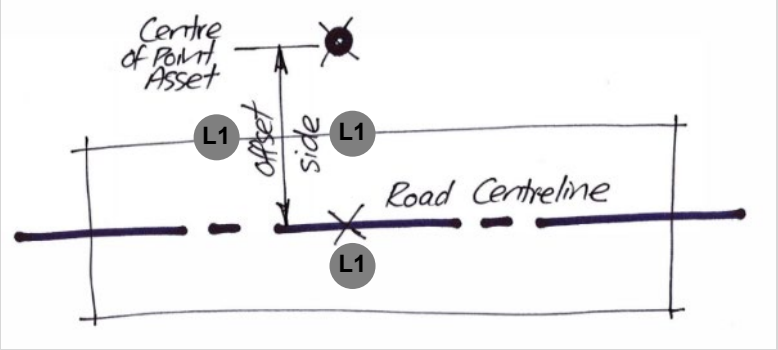
Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.5.1	Drop protection	fen_prot	If the fence provides protection to large drops		A	1	0		D	1		
8.3.5.2	Type	fen_typ	Fence type	Post and rail, rail, electric, picket, post and wire etc.	A	100	0	Code List 9.18	D	1		
8.3.5.3	Function	fen_func	Fence function	SEC – Security	A	100	0	Code List 9.17	D	2		
8.3.5.4	Height	fen_hei	Height of the fence in metres	2.1	DC	5	2		D	3		
8.3.5.5	Length	fen_len	Length of the fence		DC	4	2		D	3		
8.3.5.6	Material	fen_mat	Fence material	Wrought Iron	A	100	0	Code List 9.27	D	3		
8.3.5.7	Joint ownership	fen_joint	Is the fence in joint ownership		A	1	0		I	3		
8.3.5.8	Manufacturers name	fen_manuf	Manufacturers name	Streetsmart Group Ltd	A	100	0		I	3		

8.3.6 ITS Assets

Point assets

A point asset is an Intelligent Traffic Systems asset that is defined by a point (i.e. it has no length).

Table 8:16 ITS (point assets) – location references

Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Polyline assets

A polyline asset is an Intelligent Traffic Systems asset that has a start and end point, and an associated length.

Table 8:17 ITS (linear assets) – location references

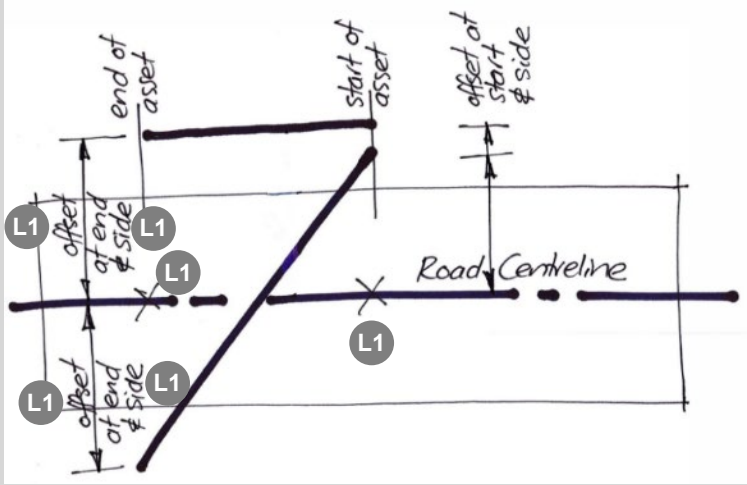
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of ITS section	Linear distance along road centreline/ spatial	
	End of ITS section	Linear distance along road centreline/ spatial	
	Start side	Side of road centreline	
	End side	Side of road centreline	
	Start offset measurement	Dimension between the road centreline and the ITS centreline	
	End offset measurement	Dimension between the road centreline and the ITS centreline	
L2	Road ID	The unique road identifier	
	Polyline (ITS)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (ITS)	Polyline geometric data (X, Y, Z)	

Table 8:18 ITS assets – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.6.1	Site name	its_site	Site name		A	30	None		L	1		
8.3.6.2	Type	its_type	Asset ITS Type	CCTV	A	100	None		D	1		
8.3.6.3	Above or below surface level	its_abobel	Height above surface or depth below surface. +ve number if above ground, –ve if below		DC	4	2		D	2		
8.3.6.4	Access requirements	its_access	Access requirements	Traffic Management	A	30	None		I	2		
8.3.6.5	Power source	its_power	Power source	Main	A	30	0	Code List 9.36	I	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.6.6	Contractor suppliers unique ID	its_l_suid	Contractor ID		AN	30	0		D	1		
8.3.6.7	Contractors unique ID	its_l_coid	Contractor's Unique ID of the 'Asset_To' asset		AN	30	0		D	1		
8.3.6.8	Controller ID	its_l_cnid	Controller ID		AN	30	0		D	1		
8.3.6.9	Conduit length	its_l_len	Conduit section length in metres (m)		DC	4	2		D	1		
8.3.6.10	Housing type	its_l_type	Housing type	Conduit	A	30	0		D	2		
8.3.6.11	Conduit material	its_l_clen	Conduit material.	Copper	A	100	0	Code List 9.27	D	2		
8.3.6.12	Defects liability end date	its_l_liae	End date of defects liability period	ddmmyyyy	D	8	0		P	1		
8.3.6.13	Design life	its_l_dl	Design life length in years	5	I	3	0		P	2		
8.3.6.14	Maintenance requirements	its_l_mreq	Maintenance requirements		A	100	0		P	2		
8.3.6.15	Defect liability start date	its_l_lias	Starting date of defects liability period	ddmmyyyy	D	8	0		P	3		
8.3.6.16	Installer	its_l_ints	Installer		A	30	0		I	3		
8.3.6.17	Manufacturer	its_l_manu	Manufacturer		A	100	0		I	3		
8.3.6.18	Supplier	its_l_supp	Supplier		A	30	0		I	3		
8.3.6.19	Warranty end date	its_l_wend	Warranty end date	ddmmyyyy	D	8	0		I	2		
8.3.6.20	Controller ID	its_p_cnid	Controller ID	DT13426	AN	30	0		D	1		
8.3.6.21	Control system type	its_p_type	Control system type		A	30	0		D	1		
8.3.6.22	Data logger present	its_p_log	A data logger is present	Y – Yes	B	1	0	Y or N	D	1		
8.3.6.23	Connected radar unit	its_p_rad	Whether a Radar Unit is connected or not	Y – Yes	B	1	0	Y or N	D	1		
8.3.6.24	Unique ID of the asset	its_p_uniq	Unique ID of the asset	RNDG367	AN	30	None		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.6.25	Communication method	its_p_comm	Communication method. Bluetooth, microwave	Bluetooth	A	30	None		D	3		
8.3.6.26	Housing type	its_p_htyp	Housing type	Conduit	A	30	None		D	3		
8.3.6.27	UPS is connected	its_p_ups	Whether a UPS is connected or not	Y – Yes	B	1	None	Y or N	D	3		
8.3.6.28	Design life in years	its_p_des	Design life length in years	25	I	4	None		P	1		
8.3.6.29	Defects liability end date	its_p_liae	End date of defects liability period	ddmmyyyy	D	8	None		P	1		
8.3.6.30	Maintenance requirements	its_p_mreq	Maintenance requirements		A	100	None		P	1		
8.3.6.31	Start date of defects liability period	its_p_lias	Starting date of defects liability period	ddmmyyyy	D	8	None		P	1		
8.3.6.32	Installer	its_p_ints	Installer		A	30	None		I	3		
8.3.6.33	IP address	its_p_ipad	IP address	123.45.123.155	AN	30	None		I	2		
8.3.6.34	Manufacturer	its_p_manu	Manufacturer		A	100	None		I	3		
8.3.6.35	Model number	its_p_mod	Model number		AN	30	None		I	2		
8.3.6.36	Mounting type	its_p_moun	Mounting type		A	30	None		I	3		
8.3.6.37	Pin number or password	its_p_pass	Pin number or password		AN	30	None		I	2		
8.3.6.38	Serial number	its_p_seri	Serial number		AN	30	None		I	3		
8.3.6.39	Supplier	its_p_supp	Supplier		A	30	None		I	3		
8.3.6.40	Warranty end date	its_p_ware	Warranty end date	ddmmyyyy	D	8	None		I	3		
8.3.6.41	Communication method	its_pl_com	Communication method. Bluetooth, microwave	Microwave	A	30	None		D	2		
8.3.6.42	Control system type	its_pl_cs	Control system type		A	30	None		D	2		
8.3.6.43	UPS is connected	its_pl_ups	Whether a UPS is connected or not	Y – Yes	B	1	None	Y or N	D	2		

8.3.7 Kerb and Channel

The kerb and channel combine to form a surfaced open drain to capture and discharge run-off from a road.

Table 8:19 Kerb and channel – location references

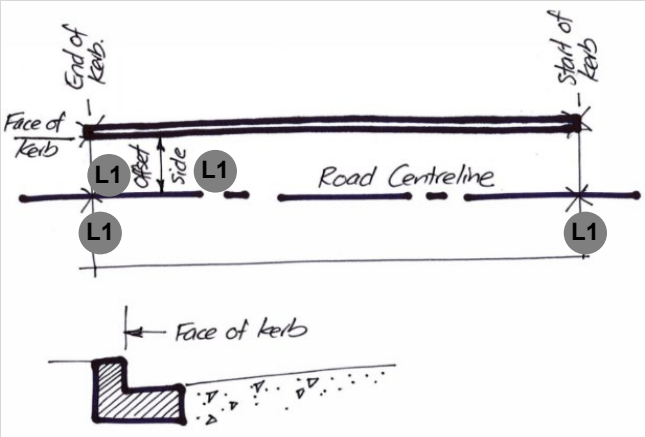
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset section	Linear distance along road centreline/ spatial	
	End of asset section	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Start offset measurement	Dimension between the road centreline and the asset centreline	
	End offset measurement	Dimension between the road centreline and the asset centreline	
L2	Road ID	The unique road identifier	
	Polyline (kerb face)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (kerb face)	Polyline geometric data (X, Y, Z)	

Table 8:20 Kerb and channel – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.7.1	Material	kc_mat	Kerb material	CONC – Concrete	A	100	0	Code List 9.27	D	1		
8.3.7.2	Type	kc_typ	Kerb Type	Mountable Kerb	A	100	0	Code List 9.23	D	1		
8.3.7.3	Width	kc_wid	With of the kerb excluding the channel. Channel width is included in the link dimensions	100	I	3	0		D	1		
8.3.7.4	Length	kc_len	Length of the kerb in metres	30.25	DC	4	2		D	3		
8.3.7.5	Responsible authority	kc_resp	The name of the responsible Authority for maintenance purposes		A	100	0		I	1		

8.3.8 Landscaping

Landscaping describes areas that have been modified for visual effect, and typically include planting or vegetation such as gardens. It can also include ‘hard’ landscaping.

Table 8:21 Landscaping – location references

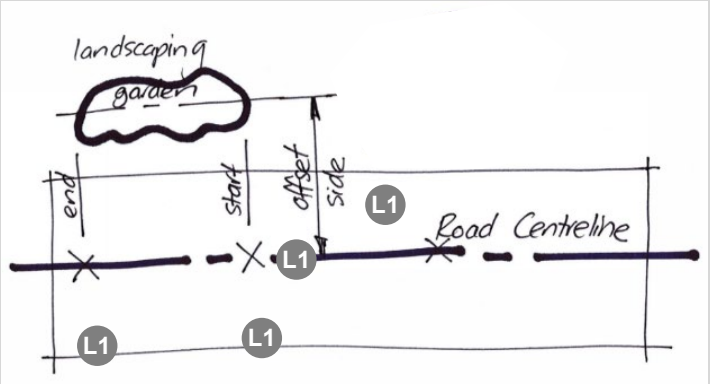
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Road ID	The unique road identifier	
	Start of landscaping	Linear distance along road centreline/ spatial	
	End of landscaping	Linear distance along road centreline/ spatial	
	Side	Either left/right of the road centreline	
	Landscaping width	Measurement of width of landscaping	
	Offset measurement	Dimension between the road centreline and landscaping centreline	
L2	Road ID	The unique road identifier	
	Polygon (landscaping perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (landscaping perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:22 Landscaping – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.8.1	Depth	land_dep	Depth of the material where the landscaping feature does not contain water. Or the average depth of water for a water feature. Height of the hedge if the feature is a hedge		I	4	None		D	1		
8.3.8.2	Material	land_mat	Material	Fibreglass	A	100	None	Code List 9.27	D	1		
8.3.8.3	Type of landscaping	land_typ	Type of Landscaping		A	100	None		D	1		

8.3.9 Lighting

Lighting covers assets that provide illumination to the road surface or related road infrastructure, primarily for the purpose of safety.

Table 8:23 Lighting – location references

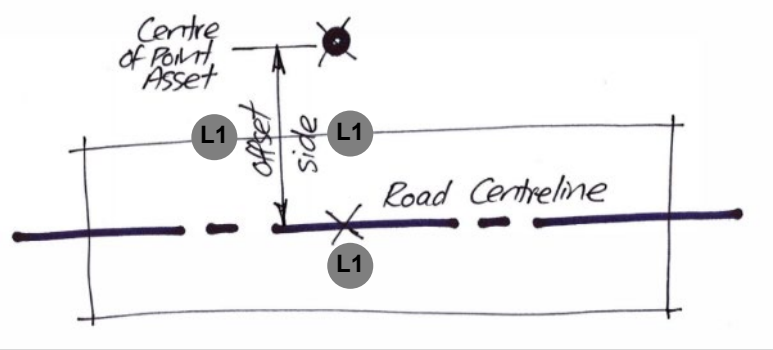
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:24 Lighting – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.9.1	Bracket height	l_brk_hei	Height from the ground to the bottom of the bracket	6.32	DC	5	2		D	1		
8.3.9.2	Bracket length	l_brk_len	Length of the bracket	1200	I	4	0		D	1		
8.3.9.3	Connection type	l_conn_typ	Connection Type	AGND – Above ground	A	10	0		D	1		
8.3.9.4	Luminaire capacity	l_cap	Luminaire capacity		I	3	0		D	1		
8.3.9.5	Luminaire model type	l_model	Luminaire model type		A	100	0		D	1		
8.3.9.6	Number of luminaires	l_lum_num	Number of luminaires	2	I	2	0		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.9.7	Pole type	l_pole_typ	Pole type	PEDEST – Pedestal	A	30	None	PEDEST - Pedestal CANT - Cantilever				
8.3.9.8	Connected to smart grid	l_smart_gd	The light is connected to a smart grid	Y – Yes	B	1	None	Y or N	D	1		
8.3.9.9	Lighting type	l_typ	Lighting Type	Directional	A	100	None	Code List 9.24	D	1		
8.3.9.10	Luminaires wattage	l_wattage	Wattage of the Luminaires	100	I	3	None		D	1		
8.3.9.11	Control point number	l_icp_no	Installation Control Point number		AN	30	None		P	1		
8.3.9.12	Bracket angle	l_brk_ang	Angle of the bracket clockwise from bracket to pole	125	I	3	None		I	2		
8.3.9.13	Bracket material	l_brk_mat	Bracket material		A	30	None		I	2		
8.3.9.14	Bracket mounting type	l_brk_mnt	Mounting type of the bracket		A	30	None		I	2		
8.3.9.15	Bracket orientation	l_brk_orie	Orientation of the bracket. Angle from North, clockwise to the bracket (its bearing)	225	I	3	None		I	2		
8.3.9.16	Bracket type	l_brk_typ	Bracket type		A	30	None		I	2		
8.3.9.17	Bulk circuit connection	l_conn	Bulk circuit connection		A	30	None		I	2		
8.3.9.18	Light colour	l_col	Light colour		A	30	None		I	1		
8.3.9.19	LED chip manufacturer	l_led_manu	LED chip manufacturer	ABC Manufacturing	A	30	None		I	3		
8.3.9.20	Luminaire manufacturer	l_manuf	Luminaire manufacturer	IBEX Co.	A	100	None		I	3		
8.3.9.21	Manufacturer importer name	l_manu_imp	Name of the Manufacturer or Importer	Australian Lighting Company	A	100	None		I	3		
8.3.9.22	Power supply company	l_power_co	Power supply company	Power Co.	A	30	None		I	1		

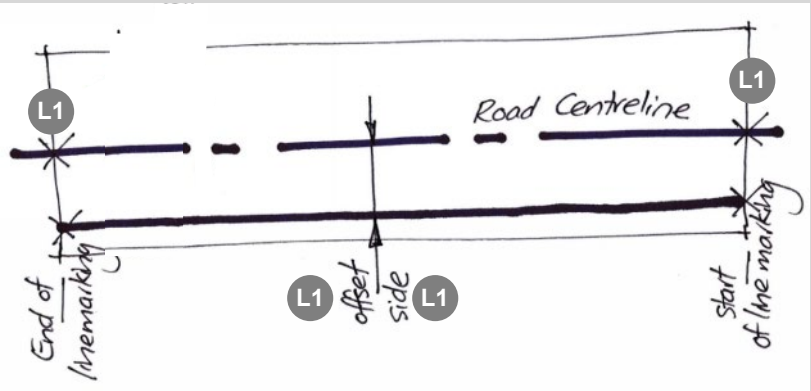
Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.9.23	Light shade type	l_shd_typ	Light shade type		A	30	None		I	2		
8.3.9.24	Lighting design standard	l_des_std	Standard the light is designed to		A	30	None		I	3		
8.3.9.25	Upcast angle	l_tilt_ang	Upcast angle, clockwise from horizontal. Horizontal = 0 degrees	20	I	3	None		I	3		

8.3.10 Line Marking

Line marking is constituted of lines, painted or otherwise applied, that delineate lane boundaries and guide traffic with respect to overtaking and the like. These markings have a start and end point and a corresponding length.

Polyline assets

Table 8:25 Line marking (polyline assets) – location references

Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset section	Linear distance along road centreline/ spatial	
	End of asset section	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Start offset measurement	Dimension between the road centreline and the asset centreline	
	End offset measurement	Dimension between the road centreline and the asset centreline	
L2	Road ID	The unique road identifier	
	Polyline (centreline of marking lines)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (centreline of marking lines)	Polyline geometric data (X, Y, Z)	

Point assets

Line marking point assets are typically symbols, painted or otherwise applied, that guide traffic or give direction to road users.

Table 8:26 Line marking (point assets) – location references

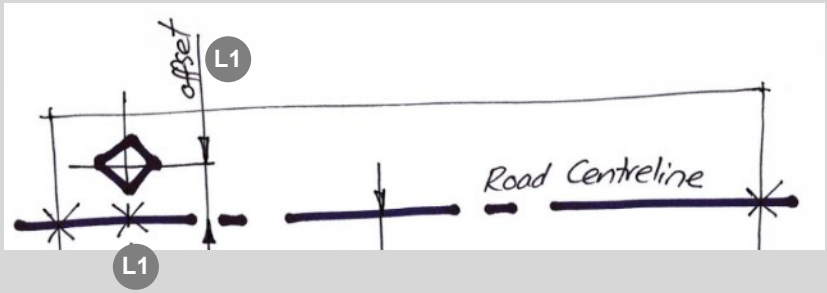
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:27 Line marking – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.10.1	Audible	lin_aud	The marking has audible capability	Y – Yes	B	1	None	Y or N	D	2		
8.3.10.2	Colour	lin_colour	Colour of the line marking	White	A	30	None		D	2		
8.3.10.3	Reflect	lin_refl	The marking is reflectorized	Y – Yes	B	1	None	Y or N	D	2		
8.3.10.4	Spacing	lin_spcng	Spacing between two markings in the polygon	spacing between two diagonal or chevron markings (600 mm)	I	4	None		D	2		
8.3.10.5	Type	lin_typ	Type of marking	Chevron	A	100	None		D	2		
8.3.10.6	Application rate	lin_app_r	Application rate used when painting the marking in square metres per second (m2/s)		DC	6	2		I	3		

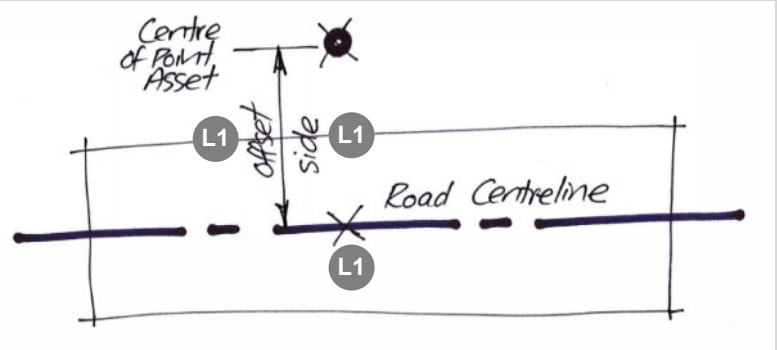
Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.10.7	Manufacturer	lin_manuf	Manufacturer of the paint used for marking		A	100	None		I	3		
8.3.10.8	Paint brand	lin_paint	Brand name of the paint used for marking		A	30	None		I	3		
8.3.10.9	Thickness	lin_thick	Thickness of the line in microns (1 x 10-6 m)	200	I	3	None		D	1		
8.3.10.10	Width	linem_wid	Width of the line	100	I	3	None		D	1		
8.3.10.11	Thickness	line_p_thi	Thickness of the line in microns (1x10-6 m)	200	I	3	None		D	1		

8.3.11 Mechanical and Electrical

Point assets

Mechanical and electrical assets. are often connected to other assets such as tunnels. Point assets have no length.

Table 8:28 Mechanical and electrical (point assets) – location references

Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Polyline Assets

Mechanical and electrical assets that are often connected to other assets such as tunnels. Linear assets have a start and end point with an associated length.

Table 8:29 Mechanical and electrical (linear assets) – location references

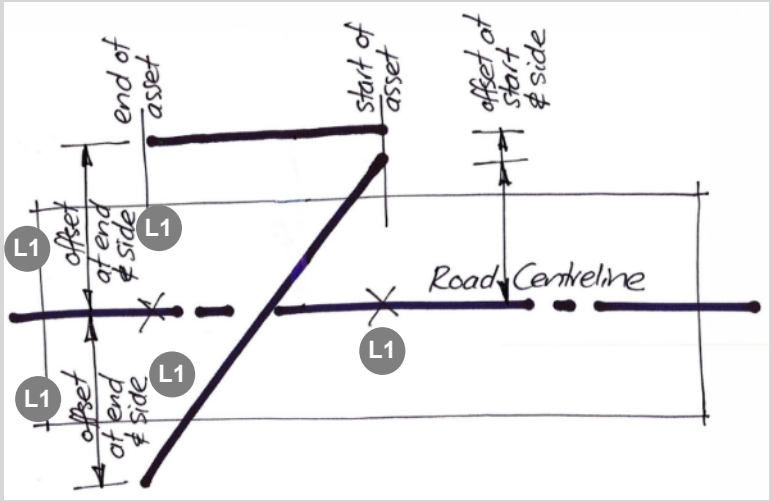
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset section	Linear distance along road centreline/ spatial	
	End of asset section	Linear distance along road centreline/ spatial	
	Start side	Either left or right of the road centreline	
	End side	Either left or right of the road centreline	
	Start offset measurement	Dimension between the road centreline and the asset centreline	
	End offset measurement	Dimension between the road centreline and the asset centreline	
L2	Road ID	The unique road identifier	
	Polyline (M&E)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (M&E)	Polyline geometric data (X, Y, Z)	

Table 8:30 Mechanical and electrical – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.11.1	Site name	me_site	Site name		A	30	None		L	1		
8.3.11.2	Absolute surface height	me_ab_surf	Height above surface or depth below surface. +ve number if above ground, –ve if below		DC	4	2		D	1		
8.3.11.3	Asset sub type	me_sub_typ	The asset sub type	Fire Protection – Foam System Lines	A	30	None	Code List 9.25	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.11.4	Type	me_typ	Asset Type	Fire	A	100	None		D	1		
8.3.11.5	Design life	me_des_lif	Design life length in years	20	I	2	None		P	1		
8.3.11.6	Defects liability end date	me_liab_e	End date of defects liability period	ddmmyyyy	D	8	None		P	1		
8.3.11.7	Maintenance requirements	me_maintre	Maintenance requirements		A	100	None		P	1		
8.3.11.8	Defects liability start date	me_dl_star	Start date of defects liability period	ddmmyyyy	D	8	None		P	3		
8.3.11.9	Access requirements	me_access	Specific access requirements	Traffic Management	A	30	None		I	2		
8.3.11.10	Installer	me_install	Name of the installer for the equipment		A	30	None		I	3		
8.3.11.11	Manufacturer	me_manu	Manufacturer		A	100	None		I	3		
8.3.11.12	Diameter	me_dia	Conduit Diameter in millimetres (mm)	100	I	3	None		D	1		
8.3.11.13	Length	me_lin_len	Conduit section length in metres (m)		DC	4	2		D	1		
8.3.11.14	Material	me_con_mat	Conduit material	PVC	A	100	None	Code List 9.27	D	1		
8.3.11.15	Communication method	me_commtyp	Communication method. Bluetooth, microwave	Bluetooth	A	30	None		D	1		
8.3.11.16	Controller ID	me_cont_id	Controller ID		AN	30	None		D	1		
8.3.11.17	Control system type	me_cs_typ	Control system type		A	30	None	Code List 9.25	D	1		
8.3.11.18	Data logger present	me_dat_log	Whether there’s a data logger present	Y – Yes	B	1	None	Y or N	D	1		
8.3.11.19	Housing type	me_housing	The housing type present	Cabinet	A	30	None		D	1		
8.3.11.20	UPS is connected	me_ups	A UPS is connected	Y – Yes	B	1	None	Y or N	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.11.21	Purchase date	me_purch	Purchase date	ddmmyyyy	D	8	None		P	1		
8.3.11.22	Model number	me_mod_no	Model number		AN	30	None		I	3		
8.3.11.23	Mounting type	me_mount	Mounting type		A	30	None	??	I	3		
8.3.11.24	Power source	me_power	Power source	Grid	A	30	None	Code List 9.36	I	1		
8.3.11.25	Serial number	me_seri_no	Serial number		AN	30	None		I	2		
8.3.11.26	Supplier	me_supp	Supplier		A	30	None		I	3		
8.3.11.27	Warranty end date	me_warrend	Warranty end date	ddmmyyyy	D	8	None		I	3		

8.3.12 Parking

The purpose, method of control, and restriction type are recorded for designated on-road and off-road parking areas.

Table 8:31 Parking – location references

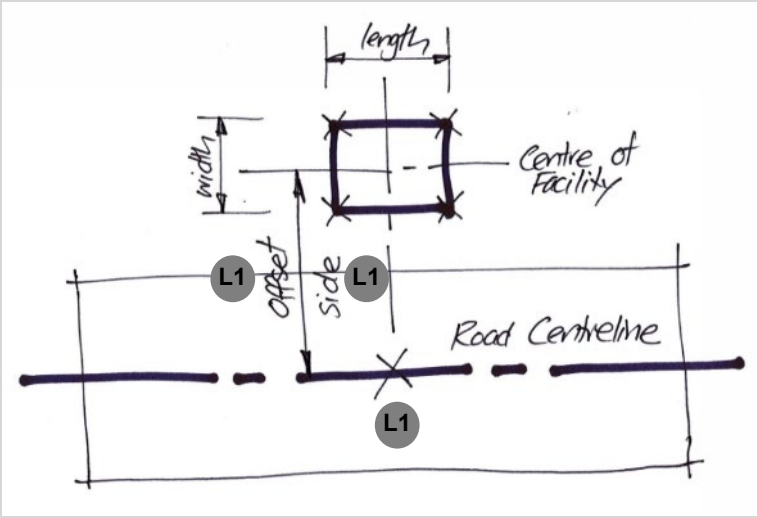
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centre of parking bay	Linear distance along road centreline/spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and the parking facility	
L2	Road ID	The unique road identifier	
	Polygon (parking bay perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (parking bay perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:32 Parking – data items

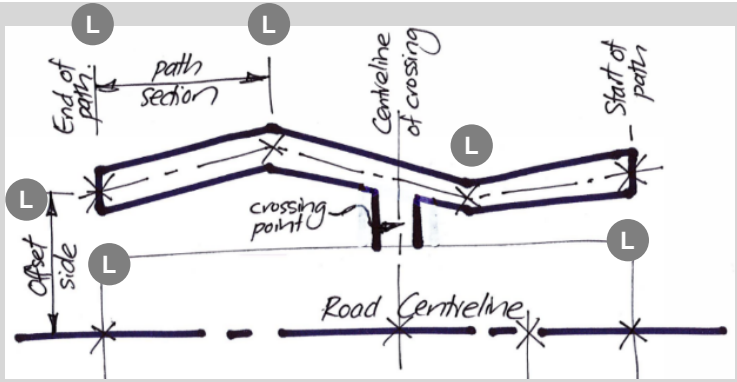
Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.12.1	Bay number	Bays	Number of parking bays in a parking area		I	3	None		D	1		
8.3.12.2	Metered parking	meter	Parking is controlled by a meter	Y – Yes	B	1	None	Y or N	D	1		
8.3.12.3	Purpose	Purpose	Purpose of the car park	Disabled	A	20	None	Code List 9.28	D	3		
8.3.12.4	Type	park_type	Type of car park	ONRD – On Road	A	100	None	ONRD – On Road OFFRD – Off Road				
8.3.12.5	Permit availability	Permits	Permit parking present at this location	Y – Yes	B	1	None	Y or N	I	3		

8.3.13 Pathways

Pathways, also referred to as footpaths or cycleways, are a public way that is reserved for the movement of pedestrians, motorised wheel chairs, personal mobility scooters and bicycles.

Polyline assets

Table 8:33 Pathways – location references

Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset section	Linear distance along road centreline/spatial	
	End of asset section	Linear distance along road centreline/spatial	
	Side	Either left/right of the road centreline	
	Start offset measurement	Dimension between the road centreline and the asset centreline	
	End offset measurement	Dimension between the road centreline and the asset centreline	
L2	Road ID	The unique road identifier	
	Polyline (pathway centreline)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (pathway centreline)	Polyline geometric data (X, Y, Z)	

Point assets

A point asset in this instance is an area set aside for the purpose of allowing pathway users to cross the road, typically connecting to a pathway on the other side.

Table 8:34 Pathway crossing points – location references

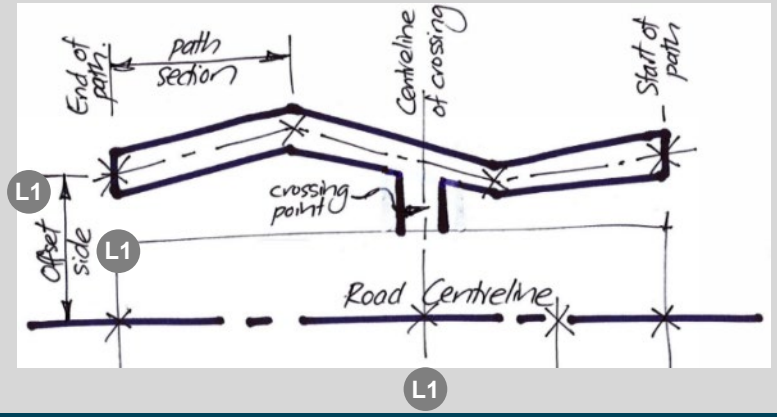
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left/right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:35 Pathways – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.13.1	Local name	path_name	Name of operator that pathways survey was done by		A	100	None		L	1		
8.3.13.2	Base depth	path_b_dep	Depth of the base course material in millimetres (mm)	100	I	3	None		D	1		
8.3.13.3	Base type	path_b_typ	Type of the base course material		A	100	None	Code List 9.27	D	1		
8.3.13.4	Depth crossing	path_c_dep	Depth of surface material (concrete) for the crossing in millimetres	150	I	3	None		D	1		
8.3.13.5	Depth pathway	path_dep	Depth of the pathway seal in millimetres	100	I	3	None		D	1		
8.3.13.6	Number of steps	path_steps	Number of steps within the section		I	3	None		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.13.7	Rail type	path_r_typ	Rail type associated with steps	Top rail with wire rope	A	30	0		D	1		
8.3.13.8	Pathway is reinforced	path_reo	The Pathway is reinforced	Y – Yes	B	1	0	Y or N	D	1		
8.3.13.9	Sub base depth	path_s_dep	Depth of the sub-base course material in millimetres (mm)		I	3	0		D	1		
8.3.13.10	Sub base type	path_s_typ	Type of the sub-base course material. As per VicRoads Standard Specification		A	100	0	Code List 9.27	D	1		
8.3.13.11	Width	path_wid	If the segment is a set of stairs with irregular width, an average width is to be included		DC	3	2		D	1		
8.3.13.12	Obstruction type	path_obst	Obstruction type that will impede the pathway	Locked gate	A	250	0		D	2		
8.3.13.13	Rail material	path_r_mat	Material of rail associated with steps	Wood	A	30	0		D	2		
8.3.13.14	Crossing material	cross_mat	The material the asset is constructed of	CONC – Concrete	A	30	0	Code List 9.27	D	3		
8.3.13.15	Crossing type	cross_type	Identifies the type of pathway crossing	Bevelled	A	30	0		D	3		
8.3.13.16	Crossing width	cross_wdth	Width of the crossing in metres		DC	3	2		D	3		
8.3.13.17	Length pathway	path_len	Length of the pathway in metres		DC	4	2		D	3		
8.3.13.18	Material pathway	path_mat	Pathway material	CONC – Concrete	A	100	0	Code List 9.27	D	3		
8.3.13.19	Pathway type	path_typ	Pathway type	Beach Access	A	100	0	Code List 9.29	D	3		
8.3.13.20	Treatment	path_treat	Treatment of the pathway	Resurfacing	A	100	0	Code List 9.59	P	2		
8.3.13.21	Instruction	path_instr	Instructions for getting around an obstruction such as a locked gate or barrier on a pathway	The contact details of the person with a gate key	AN	250	0		I	3		

8.3.14 Pavement

The pavement is defined as the portion of a road placed above the design subgrade level (earthworks) for the support of vehicular traffic, and upon which the pavement surfacing (wearing course) is applied.

Table 8:36 Pavement – location references

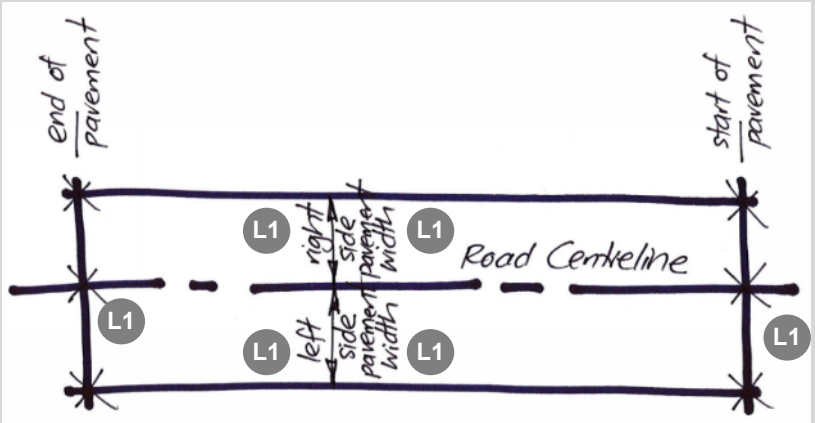
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of pavement	Linear distance along road centreline/ spatial	
	End of pavement	Linear distance along road centreline/ spatial	
	Pavement width (left)	Measurement of pavement width on left side of road centreline	
	Pavement width (right)	Measurement of pavement width on right side of road centreline	
L2	Road ID	The unique road identifier	
	Polygon (pavement perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (pavement perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:37 Pavement – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.14.1	Lateral width left	p_wid_l	Lateral distance measured from the road centreline to the left side of the formed pavement. Side is determined by the direction of increasing distance along the link		DC	5	2		L	1		
8.3.14.2	Lateral width right	p_wid_r	Lateral distance measured from the road centreline to the right side of the formed pavement. Side is determined by the direction of increasing distance along the link		DC	5	2		L	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.14.3	Chainage at start of street segment	road_from	Chainage at start of street segment. 'SLK_from' is for WA members and 'Road_from' is for other jurisdictions. This is to be the starting chainage of the centreline. Chainage is to correspond with the pavement length		I	6	0		L	1		Structure unique ID (alphanumeric)
8.3.14.4	Chainage at end of street segment	road_to	In full, no abbreviations for type of road. For subdivision roads, the proposed name can be available from the organisation it will be vested to		I	6	0		L	1		Structure unique ID (alphanumeric)
8.3.14.5	Centreline segment length	seg_cl_len	Centreline segment length between chainages in metres		DC	4	2		D	1		Pavement centreline segment length (m) numeric one decimal place
8.3.14.6	Material source	mat_source	The originating source of the material	Quarry	A	50	0		D	2		
8.3.14.7	Material source name	mat_s_name	The name of the originating source of the material	Winstones	A	50	0		D	2		
8.3.14.8	Recycled percentage	p_recy_per	The percentage of recycled material used in the pavement construction	15	I	3	0		D	2		
8.3.14.9	Recylced material	p_recy_mat	The name of the recycled material used in the pavement construction	Winstones	A	50	0		D	2		
8.3.14.10	Design ESA	design_esa	Design equivalent standard axles used in the pavement design, in millions (1 x 106)	1.5	DC	2	1		P	2		
8.3.14.11	Load Limit	p_axle_max	Maximum axle load in tonnes	1.5	DC	2	1		P	2		
8.3.14.12	Layer depth	p_lay_dep	Depth of material for the layer		I	3	0		D	1		
8.3.14.13	Layer material	p_lay_mat	Type of material for the layer		A	100	0	Code List 9.27	D	1		Layer material description (alpha)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.14.14	Layer number	p_lay_no	The order of the pavement layers from top (layer 1) to bottom. The layer number has the youngest layer at top (top layer), with the oldest at the bottom		A	2	0		D	1		
8.3.14.15	Layer Stabilising agent	p_lay_stab	Stabilizing agent used in the layer		A	30	0		D	1		
8.3.14.16	Stabilising agent percent	p_stab_pct	Stabilizing agent percentage in the layer		I	2	0		D	1		
8.3.14.17	Layer type	p_lay_typ	The type of layer the information relates to. This can be either the subgrade or a pavement layer		A	1	0	S – Subgrade L – Pavement layer	D	1		
8.3.14.18	Layer width	p_lay_wid	Width of material for the layer excluding the feather edge. Generally, this is the width of pavement underneath the surfacing		DC	5	2		D	1		Pavement layers layer width (m) numeric to two decimal places
8.3.14.19	Layer CBR	p_lay_cbr	Californian Bearing Ratio (CBR) for the natural ground and granular (non-modified) layer		DC	5	2		P	2		
8.3.14.20	layer UCS	p_lay_ucs	Unconfined compressive strength (UCS) for a modified granular or bound layer, including subgrades		DC	3	2		P	2		

8.3.15 Surfacing

The surfacing is the portion of a road upon which the traffic travels, that is specifically designed to resist abrasion from traffic and to minimise the entry of water.

Table 8:38 Surfacing – location references

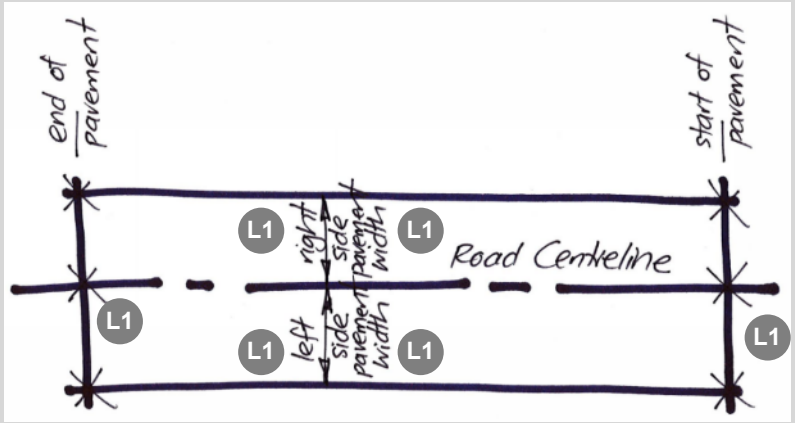
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of pavement surfacing	Linear distance along road centreline/ spatial	
	End of pavement surfacing	Linear distance along road centreline/ spatial	
	Pavement surfacing width (left)	Measurement of pavement surfacing width on left side of road centreline	
	Pavement surfacing width (right)	Measurement of pavement surfacing width on right side of road centreline	
L2	Road ID	The unique road identifier	
	Polygon (pavement surfacing perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (pavement surfacing perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:39 Pavement surfacing – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.15.1	Lateral width left	s_wid_l	Lateral distance measured from the road centreline to the left side of the pavement surfacing. Side is determined by the direction of increasing distance along the link		DC	5	2		L	1		
8.3.15.2	Lateral width right	s_wid_r	Lateral distance measured from the road centreline to the right side of the formed pavement. Side is determined by the direction of increasing distance along the link		DC	5	2		L	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.15.3	Length of seal	seal_len	The length of seal for the layer		I	5	0		D	1		Pavement seal/surfacing length (m) integer
8.3.15.4	Width of seal	seal_wid	Width of the seal layer. The seal width is only required for a partial width seal, and will have an offset from the centreline		DC	6	2		D	1		Pavement seal/surfacing width (m) numeric two decimal places
8.3.15.5	Road surface status	psurf_stat	The status of the current surfacing type	S, U	A	1	0		D	1		Pavement surfacing status: sealed (S) unsealed (U) (alpha)
8.3.15.6	Year of current surface installation	seal_year	The calendar year of the most recent surfacing		I	2	0		D	1		Pavement surfacing year current surfacing applied yyyy (integer)
8.3.15.7	Design life	s_life_des	Design life length in years for the surface	10	I	2	0		P	2		Pavement surfacing design life of surfacing years (integer)
8.3.15.8	Seal specification	seal_spec	The specification covering the way the contract is managed and warranted	P17	AN	30	0	P17 P4	I	3		
8.3.15.9	Smallest chip size	chip_small	The smallest aggregate size(chip grade) in a double/double (two chip) seal	7 mm aggregate in a 14/7 double/double seal OR Grade 5 chip in a Grade 3/5 two chip seal	I	2	0		D	1		
8.3.15.10	Largest chip	chip_large	The largest aggregate size(chip grade) in a double/double (two chip) seal	14 mm aggregate in a 14/7 double/double seal OR Grade 3 chip in a Grade 3/5 two chip seal	I	2	0		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.15.11	Depth of the seal	s_dep	The depth of the seal in millimetres. This is used for non-chip seal surfaces that have a depth such as slurry, concrete, and asphaltic concrete. Chip seals have a depth of 0		I	3	0		D	1		
8.3.15.12	Seal layer function	s_func	Function of the seal layer	M – Membrane	A	30	0	Code List 9.59	D	1		
8.3.15.13	Surfacing material type	s_mat	Type of material for the layer		AN	10	0		D	1		Pavement layer material type (alpha)
8.3.15.14	The surface layer number	s_lay_no	The surface layer number		A	1	0	1 to 99	D	1		
8.3.15.15	Polished stone value of chip for the seal layer	Psv	Polished Stone Value of Chip for the seal layer		I	2	0	50 to 65	P	2		
8.3.15.16	Additive quantity	s_add_quan	Additive Quantity used in the seal (pph)		I	3	0	0 to 100	I	3		
8.3.15.17	Type of additive	s_add_typ	Type of additive used in the seal		A	4	0	Code List 9.56	I	3		
8.3.15.18	Adhesion agent quantity	s_adh_quan	Quantity of Adhesion agent used in the seal (pph)	5	I	3	0	0 to 100	I	3		
8.3.15.19	Adhesion agent	s_add_typ	Type of additive used in the seal		A	30	0	Code List 9.57	I	3		
8.3.15.20	Average least dimension	s_ald	Average Least Dimension of the chip		DC	4	2	0 to 20	I	3		
8.3.15.21	Binder application rate	s_bind_rat	Binder application rate of the seal (litres per square metre)	2.3	DC	6	2		I	3		
8.3.15.22	Binder type	s_bind_typ	Binder type of used in the seal		A	30	None	Code List 9.58	I	3		
8.3.15.23	Cutter quantity	s_cut	Cutter Quantity used in the seal (pph)		I	2	None	0 to 20	I	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.15.24	Cutter type	s_cut_typ	Cutter type used in the seal		A	30	None		I	3		
8.3.15.25	Elastic recovery	s_elas_rec	Elastic recovery of the polymer modified seal. This information has to be obtained from the polymer modified asphalt cement provider as it is specific to the mix. Applicable to polymer modified mixes only. This is different to torsional recovery and should not be confused. Specified as a percent	15	I	3	None	0 to100	I	3		
8.3.15.26	Quantity of flux	s_flux	Quantity of flux used in the seal (pph)		I	3	None	0 to 10	I	3		
8.3.15.27	Polymer percentage	s_poly	Polymer percentage in the seal layer		I	3	None	0 to 50	I	3		
8.3.15.28	Polymer type	s_ply_typ	Polymer type in the seal layer		AN	100	None		I	3		
8.3.15.29	Percentage of recycle material	s_recy_mat	Percentage of recycle material in the seal layer		I	3	None	0 to 100	I	3		
8.3.15.30	Recycled component	s_recy	Recycled component in the seal layer		A	10	None	Code List 9.27	I	3		
8.3.15.31	Binder softening point	s_bind_sp	Softening point of the binder used in seal layer (degrees Celsius)		I	3	None		I	3		
8.3.15.32	Quarry source	s_source	The name of the Quarry the aggregate used for chip sealing or asphalt mix was sourced from		A	30	None		I	3		
8.3.15.33 (NEW)	Number of lanes	pave_lanes	Number of lanes		None	None	None		None	1		integer

8.3.16 Pits

Pits include assets referred to as catch pit, sumps and manhole chambers. Catch pits/sumps are a concrete pit at the end of a water channel used to settle out solids before the water flow enters a pipe drain. A sump is a hole or depression into which water is drained.

Table 8:40 Pits – location references

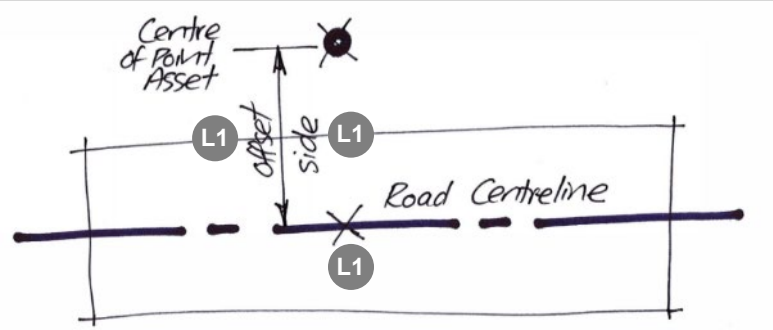
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:41 Pits – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.16.1	X coordinate	pit_x	X Coordinate locator point in metres. Will be used in the check of pipe endpoints compared to pit locator points		DC	9	2		L	2		
8.3.16.2	Y coordinate	pit_y	Y Coordinate locator point in metres. Will be used in the check of pipe endpoints compared to pit locator points		DC	9	2		L	2		
8.3.16.3	Diameter width	pit_dia	Side width of pit or diameter if circular	600	I	4	None		D	1		
8.3.16.4	Length	pit_len	Side length of pit if not circular	900	I	3	None		D	1		
8.3.16.5	Lid type	pit_li_typ	Pit lid type	Grate	A	40	None	Code List 9.34	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.16.6	Pit number	pit_no	Unique number in this Subdivision or Project Stage	39A	AN	15	None		D	1		
8.3.16.7	Type	pit_typ	Type of pit	Twin	A	100	None		D	1		
8.3.16.8	Litter trap type	pit_trap	Type of litter trap	Sand Trap	A	20	None	Code List 9.35	D	2		
8.3.16.9	Depth	pit_dep	Natural or Finished Surface level to invert of outlet pipe in metres	1.27	DC	3	2		D	3		
8.3.16.10	Fence present	pit_fence	Existence of a fence around the asset	Y – Yes	B	1	None	Y or N	D	3		
8.3.16.11	Finished surface level	pit_level	Cover Level Metres – Finished Surface Level (FSL) of pit		DC	7	2		D	3		
8.3.16.12	Number of step irons	pit_steps	Number of step irons. If no step irons enter '0'	4	I	2	None		D	3		
8.3.16.13	Construction type	pit_st_typ	Construction Type	Insitu	A	6	None	Code List 9.33	I	3		

8.3.17 Poles

Poles are vertical or near-vertical elements onto which other assets are connected, such as traffic signals, street lights, and CCTV cameras.

Table 8:42 Poles – location references

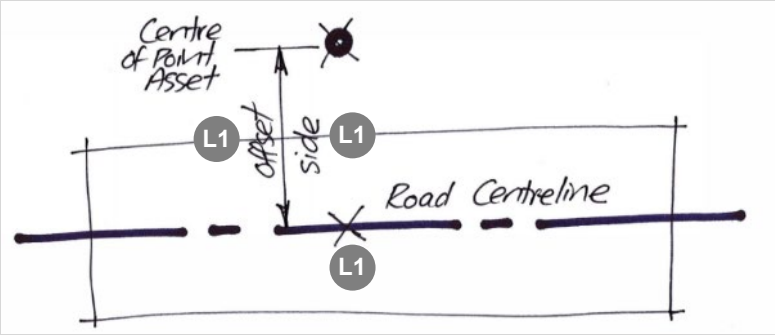
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:43 Poles – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.17.1	Pole height	pole_hei	Pole height from the ground surface	7.6	DC	4	2		D	1		
8.3.17.2	Pole material	pole_mat	Pole Material type	CONC – Concrete	A	10	None	Code List 9.27	D	1		
8.3.17.3	Pole type	pole_typ	Pole type		A	30	None		D	1		
8.3.17.4	Pole earth method	pole_earth	Method used to earth the pole		A	30	None		D	2		
8.3.17.5	Foundation material	pofoun_mat	Foundation material of the pole	CONC – Concrete	A	100	None		D	2		
8.3.17.6	Foundation type	pole_found	Foundation type of the pole		A	30	None		D	2		
8.3.17.7	Pole controller	pole_cntrl	Pole controller type	Time	A	30	None		D	2		
8.3.17.8	Pole finish	pole_finsh	Pole finish	Powder Coated	A	30	None		D	2		
8.3.17.9	Pole attachments present	pole_attac	Pole attachments are present	Y – Yes	B	1	None	Y or N	I	3		
8.3.17.10	Pole manufacturer	pole_manuf	Pole manufacturer	Jones Manufacturing	A	100	None		I	3		
8.3.17.11	Pole model number	pole_model	Pole model number	J1234	AN	20	None		I	3		
8.3.17.12	Design standard	pole_stand	Design Standard for the pole		A	30	None		I	3		

8.3.18 Public Art

This classification applies to public art or memorials.

Table 8:44 Public art – location references

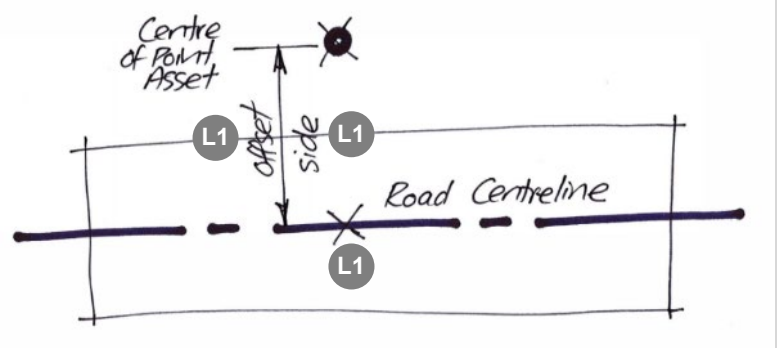
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left/right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:45 Public art – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.18.1	Description of artwork	art_desc	Description of Artwork	Statue of Child	A	100	None		D	1		
8.3.18.2	Artwork material	art_mat	Artwork material	Brass	A	100	None	Code List 9.27	D	1		
8.3.18.3	Type	art_type	Type of artwork or memorial	Statue, Memorial	A	100	None		D	1		
8.3.18.4	Plaque description	plaque_des	Plaque description on the art work or memorial		AN	250	None		D	3		
8.3.18.5	Engineering report author	art_en_rep	Who undertook the Engineering Report. This field ONLY needs to be populated in the event that structural works are required for safety. If more notes required enter in the 'Comments' field	Council engineer	AN	50	None		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.18.6	Who undertook the Safety or Risk Assessment	risk_asses	Who undertook the Safety or Risk Assessment. This field ONLY needs to be populated if a risk assessment is done. If more notes required enter in the 'Comments' field	Contractor	AN	50	None		P	2		
8.3.18.7	Construction Cost or Value for Insurance Purposes in Australian/New Zealand Dollars	value	Construction Cost or Value for Insurance Purposes in Australian/New Zealand Dollars. Currency is to be relevant to the jurisdiction	1000000	Mo	10	2		P	2		All – B valuation construction cost $AUD/NZ integer
8.3.18.8	Artist name only	artist	Artist Name only	Peter Graham	A	100	None		L	3		
8.3.18.9	Donated by	donated_by	Who donated the public art feature. This could be a seat, sculpture, painting etc.	Generous Foundation	A	100	None		L	3		
8.3.18.10	Electrical certification	elec_cert	Electrical Certification (where artwork is electrical or has lighting). ONLY needs to be populated in the event that the Artwork is electrical or lighting is required. A certificate is required after working on an electrical installation and connecting it to a source of electricity by the person for whom the work was done		AN	50	0		I	3		

8.3.19 Public Toilets

This classification applies to public toilet or ablution blocks that contain toilets, and/or changing and washing facilities.

Table 8:46 Public toilets – location references

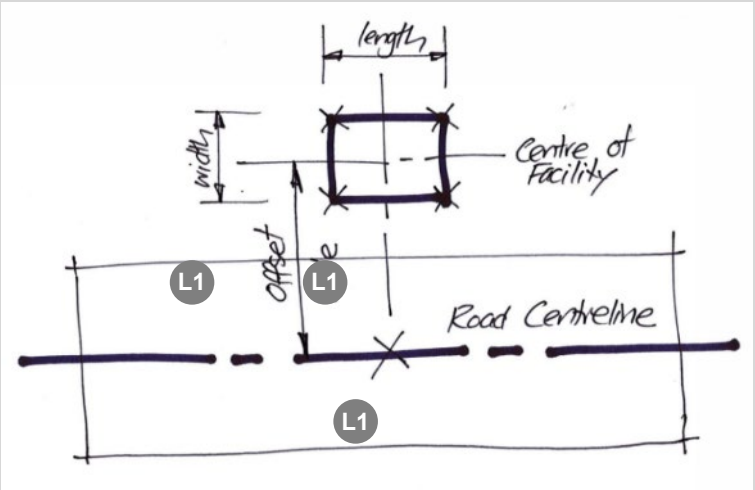
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centre of facility	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and the facility	
L2	Road ID	The unique road identifier	
	Polygon (Toilet block perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (Toilet block perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:47 Public toilets – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.19.1	Changing facilities present	wc_change	If the Public Toilet contains changing facilities	Y – Yes	B	1	None	Y or N	D	2		
8.3.19.2	Floor material	wc_flo_mat	Floor material	Tiles, Concrete	A	100	None		D	2		
8.3.19.3	Number of female showers	wc_fem_shw	Number of Female Shower Facilities	2	I	2	None		D	2		
8.3.19.4	Number of male showers	wc_mal_shw	Number of Male Shower Facilities	2	I	2	None		D	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.19.5	Number of unisex showers	wc_uni_shw	Number of Unisex Shower Facilities	2	I	2	None		D	2		
8.3.19.6	Roof material	wc_roo_mat	Toilet Roof Material	Steel and Fibreglass	A	100	None	Code List 9.27	D	2		
8.3.19.7	Toilet wall material	wc_wal_mat	Toilet Wall Material	Brick	A	100	None	Code List 9.27	D	2		
8.3.19.8	Number of benches	wc_bench	Number of Benches	1	I	2	None		D	3		
8.3.19.9	Number of baby change fixtures	wc_baby	Number of Baby Change Fixtures		I	2	None		D	3		
8.3.19.10	Number of female disabled WC fixtures	wc_fem_dis	Number of Female Disabled WC Fixtures	2	I	2	None		D	3		
8.3.19.11	Number of female WC fixtures	wc_fem	Number of Female WC Fixtures	2	I	2	None		D	3		
8.3.19.12	Number of unisex WC fixtures	wc_uni	Number of Unisex WC Fixtures	2	I	2	None		D	3		
8.3.19.13	Number unisex disabled WC fixtures	wc_uni_dis	Number of Unisex Disabled WC Fixtures	2	I	2	None		D	3		
8.3.19.14	Number of male disabled WC fixtures	wc_mal_dis	Number of Male Disabled WC Fixtures	2	I	2	None		D	3		
8.3.19.15	Number of male urinal fixtures	wc_mal_uri	Number of Male Urinal Fixtures	4	I	2	None		D	3		
8.3.19.16	Number of male WC fixtures	wc_mal_fix	Number of Male WC Fixtures	2	I	2	None		D	3		
8.3.19.17	Sharp disposal present	wc_sharps	If the Public Toilet contains Sharp Disposal Facilities	Y – Yes	B	1	None	Y or N	D	3		
8.3.19.18	Waste water disposal	wc_waste	The waste water disposal method	Town Sewer or Septic	A	20	None		D	3		
8.3.19.19	Toilet partition material	wc_par_mat	Toilet Partition Material	Wood	A	20	None	Code List 9.27	I	3		

8.3.20 Retaining Walls

A retaining wall is a wall constructed to resist lateral pressure from the adjoining ground or to maintain a mass of earth in position. These can be for pavement, pathways, natural/cut slope protection, foreshore protection and around bridge abutments.

Table 8:48 Retaining walls – location references

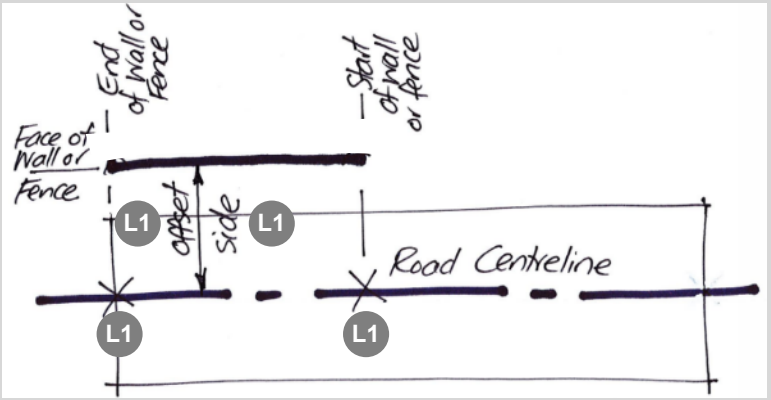
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of wall section	Linear distance along road centreline/ spatial	
	End of wall section	Linear distance along road centreline/ spatial	
	Side	Either left/right of the road centreline	
	Start of wall offset	Dimension between the road centreline and face of wall	
	End of wall offset measurement	Dimension between the road centreline and face of wall	
L2	Road ID	The unique road identifier	
	Polyline (face of wall)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (face of wall)	Polyline geometric data (X, Y, Z)	

Table 8:49 Retaining walls – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.20.1	Lateral offset face	rw_offset	Lateral offset in metres from the road centreline to the asset face, at the asset start point, from the increasing direction of travel		DC	3	1		L	1		
8.3.20.2	Length of retaining wall	rw_len	Length of the retaining wall		DC	4	2		D	1		
8.3.20.3	Restraining mechanism of the asset	rw_restrai	Restraining mechanism of the asset	Gravity	A	30	None	Code List 9.41	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.20.4	Structure type	struc_typ	Structure type	Gabion Basket, Sea Wall	A	30	None	Code List 9.42	D	1		
8.3.20.5	Average height	avg_hei	Average height of the asset in metres (m)	5.3	DC	3	1		D	2		
8.3.20.6	Drainage mechanism	drainage	Drainage mechanism	P – Porous	A	30	0	Code List 9.15	D	2		
8.3.20.7	Face area of wall	rw_fac_are	Face area of the wall in square metres (m2)	25.16	DC	6	2		D	2		
8.3.20.8	Face material	rw_fac_mat	Wall face material	Brick	A	30	0	Code List 9.27	D	2		
8.3.20.9	Foundation type	found_typ	Foundation type		A	30	0		D	2		
8.3.20.10	Wall post material	rw_pos_mat	Wall post material	CONC – Concrete	A	100	0		D	2		
8.3.20.11	Maximum height	rw_max_hei	Maximum height of the asset in metres (m)	5.3	DC	5	2		D	3		
8.3.20.12	Number of anchorage rows	rw_tie_row	Number of anchorage rows	10	I	3	0		D	3		
8.3.20.13	Anchoring system	rw_tie_sys	Anchoring system of the asset		A	30	0		D	3		
8.3.20.14	Maintained by organisation	maintained	Who maintains the asset	Wellington City Council	A	100	0		P	2		
8.3.20.15	Features above the wall	rw_above	Features above the wall	Bank	A	30	0	Code List 9.1	I	3		
8.3.20.16	Back tilt angle	rw_tilt	Back tilt angle measured from the vertical	10°	I	2	0		I	3		
8.3.20.17	Features below the wall	rw_below	Features below the wall	SEA	A	30	0	Code List 9.1	I	3		
8.3.20.18	Face thickness	rw_fac_thi	Face thickness of the wall in millimetres (mm)	150	I	4	0		I	3		

8.3.21 Road Barriers

Road barriers provide protection from errant vehicles/road users for safety purposes. They are designed to allow for vehicles to be deflected to safety from a hazard. They are used to separate opposing traffic flows, and also as protection from hazards.

Table 8:50 Road barriers – location references

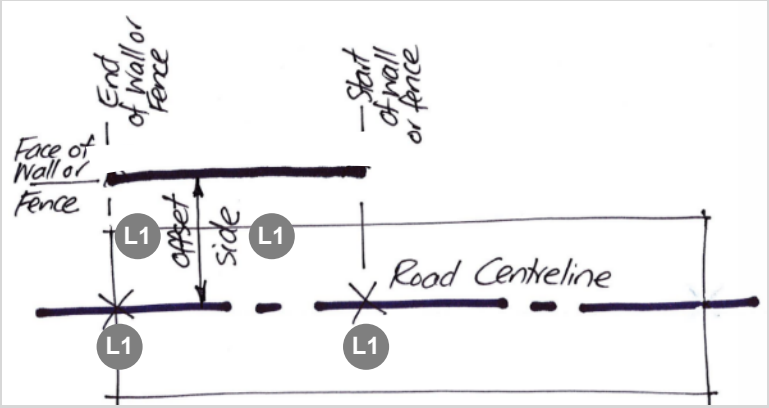
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of barrier section	Linear distance along road centreline/ spatial	
	End of barrier section	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Start of barrier offset measurement	Dimension between the road centreline and face of barrier	
	End of barrier offset measurement	Dimension between the road centreline and face of barrier	
L2	Road ID	The unique road identifier	
	Polyline (face of barrier)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (face of barrier)	Polyline geometric data (X, Y, Z)	

Table 8:51 Road barriers – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.21.1	Lateral offset face	rb_offset	Lateral offset in metres from the road centreline to the asset face, at the asset start point, from the increasing direction of travel		DC	3	1		L	1		
8.3.21.2	Length of barrier	rb_len	Length of the road barrier in metres	125.68	DC	5	2		D	1		
8.3.21.3	Material barrier rail	rb_rai_mat	Material of the road barrier rail	Steel	A	100	None	Code List 9.27	D	1		
8.3.21.4	Road barrier type	rb_typ	Road barrier type	Noise Attenuation	A	100	None	Code List 9.43	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.21.5	Height of barrier	rb_hei	Height of the road barrier measured from the ground surface	650	I	4	None		D	2		
8.3.21.6	Material barrier posts	rb_pos_mat	Material of barrier posts	Wood	A	100	None	Code List 9.27	D	2		
8.3.21.7	Attachments on the barrier	rb_attach	Attachments on the barrier	reflectorised discs	A	30	None		D	2		
8.3.21.8	Rail width	rb_wid	Rail width	200	I	4	None		D	2		
8.3.21.9	Barrier end style	rb_styl_e	End style of the barrier		A	30	None		D	3		
8.3.21.10	Barrier end style	rb_end_typ	End style type of the barrier		A	30	None		D	3		
8.3.21.11	Ground fixed method	rb_grn_fix	How the barrier is fixed to the ground		A	30	None		D	3		
8.3.21.12	Barrier number of posts	rb_posts	Number of posts in the barrier	10	I	2	None		D	3		
8.3.21.13	Barrier start style	rb_styl_s	Start style of the barrier		A	30	None		D	3		
8.3.21.14	Barrier start type	rb_typ_s	Start type of the barrier		A	30	None		D	3		
8.3.21.15	Coating system	coat_sys	Coating system		A	30	None		I	2		
8.3.21.16	Model number	rb_mod_no	Model number of the barrier		AN	30	None		I	3		
8.3.21.17	Paint colour	paint_colo	Paint colour of the barrier		A	30	None		I	2		

8.3.22 Shelters

A shelter is a structure that provides weather protection to various road users. It can include cycle, bus and pedestrian shelters.

Table 8:52 Shelters – location references

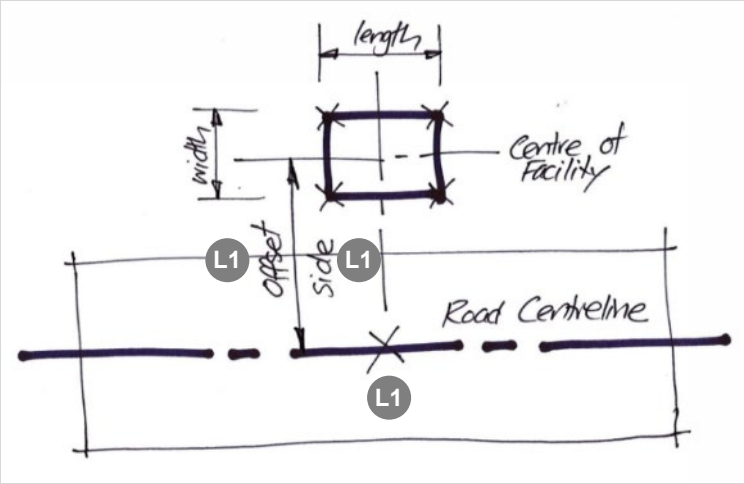
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centre of facility	Linear distance along the road centreline	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and the facility	
L2	Road ID	The unique road identifier	
	Polygon (Shelter perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (Shelter perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:53 Shelters – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.22.1	Shelter type	sh_typ	Shelter type	Pedestrian, Bus, Tram etc.	A	100	None	Code List 9.46	D	1		
8.3.22.2	Disabled access available	sh_dis_acc	Disabled access availability	Y – Yes	B	1	None	Y or N	D	2		
8.3.22.3	Floor material	sh_flr_mat	Floor material		A	100	None	Code List 9.27	D	2		
8.3.22.4	Roof material	sh_roo_mat	Roof material		A	100	None	Code List 9.27	D	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry standard	Metrics
8.3.22.5	Wall material	sh_wal_mat	Wall material		A	100	None	Code List 9.27	D	2		
8.3.22.6	Seating material	seat_mat	Seating material in the bus shelter	Plastic	A	100	None	Code List 9.27	D	3		
8.3.22.7	Advertising on shelter	advert	If there is any advertising displayed on the shelter	Y – Yes	B	1	None	Y or N	I	3		
8.3.22.8	Shelter manufacturer	sh_manuf	Shelter manufacturer		A	100	None		I	3		
8.3.22.9	Model number of shelter	sh_model	Model number of Shelter		AN	20	None		I	3		

8.3.23 Signs

Typically, traffic signs that can be a board, plate, screen or other device displaying words, figures, symbols or anything else to regulate, direct, or warn road users. They may or may not be illuminated.

Table 8:54 Signs – location references

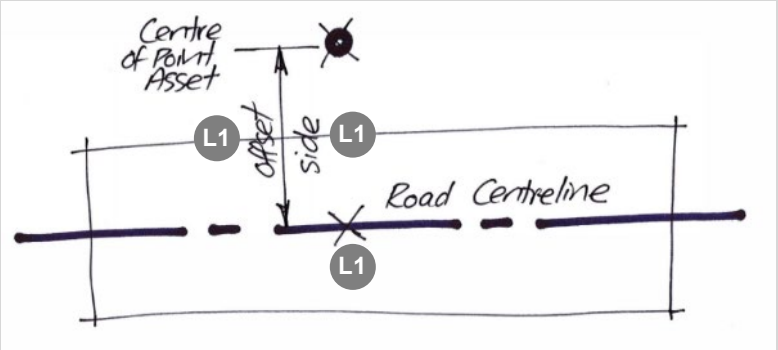
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:55 Signs – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.23.1	Sign type	sign_typ	Sign type. Refer to Australian Standards or MOTSAM (NZ)		A	100	None		D	1		
8.3.23.2	Ground height	sign_elev	Height from ground to bottom of the sign panel		DC	3	1		D	2		
8.3.23.3	Sign height	sign_hei	Height from ground to bottom of the sign panel	1200	I	4	None		D	2		
8.3.23.4	Number of posts	sign_posts	Number of sign posts	2	I	2	None		D	2		
8.3.23.5	Post material	sign_p_mat	Material of the sign post	Wood	A	100	None		D	2		
8.3.23.6	Width of sign	sign_wid	Total width of the sign	500	I	4	None		D	2		
8.3.23.7	Frame material	sign_frame	Sign frame material		A	30	None		D	3		
8.3.23.8	Number of sign panels	sign_panel	Number of panels in the sign	4	I	2	None		D	3		
8.3.23.9	Strengthening bar present	sign_stren	Whether there's a strengthening bar	Y – Yes	B	1	None	Y or N	D	3		
8.3.23.10	Background colour	sign_bcol	Background colour		A	30	None		I	2		
8.3.23.11	Background material	sign_b_mat	Background material		A	30	None		I	2		
8.3.23.12	Wording on sign	sign_words	Wording on the sign or if there are no words, a description of the sign		A	250	None		I	1		
8.3.23.13	Legend colour	sign_wordc	Legend colour		A	30	None		I	2		
8.3.23.14	Legend material	sign_wordm	Legend material		A	30	None		I	2		
8.3.23.15	Sign manufacturer	sign_manuf	Sign manufacturer		A	100	None		I	3		
8.3.23.16	Sign angle	sign_angle	Orientation of the sign. Angle from North, clockwise to the bracket (its bearing)	225	I	3	None		I	2		
8.3.23.17	Panel material	sign_mat	Material of the sign panel	Aluminium	A	100	None		I	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.23.18	Australian Standard reference	sign_refsd	Australian Standard Reference		AN	100	None		I	3		
8.3.23.19	Local sign reference number	sign_refno	Standard Local Sign Reference Number		AN	100	None		I	3		
8.3.23.20	Support type	sign_supp	Support type of the sign	On a post	A	100	None		I	2		

8.3.24 Slope Treatments

Slope treatment assets include the natural and mechanical treatment to either stabilise slopes or to control the degradation of slopes.

Table 8:56 Slopes – areas – location references

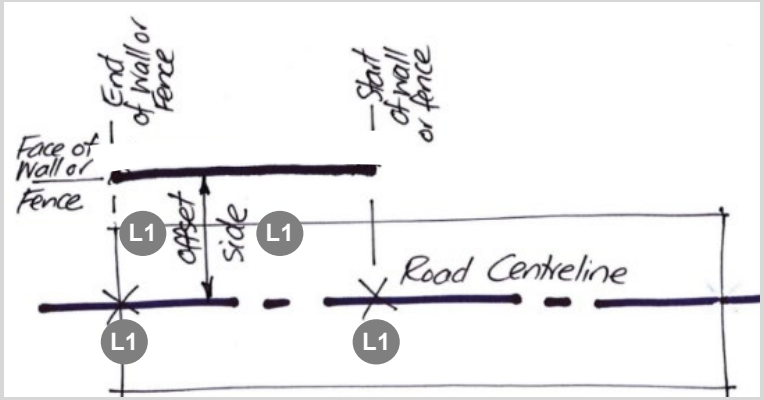
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centre of slope	Linear distance along the road centreline	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and the slope	
L2	Road ID	The unique road identifier	
	Polygon (slope perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (slope perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:57 Slopes – mechanical devices – location references

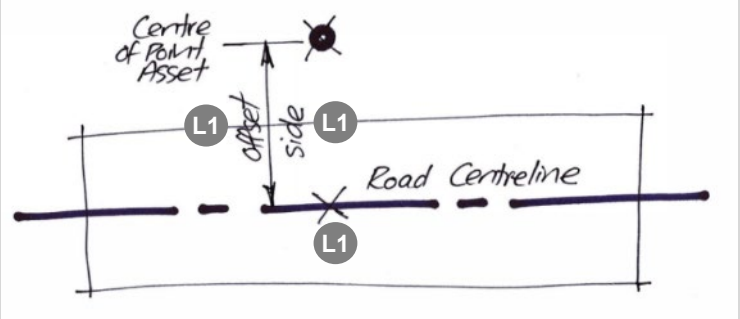
Soph	Location data	General guidance	Diagram
L1	Centreline distance to asset centre at ground level	Linear distance along road centreline/spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
	Height measurement	The slope dimension between the base of the slop and the restraint asset	
L2	Point (asset centre point)	Point geometric data (X, Y)	
L3	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:58 Slopes – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.24.1	Area of slope face	slope_area	The area obtained from plans, or accurately measured on site		I	6	None		D	1		
8.3.24.2	Slope in cut or fill	slope_typ	Whether the slope was created by a cutting (above road slope) or filling activity(embankment below or above road slope)	Cut or Fill	A	1	None	C – Cut F – Fill	D	1		
8.3.24.3	Gradient of batter slope	slope_grad	Expressed as the rise (change in height from the ground to the top of the slope) over the run (the horizontal ground distance from the toe of the slope to where the rise is measured from), expressed as a percentage		A	3	None		D	1		
8.3.24.4	Slope length	slope_len	This is the actual length of the slope measured from the start point to the end point	1020.25	I	5	None		D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.24.5	Average height	slope_hei	This is a weighted average height calculated from [area]/[length], where area is known		DC	3	1		D	1		
8.3.24.6	Planting exists	slope_plan	Planting exists to stabilise the slope	N – No	B	1	0	Y or N	D	1		
8.3.24.7	Slope is reinforced	slope_rein	The bank is reinforced	N – No	B	1	0	Y or N	D	1		
8.3.24.8	Active or passive drainage	slope_drn	The type of drainage utilised. Active where the drainage is assisted by pumping or other means, or is passive by way of natural gravity	Active or Passive	A	1	0	A – Active P – Passive	D	2		
8.3.24.9	Vegetation type planted	veg_typ	Vegetation type planted		A	30	0	Code List 9.55	D	2		
8.3.24.10	Type of anchors	anchor_typ	Type of anchors used for the stabilising material if not vegetated		A	30	0	Code List 9.49	I	2		
8.3.24.11	Type of drainage liner	dr_liner	The type of drainage liner utilised	Impermeable	A	30	0	Code List 9.50	I	3		
8.3.24.12	Bank foundation material	found_mat	The foundation material of the Bank		A	30	0	Code List 9.52	I	2		
8.3.24.13	Geotextile fabric used	geotextile	Geotextile Fabric used		A	30	0	Code List 9.51	I	2		
8.3.24.14	Geotechnical monitoring equipment	slope_mon	Geotechnical monitoring equipment used for slopes		A	50	0	Code List 9.53	I	2		
8.3.24.15	Slope seismic rating	slope_seis	The seismic rating for the slope		A	2	0	Code List 9.54	I	3		
8.3.24.16	Standpipe installed	Standpipe	Has a standpipe been installed to monitor ground water levels	Y – Yes	B	1	0	Y or N	I	3		

8.3.25 Other Structures

Assets included under ‘other structures’ are sign gantries and others that are not defined elsewhere. Bridges have their own asset type, so are not included here.

Table 8:59 Structures – location references

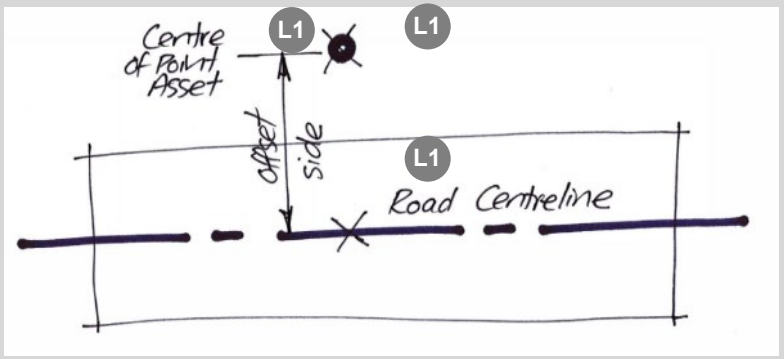
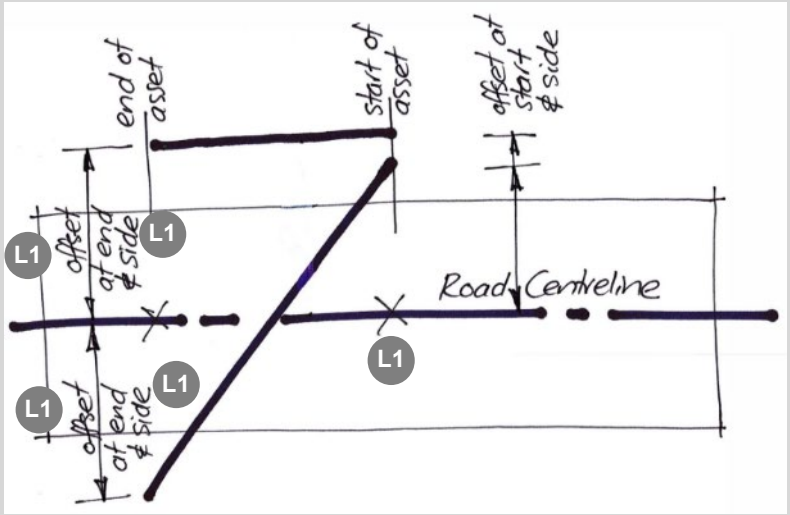
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of asset section	Linear distance along road centreline/ spatial	
	End of asset section	Linear distance along road centreline/ spatial	
	Start side	Either left or right of the road centreline	
	End side	Either left or right of the road centreline	
	Start offset measurement	Dimension between the road centreline and the asset centreline	
	End offset measurement	Dimension between the road centreline and the asset centreline	
L2	Road ID	The unique road identifier	
	Polyline (structure)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (structure)	Polyline geometric data (X, Y, Z)	

Table 8:60 Structures – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.25.1	Structure height	struc_hei	Structure height		DC	5	2		D	1		
8.3.25.2	Structure material	struc_mat	Material of the structure		A	100	0	Code List 9.27	D	1		
8.3.25.3	Structure type	struc_typ	Structure type	Cantilever	A	100	0		D	1		
8.3.25.4	Structure width	struc_wid	Structure width	DC	DC5	52	2		D	1		
8.3.25.5	Structure surface finish	struc_fin	Structure finish	Paint Finish	A	30	0		D	2		
8.3.25.6	Foundation material	found_mat	The foundation material of the bank		A	100	0		D	2		
8.3.25.7	Structure foundation type	struc_ftyp	Foundation type of the structure		A	30	0		D	2		
8.3.25.8	Structure number of supports	struct_sup	Number of supports on the structure		I	2	0		D	2		
8.3.25.9	Structure attachments	struc_att	Attachments on the structure	Sign, Light	A	30	0		I	3		
8.3.25.10	Structure manufacturer	struc_manu	Structure manufacturer		A	100	0		I	3		

8.3.26 Open Drains

An open drain or table drain is a longitudinal drain, parallel to the road, which conveys surface water run-off from the road to outlet drains. It is an unsurfaced alternative to a kerb and channel system typically used in a residential street.

Table 8:61 Table drains – location references

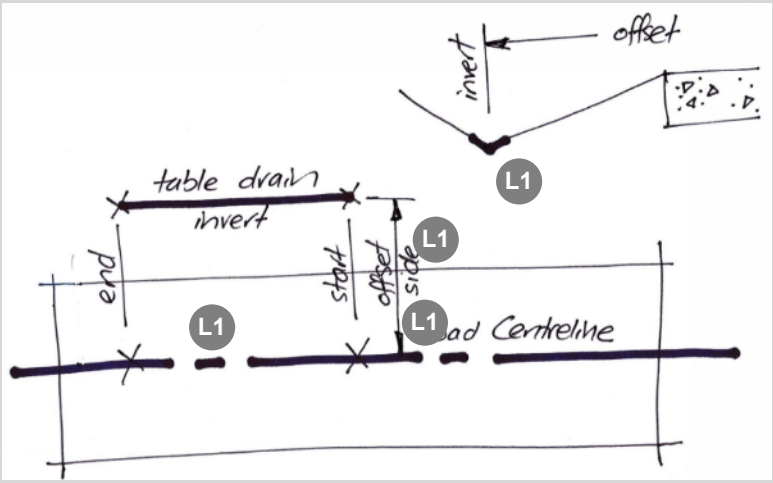
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of drain section	Linear distance along road centreline/ spatial	
	End of drain section	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Start of drain offset measurement	Dimension between the road centreline and invert of drain	
	End of drain offset measurement	Dimension between the road centreline and invert of drain	
L2	Road ID	The unique road identifier	
	Polyline (invert of drain)	Polyline geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polyline (invert of drain)	Polyline geometric data (X, Y, Z)	

Table 8:62 Table drains – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.26.1	Table drain length	drn_len	Length of the table drain in metres	30.25	DC	5	2		D	1		
8.3.26.2	Table drain depth	drn_dep	Average depth of the table drain in metres measured from ground level to invert of the drain	1.05	DC	3	1		D	2		
8.3.26.3	Table drain material	drn_mat	The material the table drain is constructed of	Earth	A	100	0	Code List 9.27	D	2		
8.3.26.4	Table drain shape	drn_shape	The general shape of the table drain	V shaped, trapezoidal	A	100	0		D	2		
8.3.26.5	Table drain width	drn_wid	Average width of the table drain measured at ground level	2.25	DC	4	2		D	2		
8.3.26.6	Authority responsible for maintenance	drn_resp	The name of the responsible Authority for maintenance purposes		A	100	0		I	3		

8.3.27 Tactile Paving

Tactile pavers are used on approaches to a pedestrian crossing point to aid visually impaired persons to identify a safe crossing point.

Table 8:63 Tactile paving – location references

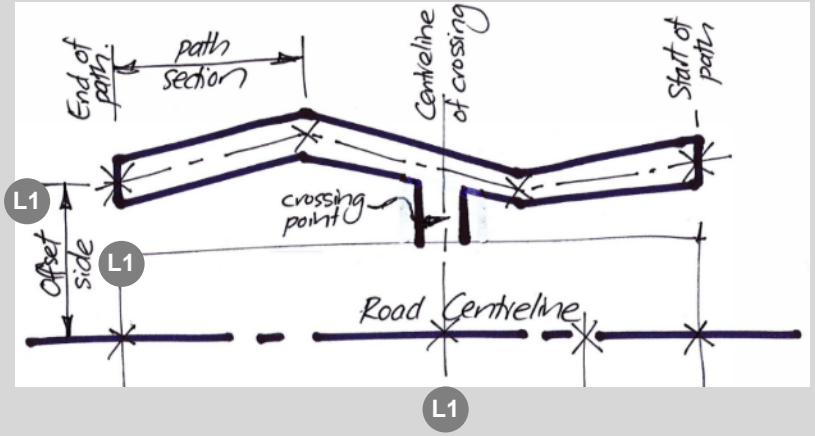
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:64 Tactile paving – data items

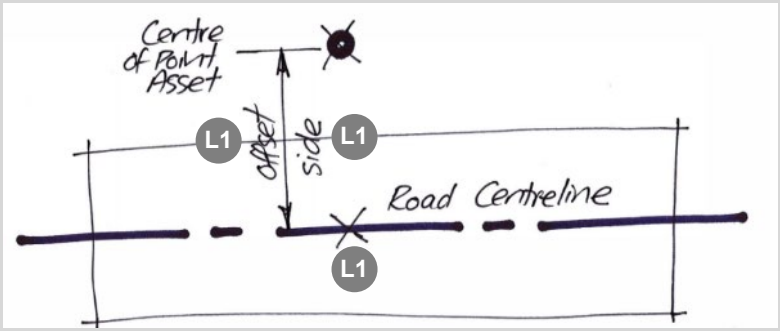
Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.27.1	Tactile paving type	pav_typ	The type of tactile paver that has been used	Tiles, Blocks	A	100	None	Code List 9.27	D	2		
8.3.27.2	Number of paving tiles	pav_tiles	The number of each tactile paver type present at the location	20	I	2	None		D	3		

8.3.28 Traffic Management Devices

Point assets

Traffic management devices manage and control the flow or speed of vehicles/road users. They include width restrictions, speed humps/platforms, pedestrian crossings, roundabouts and splitter islands. A point asset is defined by a point and has no length (e.g. bollards).

Table 8:65 Traffic management devices (point assets) – location references

Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Polygon assets

Traffic management devices manage and control the flow or speed of vehicles/road users. They include width restrictions, speed humps/platforms, pedestrian crossings, roundabouts and splitter islands. A polygon asset has a defined shape and area, such as an island.

Table 8:66 Traffic management devices (polygon assets) – location references

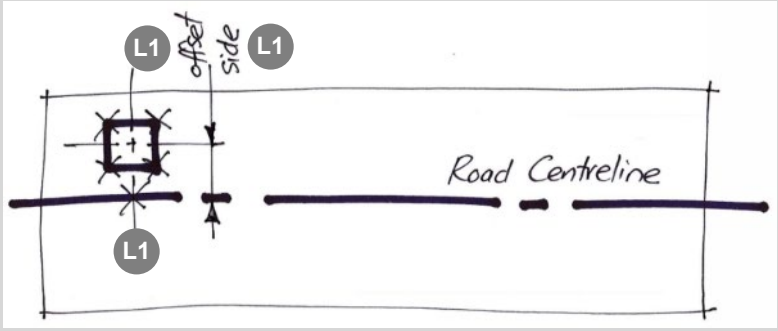
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of device	Linear distance along road centreline/ spatial	
	End of device	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Device width	Measurement of width of device	
	Offset measurement	Dimension between the road centreline and device centreline	
L2	Road ID	The unique road identifier	
	Polygon (device perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (device perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:67 Traffic management devices – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.28.1	Traffic management point material	tm_mat	The material the traffic management point is constructed of	Steel	A	100	None	Code List 9.27	D	1		
8.3.28.2	Traffic management point type	tm_p_typ	The type of point traffic management device	Bollard	A	100	None	Code List 9.62	D	1		
8.3.28.3	Company name only	tm_manuf	The manufacturing company for the point traffic management device	Lunds Pty Ltd	A	100	None		I	3		
8.3.28.4	Model number	tm_model	The model number for the point traffic management device	JK-011-S	AN	30	None		I	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.28.5	Traffic management device material	tm_mat	The material the traffic management point is constructed of	Rubber	A	100	None	Code List 9.27	D	1		
8.3.28.6	Traffic management device type	tm_typ	Traffic Management device type	RBT	A	100	None	Code List 9.62	D	1		
8.3.28.7	Diameter of roundabout	tm_is_dia	Diameter of the roundabout in metres	1.05	I	3	None		D	2		
8.3.28.8	Traffic management device infill material	tm_in_mat	The material of the infill of the asset. This field is only to be completed if TYPE is a Roundabout or the asset has an infill	Grass	A	100	None		D	2		
8.3.28.9	Traffic management device kerb type	kerb_typ	The type of kerb		A	100	None	Code List 9.23	D	2		

8.3.29 Traffic Signals

Traffic signals include all the components of the signal. Components include pedestrian call boxes, target boards, lanterns, controllers, poles, etc.

Table 8:68 Traffic signals – location references

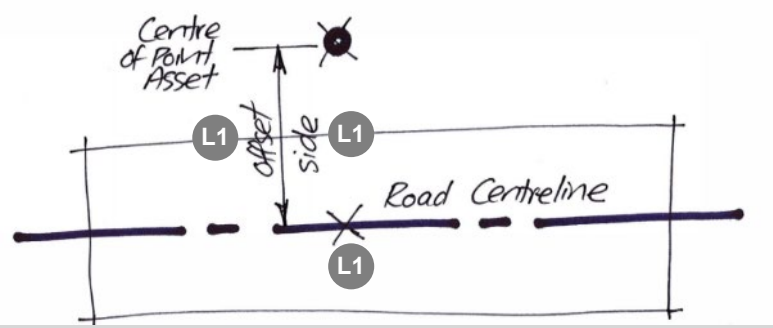
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:69 Traffic signals – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.29.1	Signal pole number	ts_pole_id	The pole number assigned to the traffic signal pole in accordance with traffic signal design. Pole numbering goes clockwise around the intersection from the signal control box	AB1234	AN	30	0		L	1		
8.3.29.2	Site name for the signals	ts_site	The site name that is allocated to the signal set	Browns/ John Intersection	A	30	0		L	1		
8.3.29.3	Signal unique asset ID	ts_unqi_id	The unique asset ID allocated to the signal asset	AD1234	AN	30	0		L	1		
8.3.29.4	Controller ID	ts_cont_id	The Controller ID assigned to the signals	123-346-125435	AN	30	0		D	1		
8.3.29.5	Control system type	ts_cs_typ	Control system type		A	30	0		D	2		
8.3.29.6	Ground height to bottom of signal	signal_hei	Height from the ground surface to the bottom of the signal target board		DC	5	2		D	2		
8.3.29.7	Signal type	ts_sig_typ	Signal type		A	100	0		D	2		
8.3.29.8	Pedestrian call box type	cbox_typ	Pedestrian call box type		A	30	0		D	3		
8.3.29.9	Data logger present	ts_dat_log	Whether there's a data logger present	Y – Yes	B	1	0	Y or N	D	3		
8.3.29.10	Earthing type for signal pole	ts_eth_typ	Earthing type for the traffic signal pole		A	30	0		D	3		
8.3.29.11	Luminaire size	ts_lum_siz	Luminaire size of the signal aspects. This is generally 200 or 300 mm	200	I	3	0	200 300	D	3		
8.3.29.12	Luminaire type	ts_lum_typ	Luminaire type		A	100	0		D	3		
8.3.29.13	Pedestrian call box present	ts_callbox	If there's a pedestrian call box at the signal installation	Y – Yes	B	1	0	Y or N	D	3		
8.3.29.14	Radar unit is connected	ts_radar	Whether a Radar Unit is connected or not	Y – Yes	B	1	0	Y or N	D	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.29.15	Target board length	tboard_len	Target board length measured from the highest point of the target board to the lowest	1500	I	4	None		D	3		
8.3.29.16	Target board material	tboard_mat	Target board material	Aluminium	A	30	None		D	3		
8.3.29.17	Target board width	tboard_wid	Target board width	300	I	3	None		D	3		
8.3.29.18	Defects liability end date	ts_dlp_end	End date of defects liability period	ddmmyyyy	D	8	None		P	2		
8.3.29.19	Defects liability start date	ts_dl_sta	Start date of defects liability period	ddmmyyyy	D	8	None		P	2		
8.3.29.20	Maintenance requirements	ts_mainreq	Maintenance requirements		A	100	None		P	2		
8.3.29.21	Signal maintenance company	ts_maintco	Name of the company who maintains the signals		A	250	None		P	2		
8.3.29.22	Traffic signal purchase cost	ts_cost	The overall cost paid at time of installation, or the vested cost through subdivision	180000	Mo	10	2		P	2		
8.3.29.23	Purchase date	ts_purchda	The purchase date for the signal installation, or vested date through subdivision	ddmmyyyy	D	8	None		P	2		
8.3.29.24	Access to asset	ts_access	Access to asset	Banner Arms	A	30	None		I	3		
8.3.29.25	Attachments type present on the poles	ts_attach	The attachment type to the signal pole		A	30	None		I	3		
8.3.29.26	Manufacturer of call box	ts_make	Manufacturer of the call box		AN	30	None		I	3		
8.3.29.27	Call box model number	ts_cbmodel	Call box model number		AN	30	None		I	3		
8.3.29.28	Luminaire manufacturer	ts_lum_man	Luminaire manufacturer		A	100	None		I	3		
8.3.29.29	Manufacturer of the signal	ts_maunf	Manufacturer of the signal		A	100	None		I	3		
8.3.29.30	Model number	ts_model	Model number	MN12453	AN	30	None		I	3		
8.3.29.31	Mounting type	ts_mnt_typ	Mounting type		A	30	None		I	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.29.32	Signal connected to a smart pad	smart_pad	The signal is connected to a smart pad	Y – Yes	B	1	None	Y or N	I	3		
8.3.29.33	Signal supplier	ts_supp	The traffic signal supplier	TSL	A	30	None		I	3		
8.3.29.34	Video detection present	video_det	If video detection is present at this signal installation	Y – Yes	B	1	None	Y or N	I	3		
8.3.29.35	Visor type	visor_type	Visor type		A	30	None		I	3		
8.3.29.36	Warranty end date	ts_war_end	Warranty end date for the traffic signal installation	ddmmyyyy	D	8	None		I	3		

8.3.30 Trees

This class requires recording of location of planted trees, planting method as well as botanical identification. Trees can be within the berm, or special landscaped areas.

Table 8:70 Trees – location references

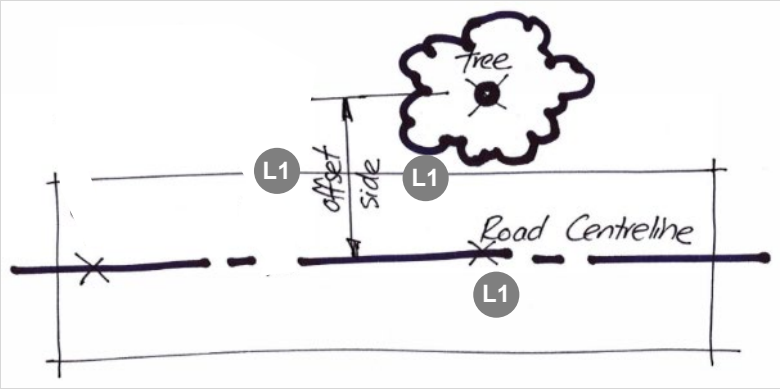
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Point (asset centre point)	Point geometric data (X, Y, Z)	

Table 8:71 Trees – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.30.1	Diameter of trunk	tree_dia	Diameter of the trunk at breast height (in metres)		DC	4	2		D	2		
8.3.30.2	Height at capture	tree_hei	Height of the tree at the time of data capture		DC	5	2	Code List 9.65	D	2		
8.3.30.3	Genus	tree_genus	Genus of the tree		A	30	0		D	3		
8.3.30.4	Tree guards present	tree_guard	Tree/Plant guards are present	Y – Yes	B	1	0	Y or N	D	3		
8.3.30.5	Stock type	tree_stock	Stock type of the tree		AN	50	0		D	3		
8.3.30.6	Tree age	tree_age	Age of the tree at time of capture		A	2	0	Code List 9.63	P	2		
8.3.30.7	Tree endemic status	tree_stat	Endemic status of the tree	New Zealand native, exotic	AN	100	0		P	2		
8.3.30.8	Maintenance requirements	tree_maint	Maintenance issues/requirements	Seasonal fruiting	A	250	0		P	2		
8.3.30.9	Tree significance	tree_sig	If the tree has any special significance, or status	Historical	A	100	0	Code List 9.67	P	2		
8.3.30.10	Pruning time interval	tree_prune	Time period between pruning cycles		I	2	0		P	3		
8.3.30.11	Common name	tree_commo	Common Name	River Red Gums	A	100	0		I	3		
8.3.30.12	Tree planting method	tree_metho	Planting method for the tree	Remnant	A	100	0	Code List 9.66	I	3		
8.3.30.13	Tree environment for roots	tree_roots	The environment the tree is planted into and if it will be root constrained	Tree Pit	A	100	0	Code List 9.64	I	3		
8.3.30.14	Tree species	tree_speci	Tree Species	Eucalyptus Camaldulensis	A	100	0		I	2		
8.3.30.15	Support type for tree	tree_supp	Support type of the tree	One post	A	100	0		I	3		
8.3.30.16	Overhead wires present	tree_wires	Overhead wires are present within the tree's envelope	Y – Yes	B	1	0	Y or N	I	2		

8.3.31 Tunnels

A tunnel is an underground roadway, dug through the surrounding soil, and enclosed except for the entrance and exit. The physical details of the tunnel are described here with any associated mechanical and electrical assets recorded under that asset type, and the same for lighting and any ITS assets. Details are recorded for various components including the portal, buttress, capping beam and barrel.

Table 8:72 Tunnels – location references

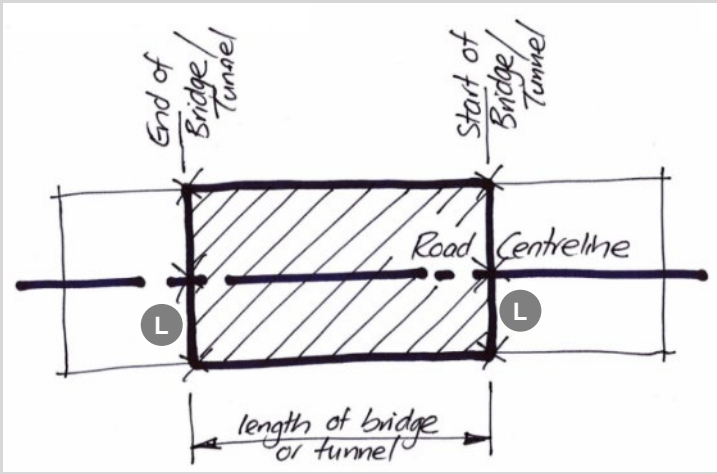
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Start of tunnel	Linear distance along road centreline/ spatial	
	End of tunnel	Measurement of tunnel width on left side of road centreline	
	Tunnel width (left)	Measurement of tunnel width on left side of road centreline	
	Tunnel width (right)	Measurement of tunnel width on left side of road centreline	
L2	Road ID	The unique road identifier	
	Polygon (tunnel perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon (tunnel perimeter)	Polygon geometric data (X, Y, Z)	

Table 8:73 Tunnels – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.31.1	Left tunnel width	tun_wid_l	Lateral measurement from the road centreline to the left inside edge of the barrel. Left side is defined from the road origin, travelling in the increasing direction		DC	4	2		L	1		Tunnel width (m) to left of road centreline numeric one decimal place

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.31.2	Right tunnel width	tun_wid_r	Lateral measurement from the road centreline to the right inside edge of the barrel. Right side is defined from the road origin, travelling in the increasing direction		DC	5	2		L	1		Tunnel width (m) to right of road centreline numeric one decimal place
8.3.31.3	Tunnel length	tun_len	Length of the tunnel measured along the centreline of the tunnel		DC	5	2		L	1		Tunnels length (m) numeric to one decimal place
8.3.31.4	Tunnel services	tun_serv	An indication of whether the tunnel includes services (lighting, extraction, communications, etc.) or is simply an unserviced tunnel		A	1	0		L	1		Tunnels services are present yes (S) or no (U) (alpha)
8.3.31.5	Earthquake rating	eq_rating	The earthquake rating for the tunnel		DC	6	2		D	1		
8.3.31.6	Maximum trafficable height	tun_mx_hei	This is the maximum trafficable height that can pass through the tunnel, providing for an ‘as of right’ width envelope. It may require a lane closure to allow passage down the centre of the tunnel. The high is measured from the road surface to the point that provides the ‘as of right’ width dimension		DC	3	1		D	1		Tunnels maximum trafficable height (m) numeric one decimal place
8.3.31.7	Tunnel clearance	tun_clear	The height measured from the road surface, at the outside edge of the traffic lane, to the inside surface of the barrel. This is the maximum height that can pass while staying within the traffic lane. Consideration will also need to be given if lower restrictions are present within the tunnel		DC	6	2		D	1		
8.3.31.8	Tunnel function	tun_func	The function the tunnel provides whether it be for the passage of pedestrians, vehicles, rail, bicycles, or a combination of road users	PED – Pedestrian underpass	A	100	0	Code List 9.68	D	1		
8.3.31.9	Tunnel structure type	tun_st_typ	A category for the different types of tunnels	UND – Underpass	A	100	0	Code List 9.69	D	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.31.10	Barrel height	tun_ba_hei	Height of the tunnel measured from the road surface to the highest point on the inside of the barrel		DC	5	2		D	2		
8.3.31.11	Barrel material	tun_ba_mat	The material that the barrel in constructed of	CONC – Concrete	A	30	None		D	2		
8.3.31.12	Barrel surface treatment type	tun_ba_typ	The type of surface treatment that exists on the barrel	paint	A	30	None		D	2		
8.3.31.13	Barrel thickness	tun_ba_thi	The thickness of the constructed barrel. This is measured as the thickness from the tunnel cut face to the inside finished surface		I	4	None		D	2		
8.3.31.14	Barrel width	tun_ba_wid	Measured at the road surface and is the inside width of the barrel		DC	5	2		D	2		
8.3.31.15	Buttress height	tun_bu_hei	Measured from the road surface to the underside of the capping beam. This is recorded as the average height for multiple variable heights		DC	5	2		D	2		
8.3.31.16	Buttress material	tun_bu_mat	The material the buttress is constructed of	Wood	A	30	None		D	2		
8.3.31.17	Capping beam material	tun_ca_mat	The material the capping beam is constructed of	CONC – Concrete	A	30	None		D	2		
8.3.31.18	Number of emergency exits	tun_e_exit	The number of all emergency exits within the length of the tunnel. This includes vehicular and pedestrian		I	2	None		D	2		
8.3.31.19	Number of buttresses	tun_bu_num	The total number of buttresses		I	2	None		D	2		
8.3.31.20	Portal height	tun_po_hei	Measured from the road surface to the underside of the capping beam. This is recorded as the average height for multiple variable heights		DC	6	2		D	2		
8.3.31.21	Portal material	tun_po_mat	The material the portal is constructed of	CONC – Concrete	A	30	None		D	2		
8.3.31.22	Portal width	tun_po_wid	Measured at the road surface from the left inside edge to the right hand inside edge of the portal. Where portal widths vary at each end the average shall be recorded		DC	5	2		D	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.31.23	Barrel installation date	tun_ba_dat	The date the barrel construction was completed	ddmmyyyy	D	8	None		P	2		
8.3.31.24	Plate or plaque year	plaque_yr	The year displayed on the structure plate attached to the structure, or the year the structure was commissioned for use	yyyy	D	4	None		P	2		
8.3.31.25	Barrel surface treatment installation date	tun_ba_sur	The date the barrel surface treatment was completed	ddmmyyyy	D	8	None		P	2		
8.3.31.26	Barrel surface treatment colour	tun_ba_col	The colour of the barrel surface treatment	White	A	30	None		I	2		

8.3.32 Vehicle Crossings

Vehicle crossings are a formed area where vehicles are permitted to cross over channel and footpath. The exact extent of this defined area varies between jurisdictions. Vehicle crossing construction and type can vary depending on its use (i.e. residential, commercial, industrial etc.).

Table 8:74 Vehicle crossing points – location references

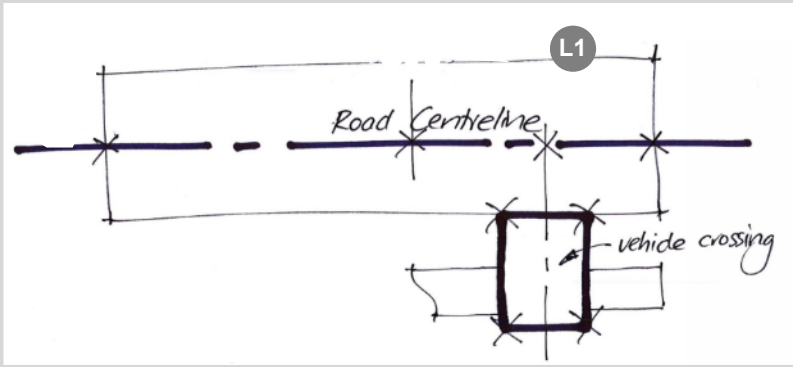
Soph	Location data	General guidance	Diagram
L1	Road ID	The unique road identifier	
	Centreline distance to asset centre at ground level	Linear distance along road centreline/ spatial	
	Side	Either left or right of the road centreline	
	Offset measurement	Dimension between the road centreline and asset centre point	
L2	Road ID	The unique road identifier	
	Polygon (crossing perimeter)	Polygon geometric data (X, Y)	
L3	Road ID	The unique road identifier	
	Polygon geometric data (X, Y)	Polygon geometric data (X, Y, Z)	

Table 8:75 Vehicle crossings – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.3.32.1	Vehicle crossing material	cross_mat	The material the asset is constructed of	CONC – Concrete	A	100	0	Code List 9.27	D	1		
8.3.32.2	Vehicle crossing type	cross_typ	The constructed type of vehicle crossing	Residential, commercial, industrial etc.	A	100	0	Code List 9.29	D	1		
8.3.32.3	Vehicle crossing depth	cross_dep	The constructed depth of the finished surface for the vehicle crossing	150	I	3	0		D	2		
8.3.32.4	Vehicle crossing reinforcing mesh present	cross_reo	Reinforcing mesh has been used in the construction of the vehicle crossing. This could be specified in an organisation's construction standards	Y – Yes	B	1	0	Y or N	D	2		
8.3.32.5	Vehicle crossing width excluding splays	cross_wid	Width of the vehicle crossing in metres excluding the splays. Measured at the road reserve boundary	3	DC	3	1		D	2		
8.3.32.6	Vehicle crossing basecourse depth	crs_b_dep	Depth of the base course material	100	I	3	0		D	3		
8.3.32.7	Vehicle crossing base course type	crs_b_typ	Type of the base course material		A	100	0	Code List 9.27	D	3		
8.3.32.8	Vehicle crossing subbase course depth	crs_s_dep	Depth of the sub-base course material	0	I	3	0		D	3		
8.3.32.9	Vehicle crossing subbase course type	crs_s_typ	Type of the sub-base course material		A	100	0	Code List 9.27	D	3		

8.4 Condition

Overview

Condition data describes asset information that relates either to its functional performance or where it sits in its life cycle. Understanding condition data is fundamental to many asset management practices including planning, valuation and predictive modelling. Condition data will often interact with other pieces of data to inform items such as access, performance, risk, works and costs.

The items listed below are considered core to road management. If collected, they should be able to be reported in this way to allow easy comparison. It is in no way intended to be a definitive list of all data items, nor is it intended to restrict the collection of additional items. It is acknowledged that advances in technology may warrant changes to this list.

Scope

There are many methods of assessing condition which are often intended to fit a specific business, operational or management requirement. Collection standards can also be driven by historical or technological restrictions. This Data Standard outlines three levels of sophistication (Soph) which can be applied to the method of how the data is collected.

- **Soph 1: Subjective Condition Assessment**

  The assessment is done subjectively with no relation to any standard or measurement. This is often just a simple visual inspection with the reporting being a discrete variable ranging from ‘as new’ to ‘end of life’.

- **Soph 2: Subjective Measured Condition Assessment**

  The assessment is still done subjectively but made in relation to a standard, guideline or measurement. The use of a standard, guideline or measurement is to apply some portability, comparability and reliability to the data. The measurement is often an estimate taken visually, or an overall score extrapolated from descriptive words and pictures.

- **Soph 3: Objective Measured Condition Assessment**

  The assessment is typically a scientific measure as defined by a specified test method, such as the Austroads Test Methods. This includes automated parameters such as roughness, rutting and texture.

  It is understood that there are items that fall between these levels of sophistication. Generally, the higher the level of sophistication, the higher the level of accuracy, although this may differ depending on each situation. Where appropriate, a reference has been given to the most relevant standard for further details about that data item. Many data items are covered in detail under the *Austroads Guide to Asset Management* (Austroads 2018d, 2018e, 2018f).

Table 8:76 Condition – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.1	Subjective condition	cond_subj	A numerical rating, established by desktop judgement, that represents the current condition of an asset in meeting its defined service objectives		I	1	None	Code List 9.8	P	1		
8.4.2	Subjective condition survey date-time	cond_date	Date-time that subjective condition survey was done	ddmmyyyy	D	8	None		P	1		Subjective condition of asset survey date dd/mm/yyyy
8.4.3	Subjective condition survey operator	cond_name	Name of operator that subjective condition survey was done by		AN	20	None		P	1		
8.4.4	Visual assessed condition	cond_vis	A numerical rating of the condition based on a visual inspection using a documented guideline with the aim of repeatable results		I	1	None	Code List 9.8	P	2		Visually assessed condition rating (0 to 5) integer
8.4.5	Visual stripping	cond_strip	Area of stripping as a percentage		I	3	None		P	2		
8.4.6	Visual ravelling	cond_rav	Area of ravelling as a percentage		I	3	None		P	2		
8.4.7	Visual patching	cond_patch	Area of all patching as a percentage		I	3	None		P	2		
8.4.8	Visual edge drop off	cond_ed	Percentage length with edge drop off		I	3	None		P	2		
8.4.9	Visual cracking area	cond_crack	Percentage area affected by cracking		I	3	None		P	2		Visually assessed % area affected by cracking (integer)
8.4.10	Visual measured rutting	cond_rut	Average manually measured rut		I	2	None		P	2		Visual condition of asset rating (1– 5) integer
8.4.11	Thornthwaite Moisture Index	clim_tmi	Thornthwaite Moisture Index		I	3	None	Typically – 50 to 100	P	2		Thornthwaite Moisture Index (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.12	All cracking extent	cr_all_ex	The percentage affected area of a 100 m section where cracking is evident in the traffic lane		I	3	None		P	3	AGAM15-18	Pavement cracking % of surface area 100 m section (integer)
8.4.13	All cracking severity	cr_all_sv	Average width of the cracking over the 100 m section		I	1	None		P	3	AGAM15-18	
8.4.14	Longitudinal cracking extent	cr_long_ex	The percentage affected area of a 100 m section where longitudinal cracking is evident in the traffic lane		I	3	None		P	3	AGAM15-18	
8.4.15	Longitudinal cracking severity	cr_long_sv	Average width of the longitudinal cracking over the 100 m section		I	1	None		P	3	AGAM15-18	
8.4.16	Transverse cracking extent	cr_tran_sv	The percentage affected area of a 100 m section where transverse cracking is evident in the traffic lane		I	3	None		P	3	AGAM15-18	
8.4.17	Transverse cracking severity	cr_tran_ex	Average width of the transverse cracking over the 100 m section		I	1	None		P	3	AGAM15-18	
8.4.18	Crocodile/ block cracking severity	cr_croc_sv	The percentage affected area of a 100 m section where crocodile cracking is evident in the traffic lane		I	3	None		P	3	AGAM15-18	
8.4.19	Crocodile/block cracking extent	cr_croc_ex	Average width of the crocodile cracking over the 100 m section		I	1	None		P	3	AGAM15-18	
8.4.20	Cracking survey date-time	cr_date	Date-time that cracking survey was done	ddmmyyyy	D	8	None		P	1		Pavement cracking survey date dd/mm/yyyy
8.4.21	Cracking survey operator	cr_name	Name of operator that cracking survey was done by		AN	20	None		P	1		
8.4.22	Deflection testing vehicle	p_df_veh	Type of vehicle used to measure deflection		AN	20	None	Code List 9.14	P	3	AGAM15-18	Pavement deflection testing vehicle type (alphanumeric)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.23	Pavement deflection d0	p_df_d0	Pavement deflection at the test load. As measured using a Benkelman beam, deflectograph, falling weight deflectometer or traffic speed deflectometer. Not normalised		DC	4	None		P	3	AGAM15-18	Pavement deflection under test load measured (micron) integer
8.4.24	Pavement deflection d200	p_df_d200	Pavement deflection at 200 mm from the test load. As measured using a Benkelman beam, deflectograph, falling weight deflectometer or traffic speed deflectometer. Not normalised		DC	4	None		P	3	AGAM15-18	
8.4.25	Pavement deflection d300	p_df_d300	Pavement deflection at 300 mm from the test load. As measured using a Benkelman beam, deflectograph, falling weight deflectometer or traffic speed deflectometer. Not normalised		DC	4	None		P	3	AGAM15-18	
8.4.26	Pavement deflection d900	p_df_d900	Pavement deflection at 900 mm from the test load. As measured using a Benkelman beam, deflectograph, falling weight deflectometer or traffic speed deflectometer. Not normalised		DC	4	None		P	3	AGAM15-18	
8.4.27	Pavement deflection d1500	p_df_d1500	Pavement deflection at 900 mm from the test load. As measured using a Benkelman beam, deflectograph, falling weight deflectometer or traffic speed deflectometer. Not normalised		DC	4	None		P	3	AGAM15-18	
8.4.28	Actual applied load	p_df_act	Actual applied load for pavement deflection testing in kN		I	3	0		P	3	AGAM15-18	
8.4.29	Ambient air temperature	temp_air	Ambient air temperature		DC	3	1		P	3	AGAM15-18	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.30	Pavement temperature	temp_pave	Pavement temperature		DC	3	1		P	3	AGAM15-18	
8.4.31	Deflection survey date-time	p_df_date	Date-time that deflection survey was done	ddmmyyyy	D	8	0		P	1		Pavement deflection survey date dd/mm/yyyy & time hrs
8.4.32	Deflection survey operator	p_df_name	Name of operator that deflection survey was done by		AN	20	0		P	1		
8.4.33	Lane roughness quarter car	iri_lane	Pavement roughness expressed as Lane IRIqc, reported at 100 m intervals		DC	4	2		P	3	AGAM15-18	Pavement roughness lane IRI (m/km) numeric two decimal places
8.4.33A	Smooth travel exposure (STE)	ste_network	#N/A									
8.4.34	Inner wheel path roughness	iri_iwp	Pavement roughness expressed as IRIqc, reported at 100 m intervals		DC	4	2		P	3	AGAM15-18	Pavement roughness inner wheel path IRI (m/km) numeric two decimal places
8.4.35	Outer wheel path roughness	iri_owp	Pavement roughness expressed as IRIqc, reported at 100 m intervals		DC	4	2		P	3	AGAM15-18	Pavement roughness outer wheel path IRI (m/km) numeric two decimal places
8.4.36	Roughness survey date-time	iri_date	Date-time that roughness survey was done	ddmmyyyy	D	8	0		P	1		Pavement roughness survey date dd/mm/yyyy
8.4.37	Roughness survey operator	iri_name	Name of operator that roughness survey was done by		AN	20	0		P	1		
8.4.38	Rut depth lane	rut_lane	The maximum rut as measured using a 3 m straight edge, across both lanes, and reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement rutting depth (mm) mean of outer & inner wheel path (integer)
8.4.39	Rut depth inner	rut_iwp	Maximum rut depth inner wheel path. Measured using a 2 m straight edge, at the deepest transverse cross section point, and reported at100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement rutting depth (mm) inner wheel path (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.40	Rut depth standard deviation inner	rut_iwp_sd	Pavement rutting in terms of standard deviation in the inner wheel path. The standard deviation of the maximum rut depths collected over the 100 m section		DC	3	1		P	3	AGAM15-18	
8.4.41	Rut depth inner wheel path 0-< 5 mm	rut_iwp_5	The percentage of a 100 m section where the average inner wheel path rutting depth<=5 mm		I	3	0		P	3	AGAM15-18	
8.4.42	Rut depth inner wheel path > 5 mm – < 10 mm	rut_iwp_10	The percentage of a 100 m section where the average inner wheel path rutting depth> 5 mm <= 10 mm		I	3	0		P	3	AGAM15-18	
8.4.43	Rut depth inner wheel path > 10 mm – < 15 mm	rut_iwp_15	The percentage of a 100 m section where the average inner wheel path rutting depth> 10 mm <= 15 mm		I	3	0		P	3	AGAM15-18	
8.4.44	Rut depth inner wheel path > 15 – < 20 mm	rut_iwp_20	The percentage of a 100 m section where the average inner wheel path rutting depth> 15 mm <= 20 mm		I	3	0		P	3	AGAM15-18	
8.4.45	Rut depth inner wheel path > 20 – < 25 mm	rut_iwp_25	The percentage of a 100 m section where the average inner wheel path rutting depth > 20 mm <= 25 mm		I	3	0		P	3	AGAM15-18	
8.4.46	Rut depth inner wheel path > 25 – < 30 mm	rut_iwp_30	The percentage of a 100 m section where the average inner wheel path rutting depth> 25 mm <= 30 mm		I	3	0		P	3	AGAM15-18	
8.4.47	Rut depth inner wheel path > 30 – < 35 mm	rut_iwp_35	The percentage of a 100 m section where the average inner wheel path rutting depth> 30 mm <= 35 mm		I	3	0		P	3	AGAM15-18	
8.4.48	Rut depth inner wheel path > 35-< 40 mm	rut_iwp_40	The percentage of a 100 m section where the average inner wheel path rutting depth> 35 mm <= 40 mm		I	3	0		P	3	AGAM15-18	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.49	Rut depth inner wheel path > 40 mm	rut_iwp_X0	The percentage of a 100 m section where the average inner wheel path rutting depth> 40 mm		I	3	1		P	3	AGAM15-18	
8.4.50	Rut depth outer	rut_owp	Maximum rut depth outer wheel path. Measured using a 2 m straight edge, at the deepest transverse cross section point, and reported at100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement rutting depth (mm) outer wheel path (integer)
8.4.51	Rut depth standard deviation inner	rut_owp_sd	Pavement rutting in terms of standard deviation in the left wheel path. The standard deviation of the maximum rut depths collected over the100 m section		DC	3	1		P	3	AGAM15-18	
8.4.52	Rut depth outer wheel path 0-< 5 mm	rut_owp_5	The percentage of a 100 m section where the average outer wheel path rutting depth <= 5 mm		I	3	0		P	3	AGAM15-18	
8.4.53	Rut depth outer wheel path > 5 mm-< 10 mm	rut_owp_10	The percentage of a 100 m section where the average outer wheel path rutting depth> 5 mm <= 10 mm		I	3	None		P	3	AGAM15-18	
8.4.54	Rut depth outer wheel path > 10 mm-< 15 mm	rut_owp_15	The percentage of a 100 m section where the average outer wheel path rutting depth> 10 mm <= 15 mm		I	3	None		P	3	AGAM15-18	
8.4.55	Rut depth outer wheel path > 15-< 20 mm	rut_owp_20	The percentage of a 100 m section where the average outer wheel path rutting depth> 15 mm <= 20 mm		I	3	None		P	3	AGAM15-18	
8.4.56	Rut depth outer wheel path > 20-< 25 mm	rut_owp_25	The percentage of a 100 m section where the average outer wheel path rutting depth> 20 mm <= 25 mm		I	3	None		P	3	AGAM15-18	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.57	Rut depth outer wheel path > 25- < 30 mm	rut_owp_30	The percentage of a 100 m section where the average outer wheel path rutting depth> 25 mm, <= 30 mm		I	3	None		P	3	AGAM15-18	
8.4.58	Rut depth outer wheel path > 30- < 35 mm	rut_owp_35	The percentage of a 100 m section where the average outer wheel path rutting depth> 30 mm, <= 35 mm		I	3	None		P	3	AGAM15-18	
8.4.59	Rut depth outer wheel path > 35- < 40 mm	rut_owp_40	The percentage of a 100 m section where the average outer wheel path rutting depth> 35 mm, <= 40 mm		I	3	None		P	3	AGAM15-18	
8.4.60	Rut depth outer wheel path > 40 mm	rut_owp_X0	The percentage of a 100 m section where the average outer wheel path rutting depth> 40 mm		I	3	None		P	3	AGAM15-18	
8.4.61	Rutting survey date-time	rut_date	Date-time that rutiing survey was done	ddmmyyyy	D	8	None		P	1		Pavement rutting survey date dd/mm/yyyy
8.4.62	Rutting survey operator	rut_name	Name of operator that rutting survey was done by		AN	20	None		P	1		
8.4.63	SCRIM speed	sfc_speed	Speed of Sideways-force Coefficient Routine Investigation Machine (SCRIM) for testing		I	3	0		P	3	AGAM15-18	
8.4.64	SCRIM inner wheel path	sfc_iwp	Skid resistance as collect by a Sideways-force Coefficient Routine Investigation Machine (SCRIM) in the inner wheel path		DC	3	0		P	3	AGAM15-18	
8.4.65	SCRIM outer wheel path	sfc_owp	Skid resistance as collect by a Sideways-force Coefficient Routine Investigation Machine (SCRIM) in the outer wheel path		DC	3	0		P	3	AGAM15-18	
8.4.66	SCRIM survey time-date	sfc_date	Date-time that rutting survey was done	ddmmyyyy	D	8	0		P	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.67	SCRIM vehicle	sfc_veh	Sideways-force Coefficient Routine Investigation Machine (SCRIM) vehicle description		AN	20	0	Code List 9.45	P	3	AGAM15-18	
8.4.68	Skid Resistance Test	skid_test	The Method used to measure the road surface skid resistance		AN	10	0	Code List 9.48	P	3	AGAM15-18	
8.4.69	Skid resistance 20 m	sk_res_20	Skid resistance as characterised by the coefficient of friction. Ratio of the traction force to the vertical load averaged over a 20 m length		DC	3	2		P	2		
8.4.70	Skid resistance 50 m	sk_res_50	Skid resistance as characterised by the coefficient of friction. Ratio of the traction force to the vertical load averaged over a 50 m length		DC	3	2		P	2		
8.4.71	SMTD pavement texture inner wheel path	tx_SMT_iwp	Pavement texture Sensor Measured Texture Depth (SMTD) measured in the inner wheel path reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	
8.4.72	SMTD pavement texture outer wheel path	tx_SMT_owp	Pavement texture Sensor Measured Texture Depth (SMTD) measured in the outer wheel path reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	
8.4.73	SMTD pavement texture between wheel path	tx_SMT_bwp	Pavement texture Sensor Measured Texture Depth (SMTD)) between the left and right wheel paths reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	
8.4.74	MPD pavement texture inner wheel path	tx_MPD_iwp	Pavement texture Mean Profile Depth (MPD) measured in the inner wheel path reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement texture MPD texture inner wheel path (mm) numeric one decimal place

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.75	MPD pavement texture outer wheel path	tx_MPD_owp	Pavement texture Mean Profile Depth (MPD) measured in the outer wheel path reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement texture MPD texture outer wheel path (mm) numeric one decimal place
8.4.76	MPD pavement texture between wheel path	tx_MPD_bwp	Pavement texture Mean Profile Depth (MPD) between the left and right wheel paths reported at 100 m intervals		DC	3	1		P	3	AGAM15-18	Pavement texture MPD texture between wheel paths (mm) numeric one decimal place
8.4.77	Texture survey date-time	tx_date	Date-time that texture survey was done	ddmmyyyy	D	8	0		P	1		Pavement surface texture survey date: dd/mm/yyyy & time hr
8.4.78	Texture survey operator	tx_name	Name of operator that texture survey was done by		AN	20	0		P	1		
8.4.79	Bridge conditlon state 1	br_cond_1	Percent of asset at Structure condition state 1		I	3	0	Condition 1 = Excellent	P	2	AGAM13-18	Structure condition % structure in condition state 1 (integer)
8.4.80	Bridge conditlon state 2	br_cond_2	Percent of asset at Structure condition state 2		I	3	None	Condition 2 = Good	P	2	AGAM13-18	Structure condition % structure in condition state 2 (integer)
8.4.81	Bridge conditlon state 3	br_cond_3	Percent of asset at Structure condition state 3		I	3	None	Condition 3 = Fair	P	2	AGAM13-18	Structure condition % structure in condition state 3 (integer)
8.4.82	Bridge conditlon state 4	br_cond_4	Percent of asset at Structure condition state 4		I	3	None	Condition 4 = Poor	P	2	AGAM13-18	Structure condition % structure in condition state 4 (integer)
8.4.83	Bridge conditlon state overall	br_cond	Overall Structure condition expressed as a whole number		I	1	None	1, 2, 3 or 4	P	2	AGAM13-18	Structure condition overall structure condition (1–4) (integer)
8.4.84	Bridge survey date-time	br_cond_dt	Date that the Structure was inspected	ddmmyyyy	D	8	None		P	1		Structure condition survey date dd/mm/yyyy time hr
8.4.85	Bridge survey operator	br_cond_in	Name of the bridge inspector		AN	20	None		P	1		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.86	Kerb and channel visual condition	kc_cond	Visually assessed condition of kerb and channel		I	1	None	Code List 9.8	P	2	IPWEA PN02	
8.4.87	Kerb and channel survey date-time	kc_date	Date-time that kerb and channel survey was done	ddmmyyyy	D	8	None		P	1		
8.4.88	Visually measure condition survey operator	kc_name	Name of operator that visually measured condition survey was done by		AN	20	None		P	1		
8.4.89	Pathway visual condition	path_cond	Visually assessed condition of pathway/footpath asset		I	1	None	Code List 9.8	P	2	IPWEA PN01	
8.4.90	Pathways survey date-time	path_date	Date-time that pathways survey was done	ddmmyyyy	D	8	None		P	1		
8.4.91	Pathways survey operator	path_name	Name of operator that pathways survey was done by		AN	20	None		P	1		
8.4.92	Unsealed road profile	us_profile	Condition of crossfall/camber to allow water to run off surface		I	1	None	Code List 9.8	P	2	AGPT06-09	
8.4.93	Unsealed drainage condition	us_drain	Numerical rating of the drainage condition		I	1	None	Code List 9.8	P	2	AGPT06-09	
8.4.94	Gravel depth	us_gv_dep	Gravel depth as measured in OWP or as appropriate		DC	2	None		P	3	AGPT06-09	
8.4.95	Unsealed survey date-time	us_date	Date-time that unsealed survey was done	ddmmyyyy	D	8	None		P	1		
8.4.96	Unsealed survey operator	us_name	Name of operator that unsealed survey was done by		AN	20	None		P	1		
8.4.98 (NEW)	Marine or non-marine	marine_region	Marine – relevant to coastal areas; non-marine – noncoastal areas		None	None	None		None	2		Description (alpha)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.4.99 (NEW)	Terrain (flat/undulating/hilly/mountainous)	terr_region	Terrain will influence construction and maintenance costs. flat (slope ≤ 5%), undulating (slope 5-20%). hilly (slope 20-30%), mountainous (slope > 30%)		None	None	None		None	2		Description (alpha)
8.4.100 (NEW)	Soil (reactive/non-reactive)	soil_region	Soil type (reactive or nonreactive) will influence infrastructure performance and capital and maintenance costs		None	None	None		None	2		Description (alpha)

8.5 Demand

Overview

'Demand' refers to measurement of the required usage and/or traffic loading of the asset. Most road management agencies record data in some form about the usage of the asset. Most commonly this would include traffic information. Demand asset data therefore includes data such as average daily traffic, annual traffic, percentage heavy vehicles and similar information. There are different standards and practices of measurement and recording of demand information.

Scope

The current demand on a road is most commonly measured by agencies in the form of:

- the number of vehicles using a section of road in a given period (traffic count)
- the traffic loading
- the traffic composition by type.

Traffic and usage information can be represented in many ways. The Austroads Strategic Business Case includes only 'current demand'; however, demand is a dynamic parameter that changes over time. Historical record-keeping and predictive estimates are important data requirements in terms of service performance measurement, predictive modelling, road design and road planning.

The vehicle classification classes included in the data tables that follow refer to the following:

- Australian classes are as per the Austroads vehicle classification system
- New Zealand classes are as per the NZTA Vehicle Classification Scheme.

Application of levels of sophistication

Demand data such as traffic volume is typically referenced (spatially or linear). Accordingly, an inventory level of sophistication can be applied to demand data.

In terms of applying a level of asset planning sophistication, the following approach has been generally applied to each data item:

A1 Could represent AADT data.

A2 Could represent AADT with some information of commercial vehicles/traffic spectrum.

A3 Could represent a detailed traffic distribution with vehicle loading, etc.

Table 8:77 Demand – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.5.1	Equivalent standard axle	Esa	The number of equivalent standard axle repetitions (SAR) which would cause the same damage as the standard load. The standard load is a single axle with dual wheels carrying a total load of 80 kN		I	9	None		P	2		Demand design value of numbers of ESAs (integer)
8.5.2	Is a bus/public transport route	bus_route	Transport routes are defined and attached to each road section	Y – Yes	B	1	None	Y or N	P	3		
8.5.3	Population	pop_catch	Total population within the relevant catchment (Road Agency boundary)		I	8	None		P	3		
8.5.4	Vehicle kilometres travelled	vkt	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the AADT on it. The yearly VKT is the daily VKT multiplied by the number of days in that year (365 or 366 days)		I	10	None		P	3		Demand road use vehicle kilometres travelled VKT (VKT/lane/year) integer

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.5.5	Gross vehicle mass kilometres	GVM_km	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the cumulative Gross Vehicle Mass (GVM) on it. The yearly GVM-km is the daily GVM-km multiplied by the number of days in that year (365 or 366 days).GVM of a vehicle, means the maximum loaded mass of the vehicle, as follows: a) If the Regulator has specified the vehicle's maximum loaded mass under Section 57 – specified by the Regulator under that section*; or b) Otherwise – stated by the vehicle's manufacturer		I	10	None		P	3		Demand road use cumulative gross vehicle mass kilometres GVM-km (GVM-km/lane/year) integer
8.5.6	Equivalent standard axles kilometres	ESA_km	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the cumulative Equivalent Standard Axles (ESA) on it. The yearly ESAkm is the daily ESA-km multiplied by the number of days in that year (365 or 366 days).ESA's is the number of standard axle loads that are equivalent in damaging effect on a pavement to a given vehicle or axle loading		I	10	None		P	3		Demand road use cumulative equivalent standard axle kilometres ESA-km (ESA-km/lane/year) integer
8.5.7	Passenger Car Unit equivalent kilometres	PCU_km	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the cumulative Passenger Car Units (PCU) on it. The yearly PCU-km is the daily PCU-km multiplied by the number of days in that year (365 or 366 days). PCU is a measure involving the conversion of different types of vehicles into their equivalent passenger cars in terms of operating characteristics		I	10	None		P	3		Demand road use cumulative pasenger car unit kilometres PCU-km (PCU-km/lane/year) integer

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.5.8	Annual growth (%/year) of all vehicle classes	trf_gr_all	The annual growth, expressed as a percentage growth for all vehicle classes		DC	4	1		P	2		Demand traffic growth % annual growth all vehicle classes (numeric) one decimal place
8.5.9	Annual growth (%/year) of all light vehicles	trf_gr_lcv	The annual growth, expressed as a percentage growth for all light vehicle classes (New Zealand: class1–3, Australia class 1–2)		DC	4	1		P	2		
8.5.10	Annual growth (%/year) of all buses	trf_gr_bus	The annual growth, expressed as a percentage growth for all buses (New Zealand: class 4, Australia: some vehicle classified under classes 3, 4, 6 and 7		DC	4	1		P	2		
8.5.11	Annual growth (%/year) of all heavy vehicles	trf_gr_hcv	The annual growth, expressed as a percentage growth for all heavy vehicles (New Zealand: class 5–14, Australia: classes 3–12)		DC	4	1		P	2		Traffic growth % annual growth of all heavy vehicles (numeric) one decimal place
8.5.12	Annual growth (%/year) of cycles	trf_gr_cyc	The annual growth, expressed as a percentage growth for cycles		DC	4	1		P	2		

8.6 Utilisation

Utilisation represents the current usage versus current capacity, and is typically presented as a ratio. The ratio defines the proportion of an asset's available capacity that is being used.

Most road management agencies record data in some form about the usage of the asset. Most commonly this would include traffic information. Utilisation asset data therefore includes data like average daily traffic, annual traffic, percentage heavy vehicles, pedestrian counts, bicycle counts and similar information. There are different standards and practices of measurement and recording of utilisation information.

Determining the capacity of the assets is typically modelled. The level of sophistication of these models varies considerably. All models will draw on inputs from existing inventory data and intersection controls data and provide outputs such as Network Capacity (veh/hr), and Lane Capacity (veh/hr).

Utilisation can be measured in two substantive ways: current utilisation and forecast utilisation. The method used to calculate the utilisation is determined by the road controlling authority and recorded in the appropriate data field (e.g. current utilisation, future utilisation).

Scope

The current utilisation of a road is most commonly measured by agencies in the form of:

- the number of vehicles using a section of road in a given period (traffic count), and/or
- the traffic loading, and/or
- the traffic composition by type.

Capacity analysis is generally a modelled output.

In terms of determining capacity, the required inputs will vary based on the model being used, however typically this will include inventory items such as:

- intersection types
- 85th percentile speed
- lane control types
- number of lanes
- width of lanes.

Current utilisation is a simple ratio of current usage/current capacity.

Table 8:78 Utilisation – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.6.1	Number of bicycles per hour	cycl_hr_xx	The number of bicycles in the xx-hour of the day		I	5	None		P	3		
8.6.2	Trips per month	cycl_mth	The number of bicycles trips per month		I	5	None		P	3		
8.6.3	User classification	cycl_user	Bicycles user profiles		I	250	None		P	3		
8.6.4	Intersection control type	int_type	Intersection control type	uncontrolled, round about, give way, stop, signalised	A	12	None		P	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.6.5	85% speed	speed_85	85% operating speed on road section		I	3	None		P	3		
8.6.6	Turn movement counts	turn_count	Turn movement counts per turn type		I	4	None		P	3		
8.6.7	Model name/ version	util_mod	Model name and version number used to calculate utilisation		I	20	None		P	3		
8.6.8	Current utilisation	util_cur	Ratio of current utilisation to current capacity		I	2	None		P	3		
8.6.9	Future utilisation	util_fut	Ratio of future utilisation to current capacity or future capacity		I	2	None		P	3		
8.6.10	Number of pedestrians per hour	ped_hr	The number of pedestrians in the xx-th hour of the day		I	5	None		P	3		
8.6.11	Passenger km travelled on public transport	ped_km	Passenger km travelled on public transport data collected via electronic ticketing systems		I	5	None		P	3		
8.6.12	Average annual daily traffic	aadt_all	Typically, the total volume of traffic (sum of vehicles travelling in both direction on a two-way road) at a location over a period of 365 days divided by 365. Practically, the counting period should be a minimum of7 continuous days and, if known, seasonal factors would be applied		I	5	None		P	2		Use traffic volumes average annual daily traffic (AADT) number vehicles/day (integer)
8.6.13	Annual average weekday traffic	aawt_all	The average daily traffic volume at the specified location on weekdays (Monday to Friday). This is expressed as number of vehicles per day		I	5	None		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.6.14	Traffic classification used	traf_cl_sy	Each country has pre-defined classes definition that differ slightly. They are based on the number of axles, axle spacing, weight and length of vehicle. New Zealand: New Zealand specifies 14 classes Australia: Austroads specifies 12 classes		AN	20	None		P	2		
8.6.15	Traffic classification system class number	traf_class	Each country has pre-defined classes definition that differ slightly. They are based on the number of axles, axle spacing, weight and length of vehicle. New Zealand: New Zealand specifies 14 classes Australia: Austroads specifies 12 classes		I	2	None		P	2		
8.6.16	Number of vehicles during peak hour	peak_hr_v	The number of vehicles at the specified location during the hour of the day that observes the highest traffic volumes. Note the period with the highest volumes may not commence at the start of any hour		I	6	None		P	2		
8.6.17	Number of vehicles per hour	hr_vol	The number of vehicles per hour. XX is the xx-th hour during the day		I	6	None		P	2		
8.6.18	Average annual daily traffic per lane	aadt_lane	Typically, the volume of traffic per lane at a location over a period of 365 days divided by 365. Practically, the counting period should be a minimum of 7 continuous days and, if known, seasonal factors would be applied		I	5	None		P	2		
8.6.19	Annual average weekday traffic per lane	aawt_lane	The average daily traffic volume per lane at the specified location on weekdays (Monday to Friday)		I	5	None		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.6.20	Percentage of AADT classified as motorbike	aadt_bke	The percentage of the aadt where the traffic volume is classified as a motorbike		I	3	None		P	3		
8.6.21	Percentage of AADT per lane classified as motorbike	aadt_bke_l	The percentage of the AADT per lane where the traffic volume is classified as a motorbike		I	3	None		P	3		
8.6.22	Percentage of AADT classified as car	aadt_car	The percentage of the aadt where the traffic volume is classified as car. Light vehicle includes cars, motorbikes and other small vehicles New Zealand: class 1–3Australia: class 1–2		I	3	None		P	2		
8.6.23	Percentage of AADT per lane classified as car	aadt_car_l	The percentage of the AADT per lane where the traffic volume is classified as car. Light vehicle includes cars, motorbikes and other small vehicles New Zealand: class 1–3Australia: class 1–2		I	3	None		P	2		
8.6.24	Percentage of AADT classified as bus	aadt_bus	The percentage of the aadt where the traffic volume is classified as bus. New Zealand: class 4 Australia: some vehicles classified under classes 3, 4, 6 and 7		I	3	None		P	2		
8.6.25	Percentage of AADT classified as bus per lane	aadt_bus_l	The percentage of the aadt per lane where the traffic volume is classified as bus. New Zealand: class 4Australia: classes 3 and some vehicles classified under 6–7		I	3	None		P	2		
8.6.26	Percentage of AADT classified as heavy vehicles	aadt_hcv	The percentage of the aadt where the traffic volume is classified as heavy vehicles. New Zealand: class 5–14Australia: classes 3–12		I	3	None		P	2		Use traffic volumes % AADT classified as heavy vehicles (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.6.27	Percentage of AADT per lane classified as heavy vehicles	aadt_hcv_l	The percentage of the aadt per lane where the traffic volume is classified as heavy vehicles. New Zealand: class 5–14Australia: classes 3–12		I	3	None		P	2		
8.6.28	Average annual daily traffic per class	aadt_cl	Each country has pre-defined classes definition that differ slightly. They are based on the number of axles, axle spacing, weight and length of vehicle. New Zealand: New Zealand specifies 14 classes Australia: Austroads specifies 12 classes		I	3	None	Maximum allowable percentage is 100%	P	2		Use traffic volumes average annual daily traffic per vehicle class (integer)
8.6.29	Average annual daily traffic per class per lane	aadt_cl_l	Each country has pre-defined classes definition that differ slightly. They are based on the number of axles, axle spacing, weight and length of vehicle. New Zealand: New Zealand specifies 14 classes Australia: Austroads specifies 12 classes		I	3	None	Maximum allowable percentage is 100%	P	2		
8.6.30	Number of vehicles during peak hour per lane	veh_p_h_ln	The number of vehicles at the specified location during the hour of the day that observes the highest traffic volumes per lane. Note the period with the highest volumes may not commence at the start of any hour		I	6	None		P	2		
8.6.31	Number of vehicles per lane per hour	veh_hr_ln	The number of vehicles of traffic per hour per lane. xx is the xx-th hour during the day		I	6	None		P	2		

8.7 Criticality

Overview

Criticality considers the importance of assets in the delivery of organisational obligations and objectives. In a road context, this can be considered in two ways:

- at an asset or component level, in terms of how individual the assets impact the route
- at a road level, in terms of the importance of that route.

The organisational objectives may include economic development, economic sustainability, safety, preservation of life, and community welfare.

Scope

The criticality of a component or route should reflect the importance of that item against organisational obligations and objectives. These items are rated by importance, with consideration for the potential impact to the delivery of the objectives. The scope includes:

- the assessment of components/routes to determine if their function is critical in regard to the delivery of the objectives
- identification of the essential assets for prioritised management.

Table 8:79 Criticality – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.7.1	Critical rating	crit_comp	A criticality rating that describes the importance of the item to the organisation		I	1	None	Code List 9.11	P	1		

8.8 Risk

Overview

Risk analysis determines the potential to gain or lose something of ‘value’, that is determining the probability of quantifiable damage, injury, liability, loss, or any other negative occurrence caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action.

Risk analysis should be undertaken on all asset-related activities such as planning, design, construction, acquisition, operations and disposal. Risk assessment is part of the process of continual improvement rather than a one-off action. Assessments need to be reviewed and updated within the risk registers throughout an asset’s life.

Scope

Components of risk

Most organisations align their risk practices with the principles contained within AS/NZS ISO 31000:2009, *Risk Management – Principles and Guidelines*.

Risk is quantified in terms of the consequences of an event and the associated likelihood of occurrence:

- Likelihood: defined as the chance of an event happening.
- Consequence: defined as the outcome of an event, expressed qualitatively or quantitatively.

Likelihood of failure is the product of an event occurring in terms of a given return period. An example of a likelihood matrix is provided in Table 8.80.

Table 8:80 Likelihood of failure

Likelihood rating code	Descriptor	Description
1	Improbable	The event has not been known to occur
2	Unlikely	The event does occur from time to time (e.g. once every 50 years)
3	Possible	The event might occur within the near future (e.g. within 10 years)
4	Likely	The event has occurred several times in recent times (e.g. every 3 years)
5	Almost certain	The event is expected to occur at least annually

The consequence of failure is typically considered within a multi-criterion analysis including:

- Health and Safety: an asset's ability to deliver the required service level within acceptable health and safety limits
- Socio-cultural: an asset's ability to impact on the social, economic, and cultural outcomes of the communities it is servicing
- Financial: an asset's ability to deliver the desired outcomes within the financial limits
- Environmental: an asset's ability to deliver the desired outcomes within the environmental limits
- Governance: an asset's ability to deliver the desired outcomes within the reputational limits, and legislative requirements.

A typical consequence assessment is summarised in Table 8.81. The consequence grade considers the number of people potentially affected by an event, and whether the consequence is temporary or permanent.

Table 8:81 Consequence assessment

Consequence grade	Health and safety	Governance	Financial	Environmental	Socio/Cultural
	Assets through all of the asset functions are managed in a manner that is safe for all people while constructing, maintaining, or using the asset.	*Assets through all of the asset functions are managed in a manner that permits the RCA to maintain a good reputation within the community.* *Assets through all of the asset functions are managed in a manner that complies with legislative requirements.*	*Assets deliver the desired outcomes in a financially sustainable manner for both the present and future.* *Assets deliver the desired outcomes in a manner that does not have a negative financial impact on stakeholders and customers.*	*Assets through all of the asset functions are managed in a manner that minimises environmental impact.*	*Assets deliver the desired outcomes in a manner that contributes to the social, economic and cultural wellbeing of the community.*
1	Potential injury or impact on health limited to individuals. Basic medical intervention such as GP visit may be required but fully recoverable after days/weeks.	The event generated minor interest within the organisation. External interest is confined to just a few individuals. Minor non-compliance with legal or regulatory requirements that is not expected to result in investigation or comment/ censure from regulatory government authorities. Manage within normal delegations.	Financial impact accommodated within annual reactive works budget. Negligible financial impact on individual customers and stakeholders.	Negligible impact to localised area. Environmental impact is reversible within days/weeks/months.	Asset can be reinstated, or alternative route be established within 12 hours.
2	Some individuals may require medical intervention, but effects are fully recoverable after days/weeks.	The event generates minor community interest. Reported in local media. Non-compliance with legal or regulatory requirements that could result in investigation comment/censure or warning from regulatory or government authority. Manage within normal delegations and inform executives.	Financial impact cannot be accommodated within annual reactive works budget. Requires funds to be diverted from other work areas but expenditure can be accommodated within the organisation's overall annual budget. Negligible financial impact on multiple customers or stakeholders.	Environmental impact to localised areas. Environmental impacts are fully reversible within months to a year.	Asset can be reinstated, or alternative route be established within 24 hours.
3	Significant impact. Individuals may potentially suffer permanent injury from the event.	The event generates community discussion, regional media discussion. Non-compliance with legal or regulatory requirements resulting in fine or legal action. Senior leadership and Chief Executive actively engaged in managing risk.	The financial impact of the event cannot be accommodated within the organisation's annual budget. Financial loss to multiple stakeholders. Loss is more than negligible but does not impact on the sustainability of financially stable businesses.	Significant damage to the environment. Damage to the environment is recoverable within years.	Asset can be reinstated, or alternative route be established within 48 hours.

Consequence grade	Health and safety	Governance	Financial	Environmental	Socio/Cultural
4	Individuals could potentially be exposed to circumstances that could cause fatalities.	National media coverage, some sections of the community lose confidence in the organisation. Non-compliance with legal or regulatory requirements resulting in fine or legal action greater than $100 000. Supervision by external regulator or federal advisory.	The organisation's overall budget for several years is affected by the event. Financial losses to multiple customers or stakeholders. Loss may affect the financial sustainability of some businesses.	Significant damage to the environment. The environment may take decades to recover.	Asset can be reinstated, or alternative route be established within 1 week.
5	Multiple fatalities might occur.	International media coverage, widespread and sustained loss of confidence in the organisation. High level government intervention that could result in loss of authority to operate service or Ministerial inquiry, criminal prosecution punishable by imprisonment.	The organisation's long-term financial sustainability is threatened. Local stakeholders and customers unable to continue to operate due to financial impact of the event.	Serious damage to the environment. Long-term impacts may not be fully reversible.	Asset can be reinstated, or alternative route be established within 2 weeks.

Calculating Risk

To determine a risk rating score, the consequence and likelihood matrix below can be used. The approach involves:

- Identifying the sources of risk that may lead to the failure of an asset.
- Identifying the consequences of an event occurring and assigning a consequence score for each of the consequence categories that are affected. Assign an overall consequence score based on the highest consequence score assigned to each of the individual categories.
- Predicting the likelihood of the event occurring and assigning a likelihood score for each of the consequence categories that are affected. Assign an overall likelihood score based on the highest likelihood score assigned to each of the individual categories.
- Assigning a risk score based on the consequence and likelihood scores assigned.

Table 8:82 Risk matrix

Risk matrix		Consequence grade				
		1	2	3	4	5
Likelihood grade	1	1	1	2	3	4
	2	1	2	3	3	4
	3	2	2	3	4	5
	4	2	3	4	5	5
	5	3	4	4	5	5

Managing and monitoring risks

For risk management to be effectively managed, the following practices need to be included as a minimum:

- documenting risks within a risk register
- developing mitigation and monitoring plans
- regularly reviewing the risks to ensure the risk score is applicable
- updating the mitigation and monitoring plans as necessary.

Table 8:83 Risk – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.8.1	Consequence rating overall	risk_co	The overall consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.2	Consequence rating health and safety	risk_co_hs	The health and safety consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational health and safety objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.3	Consequence rating socio cultural	risk_co_se	The socio-cultural consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational sociocultural objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.4	Consequence rating financial	risk_co_fi	The financial consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational financial objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.8.5	Consequence rating environmental	risk_co_en	The environmental consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational environmental objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.6	Consequence rating governance	risk_co_go	The governance consequence rating considering the impact of asset failure across the predefined list of stakeholders and organisational governance objectives		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.7	Risk ID	risk_id	Unique identifier for risks contained within the risk register		AN	10	None		P	1	AS/NZS ISO 31000:2009	
8.8.8	Risk date	risk_date	Date initial risk assessment undertaken		D	8	None	dd/mm/yyyy	P	1	AS/NZS ISO 31000:2009	
8.8.9	Likelihood rating overall	risk_le	Overall likelihood rating considering how often the hazard is likely to occur		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	
8.8.10	Schedule monitoring plan review date	risk_mo_dt	Date for next scheduled review of the risk rating, mitigation and monitoring plan		D	8	None	dd/mm/yyyy	P	2	AS/NZS ISO 31000:2009	
8.8.11	Monitoring plan identifier	risk_mo_id	Unique identifier for the monitoring and mitigation plan for each risk within the risk register		AN	10	None		P	2	AS/NZS ISO 31000:2009	
8.8.12	Risk rating overall	risk_rate	Overall risk rating identified by likelihood and consequence		I	1	None	1 to 5	P	1	AS/NZS ISO 31000:2009	

8.9 Resilience

Overview

Resilience of road transportation lifelines is dependent on their vulnerability to a loss of quality or serviceability, and the time taken to bring them back into original usage state after the reduction or loss of service.

Resilience is considered in three states: Damage State, Access State, and Duration State. The reason for this is that after an event, some availability may be able to be reinstated in a relatively short time frame. These three states can be assessed for various scenarios on primary routes and can be plotted on to a GIS layer to understand the impact of an event at a network level.

Scope

When considering resilience, the following three states need to be considered.

Resilience State:

Resilience State	Description state
Damage State	Damage State represents the severity of damage to the road and cost of damage repairs.
Access State	Access State indicates whether the road section would be able to be used either at full level, at various reduced levels or not at all. This gives an indication of the degree of access on that section of the road network after an event.
Duration State	Duration State indicates the duration over which the road will be in the Access State above. This gives an indication of the duration of loss or reduced access in links along the road network.

Damage State:

Damage level	Damage State	Damage description
1	Slight	Only slight damage that requires routine maintenance
2	Light	Minor damage requiring clean-up of small slips (few cubic metres) and debris and culverts
3	Moderate	Moderate damage requiring removal of moderate volume of slip debris (tens of cubic metres), small scale repair of underslips (less than 2 m high walls) and minor repair to walls, culverts and other structures
4	Severe	Severe damage requiring clearing of large volumes of slip materials (hundreds of cubic metres) and stabilisation, significant structures to repair underslips and major repair to walls, replacement of culverts and other structures
5	Extensive	Extensive damage requiring clearing of major volumes of landslides and stabilisation, large structures to repair underslips, damages to walls and other structures

Access State:

Access level	Access State	Access description
1	Full	Full access except condition may require care
2	Poor	Available for slow access, but with difficulty by normal vehicles due to partial lane blockage, erosion or deformation
3	Single lane	Single lane access only with difficulty due to poor condition of remaining road
4	Difficult	Road accessible single lane by only 4 x 4 off road vehicles
5	Closed	Road closed and unavailable for use

Duration State:

Duration level	Duration State	Duration description
1	Open	No closure, except for maintenance
2	Minor	Condition persists for up to 3 days
3	Moderate	Condition persists for 3 days to 2 weeks
4	Severe	Condition persists for 2 weeks to 3 months
5	Long term	Condition persists for > 3 months

Table 8:84 Resilience – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.9.1	Event scenario that route/road section resilience is being considered for	resil_sc	Event scenario that route/ road section resilience is being considered for		AN	250	None		P	2		
8.9.2	Damage state	resil_dam	Qualitive measure that represents the severity of damage to the route/road section in terms of actual or potential damage		I	1	None	1 to 5	P	2		
8.9.3	Access state	resil_ava	Qualitive measure that indicates whether the road section would be able to be used either at full level, at various reduced levels or not at all in terms of actual or potential road section availability		I	1	None	1 to 5	P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.9.4	Duration	resil_out	Indicated the duration over which the route/road section will be in the Access State above. Qualitive measure in terms of the duration over which the route/road section will be in the Availability State above		I	1	None	1 to 5	P	2		

8.10 Performance (Asset)

Overview

Asset performance, in terms of this Standard, refers to technical levels of service (TLoS) derived from objective data and measured qualitatively. Measurement of TLoS enables asset owners and users to understand how the network of assets is performing.

Technical performance measures currently vary significantly between road agencies and local councils. There is an option of standardisation of asset performance standards and measures where funding bodies might require specific asset performance indicators to be provided by road agencies and local councils as a condition of funding. These measures are typically used to aggregate information for reporting purposes and comparative analysis of performance.

Scope

Asset performance data can be used by a wide range of stakeholders to rate the efficiency and effectiveness of how asset systems are performing. This section incorporates a range of technically focussed asset performance measures, separated into sub-categories.

The *Achievement* sub-category provides a list of general data fields which will apply to performance measures within the other sub-categories.

The *Asset Life* sub-category provides a number of performance measures which can be applied to each of the Asset Types listed in Section 8.3 Inventory.

Performance measure targets may be aspirational (set without robust consideration of available budget to achieve the typically ‘stretch’ target), or performance measure targets may be achievable (set with due consideration of available budget). This Data Standard does not attempt to set targets for performance measures, as performance measure targets are a function of available budget and risk appetite, which will vary between road management authorities.

Table 8:85 Performance (asset) – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.10.1	Performance category	perfa_cat	Performance category		A	7	None	Code List 9.30	P	2		
8.10.2	Performance measure target_achievable	perfa_ach	Required technical performance value, determined as achievable in consideration of available funding envelope		AN	10	None		P	3		
8.10.3	Target date for performance measure target_achievable	tach1_date	Target date for delivery of target set under Performance measure target_achievable		D	8	None		P	3		
8.10.4	Performance measure target_aspirational	perfa_asp	Required technical performance value, considered aspirational without consideration of available funding envelope		AN	10	None		P	2		
8.10.5	Target date for performance measure target_aspirational	tasp1_date	Target date for delivery of target set under Performance measure target_aspirational		D	8	None		P	2		
8.10.6	Performance actual	perfa_act	Actual technical performance value		AN	10	None		P	2		
8.10.7	Actual date for performance actual	act1_date	Actual date performance measured for Performance actual		D	8	None		P	2		
8.10.8	Design life	life_des	The total number of years the asset is expected to provide service, designed for a high level of reliability (typically 90 to 95%). Note: The Design life is typically shorter than the Useful life		I	3	None		P	1		Asset life expected design life (years) integer
8.10.9	Useful life assessed	life_use_a	The total number of years the asset is expected to be available for use, based on a subjective assessment or engineering estimation is, beyond which the asset is no longer acceptable for use. Note: The Useful life is typically longer than the Design life		I	3	None		P	1		Asset life estimated useful service life (years) integer

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.10.10	Useful life calculated	life_use_c	The total number of years the asset is expected to provide service, based on the assessed/estimated mean of a mature asset stock, beyond which the asset is no longer acceptable for use. Note: The Useful life is typically longer than the Design life		I	4	0		P	2		
8.10.11	Useful life calculation method	life_use_m	The method used to calculate the useful life for the asset		I	3	0	Code List 9.37	P	2		
8.10.12	Out of service date	life_e	The date the asset was taken out of service or replaced		D	8	0		P	1		
8.10.13	End of life reason	life_e_r	The reason for the asset being taken out of service or replaced		A	2	0	Code List 9.16	P	1		
8.10.14	Life achieved	life_ach	The number of years the asset was actually in service		I	3	0		P	1		Asset life years of life achieved (integer)
8.10.15	Asset age	asset_age	The current age of the asset		I	3	0		P	1		Asset age years (integer)
8.10.16	Remaining life assessed	life_rem_a	The subjectively assessed remaining life for the asset		I	3	0		P	1		Asset life assessed years of remaining (integer)
8.10.17	Remaining life calculated	life_rem_c	The calculated remaining life for the asset		I	3	0		P	2		
8.10.18	Remaining life calculation method	life_rem_m	The method used to calculate the remaining life for the asset		I	3	0	Code List 9.37	P	2		
8.10.19	Resurfacing coverage across total network	surf_pc	The area of the total pavement network (i.e. sealed and unsealed) resurfaced (i.e. reseal and thin asphalt on sealed network plus granular resheet on unsealed network), expressed as a percentage of the total network area at the start of the year. Reported annually		DC	3	1	0 to 100	P	2		Output annual resurfacing (m2) % of total road network area m2 (numeric) one decimal place

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.10.20	Resheeting coverage across unsealed network	surf_us_pc	The area of the unsealed pavement network resurfaced (i.e. granular resheet), expressed as a percentage of the total unsealed network area at the start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output annual granular resheeting (m2) % of total unsealed road network area m2 (numeric) one decimal place
8.10.21	Resurfacing coverage across sealed network	surf_s_pc	The area of the sealed pavement network resurfaced (i.e. reseal and thin asphalt), expressed as a percentage of the total sealed network area at the start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output annual resurfacing (m2) % of total sealed road network area m2 (numeric) one decimal place
8.10.22	Spray seal resurfacing coverage across sealed network	sseal_pc	The area of the sealed pavement network resurfaced with a sprayed seal, expressed as a percentage of the total sealed network area covered by sprayed seal at start of the year. Reported annually		DC	3	1	0 to 100	P	2		Output annual sprayed seal resurfacing (m2) % of total sprayed sealed road network area m2 (numeric) one decimal place
8.10.23	Asphalt resurfacing coverage across sealed network	asphalt_pc	The area of the sealed pavement network resurfaced with a thin asphalt treatment, expressed as a percentage of the total sealed network area covered by asphalt at start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output annual asphalt resurfacing (m2) % of total asphalt surfaced road network area m2 (numeric) one decimal place
8.10.24	Pavement rehabilitation network coverage	rehab_pc	The area of the sealed pavement network rehabilitated, expressed as a percentage of the total sealed network area at the start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output annual rehabilitated sprayed sealed pavements (m2) % of total sealed road network area m2 (numeric) one decimal place

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.10.25	Major structures replaced	struct_pc	The total number of major structures (i.e. bridges and major culverts) replaced, expressed as a percentage of the total number of structures across the network at start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output number of structures replaced as % of total number of structures in network (numeric) one decimal place
8.10.26	Bridges replaced	bridge_pc	The total number of bridges (i.e. excluding major culverts) replaced, expressed as a percentage of the total number of bridges across the network at start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output number of bridges replaced as % of total number of bridges in network (numeric) one decimal place
8.10.27	Major culverts replaced	maj_cul_pc	The total number of major culverts (i.e. excluding bridges) replaced, expressed as a percentage of the total number of major culverts across the network at start of the financial year. Reported annually		DC	3	1	0 to 100	P	2		Output number of culverts replaced as % of total number of culverts in network (numeric) one decimal place
8.10.28 (NEW)	Pavement rehabilitation across sprayed sealed network coverage	rehab_sseal_pc	#N/A		None	None	None		None	None		
8.10.29 (NEW)	Pavement rehabilitation across asphalt network coverage	rehab_aspha_pc	#N/A		None	None	None		None	None		

8.11 Performance (Financial)

Overview

Financial performance, in terms of this Standard, refers to Financial Level of Service (FLoS) measures that provide an indication of the financial efficiency and effectiveness derived from objective data and measured qualitatively. Measurement of FLoS enables asset owners and users to understand how the network of assets is performing in terms of financial return and sustainability.

Scope

Financial performance data can be used by a wide range of stakeholders to rate the financial efficiency and effectiveness of the asset system.

Table 8:86 Performance (finance) – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.11.1	Return on construction expenditure BCR <1	rce_less1	Percentage of total programmed expenditure in a financial year with BCR less than 1.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	
8.11.2	Return on construction expenditure BCR 1-2	rce_1to2	Percentage of total programmed expenditure in a financial year with BCR less between 1.0 and 2.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	
8.11.3	Return on construction expenditure BCR 2-3	rce_2to3	Percentage of total programmed expenditure in a financial year with BCR less between 2.0 and 3.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	
8.11.4	Return on construction expenditure BCR 3-4	rce_3to4	Percentage of total programmed expenditure in a financial year with BCR less between 3.0 and 4.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.11.5	Return on construction expenditure BCR 4-5	rce_4to5	Percentage of total programmed expenditure in a financial year with BCR less between 4.0 and 5.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	
8.11.6	Return on construction expenditure BCR >5	rce_great5	Percentage of total programmed expenditure in a financial year with BCR greater than 5.0. The BCR used is that one attributed to a project when the decision to fund the project was made		DC	3	1		P	3	Austroads National Performance Indicators NPI 6.1. Typically represented as a graph along with other BCR band widths (Austroads 2019)	
8.11.7	Operating surplus ratio	fin_osr	The operating result (exclusive of capital income) expressed as a percentage of total operating income (also exclusive of capital income). It assesses the entity's financial performance		DC	3	1		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	
8.11.8	Net financial liabilities ratio	fin_nflr	The magnitude of net financial liabilities relative to operating income. It is calculated based on its level of debt and other financial liabilities less financial assets all expressed as a ratio of operating revenue (exclusive of capital income)		DC	3	1		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.11.9	Asset renewal funding ratio	fin_arfr	The ratio of asset renewal and replacement expenditure for a period relative to the asset renewal and replacement expenditure identified as warranted in an asset management plan for the same period. It assesses the entity's asset renewal and replacement performance. NOTE: Where an entity does not yet have a reliable forecast of renewal requirements, it should cautiously adopt the Asset Sustainability Ratio as a substitute		DC	3	1		P	3	Australian Infrastructure Financial Management Manual (IPWEA 2016)	
8.11.10	Asset sustainability ratio	fin_asr	The ratio of asset replacement expenditure relative to depreciation for a period. It measures whether assets are being renewed at the rate they are wearing out		DC	3	1		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	
8.11.11	Total capital spend	capex_tot	Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, upgrade and expansion expenditure. Measured as a three-year rolling average of historical capital spend, including renewal, upgrade and expansion capital expenditure		Mo	10	2		P	1	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment total capital spend upgrades/ expansion/ renewals replacement of assets $AUD/NZD/year (integer)
8.11.12	Capital spend – upgrade and expansion	capex_ue	Upgrade capital is expenditure which replaces a previously existing asset with enhanced capability or function, where an option existed for replacement without the enhanced capability or functionality (e.g. widening the sealed area of an		Mo	10	2		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment capital spend on upgrades and expansion of assets $AUD/NZD/year (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
			existing road, replacing drainage pipes with pipes of greater capacity). Expansion capital is expenditure that creates new assets to provide a new service/output or extends the capacity of an existing asset to new beneficiaries (e.g. building of a new road or building of a new culvert where one did not previously exist). Measured as a three-year rolling average of historical capital spend, excluding renewal capital expenditure									
8.11.13	Capital spend – renewals	capex_ren	Renewal capital is expenditure on an existing asset or on replacing an existing asset, which returns the service capability of the asset up to that which it had originally (e.g. resurfacing or resheeting a material section of the road network, replacing a material section of a drainage network with pipes of the same capacity).Measured as a three year rolling average of historical capital spend, excluding upgrade and expansion capital expenditure. NOTE: Historical definitions of road network maintenance expenditure typically covered both maintenance and renewal. For the avoidance of doubt, renewal expenditure (Capex) is not considered maintenance expenditure (Opex)		Mo	10	2		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment capital renewals spend on or replacement of assets $AUD/NZD/year (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.11.14	Total Recurrent Spend	opex_tot	Recurrent expenditure, which is relatively small (immaterial) or that which has benefits expected to last less than 12 months. Recurrent expenditure is continuously required to maintain and asset or provide a service. Recurrent expenditure includes operating and maintenance expenditure. Measured as a three year rolling average of historical operating spend, including maintenance, operating and depreciation expenditure		Mo	10	2		P	1	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment recurrent spend total $AUD/NZD/year (integer)
8.11.15	Recurrent spend – maintenance	opex_maint	Maintenance is recurrent expenditure, which is regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service (e.g. defect patching, guard rail tensioning). Measured as a three year rolling average of historical recurrent spend, excluding operations and depreciation expenditure. NOTE: Historical definitions of road network maintenance expenditure typically covered both maintenance and renewal. For the avoidance of doubt, maintenance expenditure (Opex) excludes renewal expenditure (Capex)		Mo	10	2		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment recurrent spend maintenance $AUD/NZD/year (integer)

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.11.16	Recurrent Spend – Operations	opex_oper	Operations is recurrent expenditure, which is continuously required to provide a service (e.g. street sweeping, grass mowing, power, fuel, staff, on-costs, overheads). Measured as a three-year rolling average of historical recurrent spend, excluding maintenance and depreciation expenditure		Mo	10	2		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	
8.11.17	Depreciation expense	opex_dep	Depreciation expense is the sum of asset depreciation resulting from the systematic allocation of the depreciable amount of an asset over its useful life		Mo	10	2		P	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	
8.11.18 (NEW)	Recurrent Spend – Routine Off Pavement-Related Maintenance	opex_rout_off_maint	#N/A		None	None	None		None	2	Australian Infrastructure Financial Management Manual (IPWEA 2016)	Investment recurrent spend routine off pavement maintenance $AUD/NZD/year (integer)

8.12 Performance (Service)

Overview

Levels of service have traditionally been presented in terms of technical- or engineering-focussed requirements, such as intervention triggers and response time requirements. In recognition of the increasing focus on how assets support the delivery of the service to the community, customer levels of service are being used to evaluate the service performance of asset systems.

Customer levels of service (CLoS) are used by road management agencies to monitor, evaluate and report on the service performance of the asset systems managed by their jurisdiction to support the organisation's stated objectives. CLoS typically measure performance in the context of road user mobility, safety, amenity or accessibility. These outcomes are important for a range of users including car drivers, freight, emergency services, public transport operators and for non-car-based travellers such as pedestrians and cyclists.

CLoS may be measured in either a qualitative or quantitative manner. A CLoS describes the ability of the road network to provide safe and efficient access to road users. Because CLoS are predominantly KPI-focussed, they are often presented as metrics derived from existing data sets. Information from data sets such as traffic volumes and speed, maintenance requests and schedules, road closures, crashes, transport asset inventories and public transport journeys are all used to measure CLoS outcomes.

Despite efforts towards harmonising service performance measures across the roads sector, such as the Austroads National Performance Indicators, CLoS continue to vary significantly between road agencies and local governments. A harmonised set of asset performance standards and measures may aid in measuring performance more closely aligned to the road user's experience. Adoption of a harmonised set of CLoS, supplemented by TLoS, will provide a more complete set of performance measures to aid interaction of road agencies and local governments with their customers and funding agencies.

Scope

Service performance data can be used by a wide range of stakeholders to rate the efficiency and effectiveness of the performance of asset systems. This section incorporates a range of customer-focussed service performance measures, separated into sub-categories.

The Achievement sub-category provides a list of general data fields which will apply to performance measures within the other sub-categories.

Performance measure targets may be aspirational (set without robust consideration of available budget to achieve the typically 'stretch' target), or performance measure targets may be achievable (set with due consideration of available budget). This Data Standard does not attempt to set targets for performance measures, as performance measure targets are a function of available budget and risk appetite, which will vary between road management authorities.

Table 8:87 Performance (service) – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.1	Performance category	perf_cat	Performance category		A	7	None	Code List 9.30	P	2		
8.12.2	Performance measure target_achievable	perf_ta_ac	Required technical performance value, determined as achievable in consideration of available funding envelope		AN	10	None		P	3		
8.12.3	Target date for Performance measure target_achievable	perf_ta_da	Target date for delivery of target set under Performance measure target_achievable		D	8	None		P	3		
8.12.4	Performance measure target_aspirational	perf_tx	Required technical performance value, considered aspirational without consideration of available funding envelope		AN	10	None		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.5	Target date for Performance measure target_aspirational	perf_tx_da	Target date for delivery of target set under Performance measure target_aspirational		D	8	None		P	2		
8.12.6	Performance actual	perf_act	Actual service performance value achieved		AN	10	None		P	2		
8.12.7	Actual date for performance actual	perf_a_da	Actual date performance measured for Performance actual		D	B	None		P	2		
8.12.8	Smooth travel exposure urban (4.2 IRI)	ste_u_420	Proportion of travel undertaken each year on urban roads with a roughness level condition of less than 4.2 IRI		DC	4	1		P	3	Austroads National Performance Indicators NPI 4.2.1 (Austroads 2007)	
8.12.9	Smooth travel exposure rural (4.2 IRI)	ste_r_420	Proportion of travel undertaken each year on rural roads with a roughness level condition of less than		DC	4	1		P	3	Austroads National Performance Indicators NPI 4.2.2 (Austroads 2007)	
8.12.10	Smooth travel exposure all (4.2 IRI)	ste_a_420	Proportion of travel undertaken each year on all roads with a roughness level condition of less than4.2 IRI		DC	4	1		P	2	Austroads National Performance Indicators NPI 4.2.3 (Austroads 2007)	Customer experience % of all travel < 4.2 IRI (numeric) one decimal place)
8.12.11	Smooth travel exposure urban (5.33 IRI)	ste_u_533	Proportion of travel undertaken each year on urban roads with a roughness level condition of less than 5.33 IRI		DC	4	1		P	3	Austroads National Performance Indicators NPI 4.2.7 (Austroads 2007)	
8.12.12	Smooth travel exposure rural (5.33 IRI)	ste_r_533	Proportion of travel undertaken each year on rural roads with a roughness level condition of less than5.33 IRI		DC	4	1		P	3	Austroads National Performance Indicators NPI 4.2.8 (Austroads 2007)	
8.12.13	Smooth travel exposure all (5.33 IRI)	ste_a_533	Proportion of travel undertaken each year on all roads with a roughness level condition of less than5.33 IRI		DC	4	1		P	3	Austroads National Performance Indicators NPI 4.2.9 (Austroads 2007)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.14	Reported number of hazards	hazards	Reported number of hazards across all network infrastructure assets, reported from Maintenance Management System on a monthly basis		I	3	0		P	2		
8.12.15	Reported number of defects	defct_num	Reported number of defects across all infrastructure assets, reported from Maintenance Management System on a monthly basis		I	3	0		P	2		
8.12.16	Reported number of defects on pathways	defct_path	Reported number of defects across pathway assets, reported from Maintenance Management System on a monthly basis		I	3	0		P	2		
8.12.17	Reported number of defects on pavement surface	defct_surf	Reported number of defects across pavement assets, reported from Maintenance Management System monthly		I	3	None		P	2		
8.12.18	Reported number of service issues for traffic restraining devices	defct_rail	Reported number of defects, faults and non-conformances to standards across traffic restraining device assets (i.e. bridge side rails, guardrails, wire rope barriers, crash cushions). Defects and faults reported via Maintenance Management system and non-conformances to standards assessed via inspections		I	3	None		P	3		
8.12.19	Reported number of service issues for lighting	defct_ligt	Reported number of defects, faults and non-conformances to standards across lighting assets. Defects and faults reported via Maintenance Management system and non-conformances to standards assessed via night time inspections		I	1	None		P	3		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.20	Pathways meeting the level of service standard	sci_path	Percentage of pathways by area, across the network, within the defined and documented level of service standard		I	3	None		P	3		
8.12.21	Pavement surfacing meeting the level of service standard	sci_pave	Percentage of pavement surfacings by area, across the network, within the defined and documented level of service standard		I	3	None		P	3		
8.12.22	Achieved service request response time	sreq_time	Achieved service request response time		B	1	None		P	2		
8.12.23	Service request response time compliance	sreq_compl	Measures service request response time compliance, via percentage of requests actioned in accordance with pre-determined and documented response timelines. Uses ‘Achieved service request response time’ as core input variable		DC	4	1		P	3		
8.12.24	Duration of interruption due to planned works	work_dur	The duration of the planned works		I	3	0		P	2		
8.12.25	Work sites meeting planned closure times	work_close	Percentage of time targets met for planned road closures. Number of sites that meet planned closure target expressed as a percentage of the total number of sites planned for closure. Journey planning information prior to journey. Customers are informed at least x days ahead of a planned event of delays exceeding a given threshold		I	3	0		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.26	Proportion of planned work sites	wsites_len	The total length of planned work sites in metres, expressed as a percentage of the total network length, measured month by month		DC	3	1		P	3		
8.12.27	Actual travel speed at planned work sites	work_atsu	Weighted aggregate speed on a representative sample of planned work sites along arterial roads and freeways in major cities		DC	3	1		P	3		
8.12.28	Actual delay at planned work sites	work_delay	The delay resulting from planned works. Weighted aggregate speed on a representative sample of planned work sites minus the Nominal Travel Speed		DC	3	1		P	3		
8.12.29	Public transport reliability	pt_reliab	Public transport reliability		I	3	0		P	3		
8.12.30	Public transport travel time reliability	ttime_rel	Public transport travel time. % of time target is met		I	3	0		P	3		
8.12.31	Crash date	crash_date	Crash date		D	8	0	dd/mm/yyyy	P	2	AS/NZS ISO 31000:2009	
8.12.32	Crash location	crash_loc	Crash location {Refer location referencing section}		I	6	0		P	2	Base data fields used to capture core input data for Austroads National Performance (Road Safety) Indicators	
8.12.33	Road user involved	crash_r_us	Vehicles/road users involved in crash. Identify the vehicle types involved in all reported crashes including cyclists and pedestrians Used to facilitate reporting for a number of Road Safety measures that rely on data relating to reported crashes		A	3	0	Code List 9.10	P	2	Base data fields used to capture core input data for Austroads National Performance (Road Safety) Indicators	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.34	Crash severity	crash_sev	Crash severity, categorised as one of fatal, serious, minor, non-injury. Used to facilitate reporting for a number of Road Safety measures that rely on data relating to reported crashes		A	1	0	Code List 9.11	P	2	Base data fields used to capture core input data for Austroads National Performance (Road Safety) Indicators	
8.12.35	Crash count	crash_cnt	Total average annual crash count, by location		I	4	0		P	2	Base data fields used to capture core input data for National Performance (Road Safety) Indicators (Austroads 2013)	
8.12.36	Crash count number of years of data	crash_yrs	Number of years over which the average annual crash count was calculated		I	2	0		P	2	Base data fields used to capture core input data for National Performance (Road Safety) Indicators (Austroads 2013)	
8.12.37	Total crash count (population)	crash _p	Total crashes per 100 000 population		I	4	0		P	3		
8.12.38	Total crash count (vehicle-kilometres travelled)	crash _t	Total crashes per 100 million veh-kms		I	4	0		P	3		
8.12.39	Number of serious casualty crashes	Scc	Count of crashes involving hospitalisation or death during the year		I	6	0		P	2	Input field for Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.40	Serious casualty crashes (population)	scc_p	Serious Casualty Crashes per 100 000 population		DC	4	1		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.41	Serious casualty crashes (vehicle-kilometres travelled)	scc_t	Serious Casualty Crashes per 100 million veh-kms		DC	3	1		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.42	Number of road fatalities	sf	Count of fatalities resulting from road crashes during the year		I	4	0		P	2	Input field for Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.43	Road fatalities (population)	sf_p	Fatalities per 100 000 population		DC	3	1		P	2	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	Road safety number of fatalities per 100 000 population (numeric) one decimal place
8.12.44	Road fatalities (vehicle-kilometres travelled)	sf_t	Fatalities per 100 million veh-kms		DC	3	2		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.45	Number of persons hospitalised	sph	Count of persons admitted to hospital resulting from road crashes per year		I	6	0		P	2	Input field for Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.46	Persons hospitalised (population)	sph_p	Persons hospitalised per 100 000 population		DC	4	1		P	2	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	Road safety number of persons hospitalised per 100 000 population (numeric) one decimal place
8.12.47	Persons hospitalised (vehicle-kilometres travelled)	sph_t	Persons hospitalised per 100 million veh-kms		DC	3	1		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.48	Social cost of serious casualty crash	ssc	Average social cost per serious casualty crash		Mo	10	2		P	2	Input field for Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.49	Social cost of serious casualty Crashes (Population)	ssc_p	AU$ million cost of serious casualty crashes per 100 000 population		Mo	10	2		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	
8.12.50	Social cost of serious casualty crashes (vehicle-kilometres travelled)	ssc_t	$ million cost of serious casualty crashes per 100 million veh-kms		Mo	10	2		P	3	Austroads National Performance Indicators Clause 3.4 (Austroads 2013)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.51	Collective road safety risk	saferisk_c	Average annual fatal and serious injury crashes per km Collective Road Safety Risk is a measure of the total number of fatal and serious injury crashes per kilometre over a section of road. (Collective Road Safety Risk can also be described as the Crash Density)		A	4	0	Code List 9.44	P	3	KiwiRAP (NZRAP 2010)	
8.12.52	Personal road safety risk	saferisk_p	Average annual fatal and serious injury crashes per 100 million vehicle-km Personal Road Safety Risk is a measure of the danger to each individual using the state highway being assessed. (Personal Road Safety Risk can also be described as the Crash Rate)		A	4	0	Code List 9.44	P	3	kiwiRAP (NZ Road Assessment Programme (NZRAP) 2010)	
8.12.53	Nominal travel time	ntt	Nominal travel time of link measured in minutes		I	3	0		P	3	Input field for Austroads National Performance Indicators NPI 7.2, 7.3.1, 7.3.2, 7.3.3 and 7.3.4 (Austroads 2007)	
8.12.54	Actual travel time	Att	Actual travel time of link, measured in minutes		I	3	0		P	3	Input field for Austroads National Performance Indicators NPI 7.2, 7.3.1, 7.3.2, 7.3.3 and 7.3.4 (Austroads 2007)	
8.12.55	Mean travel time	mtt	Mean travel time of link, measured in minutes		I	3	0		P	3	Input field for Austroads National Performance Indicators NPI 7.1.1, 7.1.2, 7.1.3, 7.1.4, 7.4.1, 7.4.2, 7.4.3 and 7.4.4 (Austroads 2007)	
8.12.56	Standard deviation of travel times	sdtt	Standard Deviation of travel times of link		DC	3	2		P	3	Input field for Austroads National Performance Indicators NPI 7.4.1, 7.4.2, 7.4.3 and 7.4.4 (Austroads 2007)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.57	AM peak actual travel speed (urban)	atsu_amp	Weighted aggregate speed (measured over the full financial year) on a representative sample of arterial roads and freeways in major cities during AM peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.1.1 (Austroads 2007)	
8.12.58	PM peak actual travel speed (urban)	atsu_pmp	Weighted aggregate speed (measured over the full financial year) on a representative sample of arterial roads and freeways in major cities during PM peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.1.2 (Austroads 2007)	
8.12.59	Off peak actual travel speed (urban)	atsu_off	Weighted aggregate speed (measured over the full financial year) on a representative sample of arterial roads and freeways in major cities during off peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.1.3 (Austroads 2007)	
8.12.60	All day actual travel speed (urban)	atsu_day	Weighted aggregate speed (measured over the full financial year) on a representative sample of arterial roads and freeways in major cities over the whole day		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.1.4 (Austroads 2007)	
8.12.61	Nominal travel speed (urban)	ntsu	Weighted aggregate speed (measured over the full financial year) on a representative sample of arterial roads and freeways in major cities, assuming vehicles travel at the posted speed limit		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.2 (Austroads 2007)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.62	AM peak congestion indicator (urban)	cgi_amp	Difference between Actual and Nominal Travel Time (measured over the full financial year) – delay from traffic conditions which do not permit travel at the posted speed limit during AM Peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.3.1 (Austroads 2007)	
8.12.63	PM peak congestion indicator (urban)	cgi_pmp	Difference between Actual and Nominal Travel Time (measured over the full financial year) – delay from traffic conditions which do not permit travel at the posted speed limit during PM Peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.3.2 (Austroads 2007)	
8.12.64	Off peak congestion indicator (urban)	cgi_off	Difference between Actual and Nominal Travel Time (measured over the full financial year) — delay from traffic conditions which do not permit travel at the posted speed limit during off peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.3.3 (Austroads 2007)	
8.12.65	All day congestion indicator (urban)	cgi_day	Difference between Actual and Nominal Travel Time (measured over the full financial year) — delay from traffic conditions which do not permit travel at the posted speed limit over the whole day		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.3.4 (Austroads 2007)	
8.12.66	AM peak variability of travel time (urban)	vtt_amp	Variability of travel time (measured over the full financial year) on a representative sample of arterial roads and freeways in the urban metropolitan area during AM Peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.4.1 (Austroads 2007)	

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.12.67	PM peak variability of travel time (urban)	vtt_pmp	Variability of travel time (measured over the full financial year) on a representative sample of arterial roads and freeways in the urban metropolitan area during PM Peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.4.2 (Austroads 2007)	
8.12.68	Off peak variability of travel time (urban)	vtt_off	Variability of travel time (measured over the full financial year) on a representative sample of arterial roads and freeways in the urban metropolitan area during off peak hours		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.4.3 (Austroads 2007)	
8.12.69	All day variability of travel time (urban)	vtt_day	Variability of travel time (measured over the full financial year) on a representative sample of arterial roads and freeways in the urban metropolitan area over the whole day		DC	3	1		P	3	Austroads National Performance Indicators NPI 7.4.43 (Austroads 2007)	
8.12.70	Time to respond to incident	inc_r_time	Incident response time. Time to respond and restore service from the time of event occurring/reported		DT	14	0		P	2		
8.12.71	User satisfaction index	Usi	The USI is an indicator which measures road users' satisfaction with the road system. Index of users' qualitative evaluation of satisfaction with road system outcomes expressed as a mean score out of 5		I	1	0	Code List 9.72	P	3		
8.12.72 (NEW)	Posted travel speed	pts	Posted travel speed (speed limit) on rural or urban road link		None	1	None		None	None		Posted travel speed km/h integer)

8.13 Access

Overview

Access and restrictions for the transport network/system include the factors that affect or limit travel use or behaviour by some or all users of the road asset, often based on some characteristic of the user.

Access can be empowered or restricted on typically the following basis:

- single mode-only links or lanes (cycleway, busway or part-time bus lanes)
- motorway (no cycling, no pedestrians, bus or T2 lanes)
- vehicle weight limits (often due to bridge or pavement strength limits)
- vehicle size limits (vehicle width, height, length, say through tunnels or beneath overbridges)
- heavy goods vehicles in general (residential zones or Central Business Area lanes)
- tolled access (payment required to travel)
- one-way travel or speed restrictions.

Access and restrictions can be permanent or temporary. Those that are permanent, once installed, take significant process to change and thus rarely change. To manage the restriction or empowerment, significant warning needs to be located within the road corridor with consistent supporting systems such as signage in place.

Scope

Permanent access and restrictions or mode empowerment are usually focussed on strategic network-level outcomes and are quite specific. To ensure those vehicles to be excluded or empowered are addressed, usually there will be detailed legal background to the situation.

Temporary access control can be used as an operational management tool through applying periodic, seasonal, or temporary control to address specific local conditions. Periodic control is most often associated with facilities such as schools, and typically major sports stadia, when there are specific times that controls are required to manage operational safety and efficiency.

Access and restrictions are recorded using differing transport data sets for permanent or temporary situations. The need for on-road warning and legal requirements for permanent controls means they are embedded into the network assets through warning signage and road markings. Mapping of permanent restrictions is helpful to understand their strategic nature. This also suits enforcement, since some controls can cover large areas and many links within a network.

Table 8:88 Access – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.13.1	Restriction ID	restr_id	Unique identification code for the restriction		AN	10	None		D	1		
8.13.2	Restriction type	restr_type	The restriction type		A	10	None	Code List 9.39	D	1		
8.13.3	Restriction reason	restr_cse	The reason for the restriction being applied		A	10	None	Code List 9.38	D	1		
8.13.4	User group restriction applies to	restr_app	The user group that the restriction applies to.		A	6	None	Code List 9.40	D	1		
8.13.5	Restriction unit	restr_unit	Unit for the value dimensioning the restriction		A	2	None	m – metres kg – kilograms	D	1		
8.13.6	Restriction value	restr_val	Unit of measure for the restriction		DC	8	2		D	1		
8.13.7	Organisation responsible	restr_resp	The organisation responsible for the asset causing the restriction		A	1	None	A – asset owned by agency O – asset owned by others	D	1		
8.13.8	Restriction owner	restr_ownr	The owner of the asset causing the restriction		A	1	None		D	1		
8.13.9	Restriction status	restr_stat	The status of the restriction		A	1	None	P – permanent T – temporary	D	1		
8.13.10	Restriction period	restr_peri	The time period the restriction applies		A	1	None	C – continuous (24/7) P – periodic	D	1		
8.13.11	Restriction start date	restr_s	The date the restriction starts		D	8	None		D	1		
8.13.12	Restriction end date	restr_e	The date the restriction ends		D	8	None		D	1		
8.13.13	Restriction day	restr_day	The days that the restriction applies		A	20	None	M,T,W,TH,F,SA, SU	D	1		
8.13.14	Restriction start time	restr_t_s	The time the restriction starts		DT	14	None		D	1		
8.13.15	Restriction end time	restr_t_e	The time the restriction ends		DT	14	None	dd/mm/yyyy: hh:mm	D	1		

8.14 Works and Costs

Overview

The purpose of this function group is to provide a data set for planning, describing and capturing maintenance and forward works and the associated costs. This data is currently used by road agencies for a variety of purposes including:

Traffic Advisory	Active physical road works activities are communicated to road users, typically via a publicly-accessed website or digital notification subscription service, by the road agencies. This information promotes road network efficiency.
Asset Register	Physical works achievement, principally capital and renewal works, should be reflected in the asset register and any related financial registers. The capture of this information provides a trigger for action and the basis for reconciling any updates.
Valuation Impacts	Capital and renewal projects directly impact the asset valuation through the provision of new assets. This data set will provide the basis for recognising new assets and the associated capital cost. The costs alone could also provide the basis for establishing appropriate replacement costs across the asset portfolio.
Investment Profiles	The capture of construction, renewal and maintenance costs over time will provide the basis for producing historic investment profiles for each asset type. This information may also provide the basis for projecting future cost profiles.
Intervention Parameters	Defining the intervention triggers which may prompt road agencies to undertake works on the basis of safety, condition, cost of maintenance, efficiency (due to the proximity of similar or complementary works) or the consequences of asset failure. The treatment type will depend on the trigger parameter.
Intervention Criteria	Determining the point at which intervention is warranted, in terms of level of service condition or least cost where accumulated historic and future maintenance costs exceed the cost of the treatment proposed.
Replacement Analytics	The recording of the expected useful life at the time of construction will provide the basis for determining the actual return on capital investment. Calculating the remaining life will assist to determine the anticipated end of asset life and renewal or replacement timing and cost.
Cost Estimates	Recording works achievement with the related cost will provide a basis for refining future cost estimates for similar works.
Condition Indicator	Rising maintenance costs, associated with the same asset, can be an empirical indicator of asset condition and potential remaining life.
Treatment Selection	Cost monitoring and related condition analysis will provide an indication of systemic maintenance issues where accumulated cost can be compared to more extensive treatments beyond continued maintenance. Treatment selection analysis requires a sound understanding of accumulated costs as well as predicted future works and costs.

Scope

The capture of works and costing data can impact on management and investment decisions from a number of sources for the delivery of:

- capital projects inclusive of asset upgrades
- rehabilitation, routine and planned maintenance
- ‘special’ road projects.

Works and costing data is a critical indicator in investment decisions and can be accessed from a number of sources including:

- industry established tools, including pavement management systems (estimated costs), and maintenance management systems (achieved costs and works)
- industry publications (estimated costs)
- financial management systems (capital costs etc.).

Table 8:89 Works and costs – data items

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.14.1	Forward works program category	fwp_treat	The proposed FWP treatment		A	5	None	Code List 9.22	P	2		
8.14.2	Forward works program treatment reason	fwp_reason	The reason for the treatment		A	10	None	Code List 9.21	P	2		
8.14.3	Planned forward work treatment start year	fwp_yr_s	This is the first year of the financial year. For example: 2016 for the2016–17 financial year		D	4	0		P	2		
8.14.4	Forward works program treatment location start	fwp_start	This is the start of the forward works program treatment length		I	6	0		L	2		
8.14.5	Forward works program treatment location end	fwp_end	This is the end of the forward works program treatment length		I	6	0		L	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.14.6	Forward work program intervention parameter	fwp_param	The reason for planning a treatment		A	20	0		L	2		
8.14.7	Forward work program intervention threshold	fwp_thresh	Defining the parameter or condition that triggers the intervention treatment		AN	20	0		L	2		
8.14.8	Forward works treatment estimated cost	fwp_cest	This is the estimated cost allocated to the future treatment		MO	10	2		P	2		
8.14.9	Planned forward treatment end year	fwp_end_yr	This is the planned year that the treatment in the work program ends		I	4	0		P	2		
8.14.10	Maintenance defect ID	mt_def_id	Unique identification number that relates to the defect		AN	10	0		P	2		
8.14.11	Defect description	mt_def	A description of the identified hazard or defect		A	20	0	Code List 9.13	P	2		
8.14.12	Status of work	mt_status	The status of the work identified to address the recorded defect		A	2	0	Code List 9.74	P	2		
8.14.13	Unit for payment	mt_unit	The unit for payment for the work activity used to remedy the defect		A	3	0	Code List 9.71	P	2		
8.14.14	Work quantity	mt_quan	The quantity of the actual work completed to address the recorded defect, for a given activity		DC	7	1		P	2		
8.14.15	Work schedule rate	mt_crate	The contract schedule rate or proxy rate that applies to the maintenance activity to address the identified defect		Mo	10	2		P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.14.16	Maintenance paid amount	mt_cost	The actual amount paid that applies to the maintenance activity to address the identified defect. This should be calculated from the quantity and rate. [maint_work_rte] x[maint_work_quantity]		Mo	10	2		P	2		
8.14.17	Date approved for payment	mt_date_a	This is the date the completed work was approved for payment		D	8	0		P	2		
8.14.18	Defect liability start date	mt_dlp_s	Starting date of defects liability period		D	8	0		P	3		
8.14.19	Defect liability end date	mt_dlp_e	End date of defects liability period		D	8	0		P	3		
8.14.20	Source identification	mt_id	The hazard or defect is identified from a routine patrol inspection activity or from an external source (call centre)		AN	20	0		P	3		
8.14.21	Source identification reference	mt_ref	Enquiry Tracking System reference number or similar		AN	20	0		P	3		
8.14.22	Date and time of creation	mt_date_cr	The date and time that the hazard or defect was identified or of notification from an external source		DT	14	0		P	3		
8.14.23	Intervention parameter	mt_int_par	The reason for undertaking or planning the repair of a hazard or defect		A	20	None		P	3		
8.14.24	Intervention threshold	mt_int_thr	The point at which intervention is required		AN	20	None		P	3		
8.14.25	Action completed	mt_action	Define whether a hazard or defect has been rectified or appropriate warning signage installed		A	20	None	Code List 9.74	P	2		

Ref	Name	Code	Description	Example	Type	Precision	Scale	List	Purpose	Soph	Industry Standard	Metrics
8.14.26	Date and time of completion	mt_compl	The date and time that the hazard or defect was rectified, or warning signage was installed		DT	14	None		P	2		
8.14.27	Location reference type	mt_loc	The type of location reference that applies to the maintenance activity		I	6	None		P	2		
8.14.28	Activity group	mt_act_grp	The overall work activity group		A	12	None	Code List 9.26	None	2		
8.14.29	Work activity	mt_act	The work activity that is planned or has been undertaken		A	20	None	Code List 9.26	P	2		
8.14.30	Maintenance cycle	mt_cyc	The timing of the cycle which the work activity is undertaken		A	20	None		None	1		
8.14.31	Forward work treatment actual completed cost	fwp_cost_a	This is for completed works and is an all inclusive cost to do the work		Mo	10	2		P	2		
8.14.32	Routine maintenance efficiency	Rme	Routine Maintenance Efficiency expressed as a percentage		I	3	None	0 to 100	P	1		
8.14.33	Percent routine maintenance	Prm	The percentage of the network that is receiving routine maintenance		I	3	None	0 to 100	P	1		
8.14.34	Benefit cost ratio	Bcr	A value measure for undertaking an activity relative to its cost		DC	3	1		P	2		
8.14.35	Current replacement cost	drc	Current replacement cost for asset		Mo	10	2		P	2		
8.14.36	Actual work treatment start date	treat_s_a	This is the date that the actual treatment in the work program started		D	8	None		P	1		
8.14.37	Actual work treatment end date	treat_e_a	This is the date that the actual treatment in the work program ended		D	8	None		P	1		

9. Referenced Code Lists

This section provides the code lists that are referenced by attributes. Note that Table 9.56 to Table 9.60 have attempted to provide generic Australian equivalencies to the NZ descriptions.

Table 9:1 Above-below retain wall

Code	Description
BANK	Bank
C-PROP	Council property
DWY	Driveway
OPEN	Open space
PATH	Path
PRIV	Private property
ROAD	Roadway
SEA	Sea
STRU	Structure
WCOURSE	Waterway

Table 9:2 Asset type

Code	Description
AMENITY	Amenities
BIN	Bins
BRIDGE	Bridges
EARTHWORKS	Earthworks
FENCE	Fences
ITS	ITS assets
KERB AND CHANNEL	Kerb and channel
LANDSCAPING	Landscaping
LAND UNDER ROAD	Land under roads
LIGHTING	Lighting
LINE MARKING	Line marking
MAJOR CULVERT	Major culverts
MECH AND ELEC	Mechanical and electrical
MINOR CULVERT	Minor culverts
OPEN DRAIN	Open drains
OTHER STRUCTURE	Other structures
PARKING	Parking
PATHWAY	Pathways
PAVEMENT	Pavement
SURFACING	Surfacing
PIT	Pits
PUBLIC ART	Public art
PUBLIC TOILET	Public toilets
RETAINING WALL	Retaining walls
ROAD BARRIER	Road barriers
SHELTER	Shelters
SIGN	Signs
SLOPE TREATMENT	Slope treatments
TRAFFIC DEVICE	Traffic management devices
TRAFFIC SIGNAL	Traffic signals
TREE	Trees
TUNNEL	Tunnels
VEHICLE CROSSING	Vehicle crossings

Table 9:3 Asset status

Code	Description
ABN	Abandoned or disused
INACTIVE	Not in current use, however available
INUSE	In-Use
OTHER	Other use
PLANNED	Planned
REM	Removed
ABN	Abandoned or disused

Table 9:4 Bin intended use

Code	Description
GLASS	Glass only
GREEN	Green waste
HAZCHEM	Hazardous material
RECYC	Recycle
WASTE	Waste

Table 9:5 Bridge major culvert

Code	Description
CUL	Culvert
FB	Footbridge
PED	Pedestrian overpass/underpass
RAC	Road and separate cycleway
RAIL	Rail
RAP	Road and pedestrian
RAR	Road and rail
RB	Road bridge
UP	Stock crossing/underpass

Table 9:6 Element code

Code	Description
1S	Steel box girder
24C	Cast-in situ abutment
3T	Timber through truss
8P	Precast deck slab

Table 9:7 Bridge type

Code	Description
BG	Box girder
COL	Column
TB	T beam

Table 9:8 Condition rating

Code	Description
1	Very good ('as-new')
2	Good (minor defects)
3	Fair or moderate (significant maintenance)
4	Poor (significant renewal/ rehabilitation required)
5	Very poor (significant defects in need of major works by way of replacement)

Table 9:9 Confidence

Code	Description
A	Assessed
G	Guessed
M	Measured
U	Unknown

Table 9:10 Crash road user classification

Code	Description
A	Articulated truck
B	Bus
C	Car
E	Pedestrian
F	SUV/4 x 4
H	Heavy truck
I	Bicycle
K	Skateboard/in-line skater
L	Light truck
M	Motorcycle
O	Other/unknown
P	Moped
Q	Equestrian
R	Heavy rigid truck
S	School bus
U	Ute
V	Van
W	Wheeled pedestrian (e.g. wheelchair)
X	Taxi/taxi van

Table 9:11 Crash severity

Code	Description
FAT	Fatal injury crash
MIN	Minor injury crash
NON	Non-injury crash
SER	Serious injury crash

Table 9:12 Criticality rating

Code	Description
1	Essential to the organisation in delivering its service obligations (ie. life line routes)
2	Has a high potential to directly impact essential services
3	Has a low potential to directly impact essential services
4	Has no potential to impact any service obligations

Table 9:13 Defect

Code	Description
ACCIDENT	Vehicle accident
ADMIN	Administration
AGG LOSS	Aggregate loss
APR REP	Approach repair
BLOCKDD	Blocked
BROKEN	Broken
COND	Condition
CORRODED	Corroded
CORRUG	Corrugations
CRACK	Cracking
DAMGED	Damaged
DEBRIS	Debris
DECK REN	Deck renew
DECK REP	Deck repair
DEFORM	Deformation
DEPRESS	Depression
DETRITUS	Detritus
DRAIN INAD	Drainage – inadequate
DUST	Dust nuisance
EDGE BRK	Edge break
EROSION	Erosion, includes scouring
FOUND	Foundation
GRAFF	Graffiti
INSP	Inspections
JOINT	Joint repair
LANDSLIP	Landslip
LEANING	Leaning – sign
LEVEL SERV	Level of service not being met
LITTER	Litter
LOOSE	Loose
LOW SURF	Low surface
PAIN	Painting
POT HOLES	Pot holes
RAIL MAINT	Rail maintenance
REDUND	Redundant
RUTTING	Rutting
SATURATED	Saturated pavement
SHAPE	Shape – cross sectional
STRUCT	Structural members
TEXTURE BLEED	Texture – bleeding road surface
TEXTURE POLISHED	Texture – polished road surface
TRENCH	Trench settlement
UNEV SURF	Uneven surface
UNSAFE	Unsafe
VEGET	Vegetation

Table 9:14 Deflection test

Code	Description
BB	Benklemen beam
DFG	Deflectograph
FWD	Falling weight deflectometer
TSD	Traffic speed deflectometer

Table 9:15 Drainage mechanism

Code	Description
P	Porous
S	Sub soil
W	Weep hole

Table 9:16 End of life reason

Code	Description
CD	Capacity/demand
CS	Change of standards
EL	Deterioration/end of life
MP	Major project impact
OU	Other/unknown
SC	Safety considerations
TO	Technological obsolescence

Table 9:17 Fence function

Code	Description
AGRI	Agriculture
PERIM	Perimeter
PRIV	Privacy
SECURITY	Security

Table 9:18 Fence type

Code	Description
BOLLARD	Bollard
ELECTRIC	Electric
PICKET	Picket style fence
POOL	Pool wire type fence
POSTTR	Post and top rail
POSTW	Post and wire
RAIL	Rail only
WOODPAL	Wooden paling fence

Table 9:19 Function of the feature

Code	Description
OR	Over road
OW	Over watercourse
UR	Under road

Table 9:20 Functional classification

Code	Description
ART	Arterial [2]
ACC	Access [6a]
ALV	Access low volume [6b]
NAT	National [1b]
NHV	National high volume [1a]
PC	Primary connector [4]
REG	Regional [3]
SC	Secondary connector [5]

Note: for definitions of each functional classification refer to: http://www.nzta.govt.nz/assets/Road-Efficiency-Group/docs/functional-classification.pdf. Numbers in square brackets denote hierarchy of classification system.

Table 9:21 Forward works program reason

Code	Description
BLEED	Bleeding
COND	Condition
CRACK	Cracking
DEFORM	Deformation
INAD DRAIN	Inadequate drainage
MAINT	High maintenance costs
OPER	Operational
PPM	Pavement performance modelling recommendation
SAFETY	Safety
SC	Second coat

Table 9:22 Forward works program treatment

Code	Description
IMPROVE	Improvement to existing assets (betterment of existing assets e.g. seal widening/extension)
NEW	New asset creation
RENEW	Refurbishment of an existing asset to a new condition
REPLACE	Replacement of existing assets (e.g. rehabilitation, resurfacing, footpath replacement)

Table 9:23 Kerb type

Code	Description
BK	Barrier kerb (kerb)
BKC	Barrier kerb & channel (kerb & channel)
BUN	Bund
CPK	Car park kerb
DDC	Dish drain/channel
FK	Flat kerb
HAL	Half pipe channel
LK	Layback kerb & channel
MK	Mountable kerb
MKC	Mountable kerb & channel
RK	Riley kerb
RKC	Roll top kerb & channel
SBK	Semi-barrier kerb
SBKC	Semi-barrier kerb & channel
SH	Shoulder
SK	Separation kerb
SLO	Slot channel
SMK	Semi-mountable kerb
SMKC	Semi-mountable kerb & channel

Table 9:24 Lighting type

Code	Description
BOL	Bollard
DIR	Directional
FEA	Feature (spot highlight)
NAV	Navigational
SOL	Solar
SPT	Sport lighting
STR	Street light
TWN	Twin light
UPL	Up light

Table 9:25 M&E ITS types & sub-types

Code	Description
CABL-CDLN	Cables – communication & data lines
CABL-PWLN	Cables – power lines
COMM-FTR	Communication – fibre termination rack
COMM-MCP	Communication – manual call point
COMM-MEP	Communication – motorist emergency phone
COMM-PANC	Communication – public address network controller
COMM-SNS	Communication – sensor
COMM-SPK	Communication – speaker
ELEC-BAT	Power/electrical (fixed/ stand-by) – batteries
ELEC-CBR	Power/electrical (fixed/ stand-by) – circuit breaker
ELEC-CBRSP	Power/electrical (fixed/ stand-by) – circuit breaker – stand-by power
ELEC-CNC	Power/electrical (fixed/ stand-by) – control cabinet
ELEC-CNP	Power/electrical (fixed/ stand-by) – control panel
ELEC-CNT	Power/electrical (fixed/ stand-by) – contactor
ELEC-CNTSP	Power/electrical (fixed/ stand-by) – contactor – stand-by power
ELEC-DSB	Power/electrical (fixed/ stand-by) – distribution board
ELEC-DSBSP	Power/electrical (fixed/ stand-by) – distribution board – stand-by power
ELEC-EESL	Power/electrical (fixed/ stand-by) – emergency exit strobe light
ELEC-GSSP	Power/electrical (fixed/ stand-by) – generator set – stand-by power
ELEC-HWR	Power/electrical (fixed/ stand-by) – hardware
ELEC-IABC	Power/electrical (fixed/ stand-by) – incoming ACB
ELEC-ISO	Power/electrical (fixed/ stand-by) – isolator
ELEC-JBX	Power/electrical (fixed/ stand-by) – junction box
ELEC-KBS	Power/electrical (fixed/ stand-by) – keyboards
ELEC-LFT	Power/electrical (fixed/ stand-by) – light fitting
ELEC-PFC	Power/electrical (fixed/ stand-by) – PF correction
ELEC-PLCC	Power/electrical (fixed/ stand-by) – PLC components
ELEC-PLCIO	Power/electrical (fixed/ stand-by) – PLC I/O
ELEC-PLCPU	Power/electrical (fixed/ stand-by) – PLC CPU redundancy
ELEC-PLCS	Power/electrical (fixed/ stand-by) – PLCs
ELEC-PMT	Power/electrical (fixed/ stand-by) – photo meter
ELEC-PWMSB	Power/electrical (fixed/ stand-by) – power meter – stand-by power
ELEC-PWMT	Power/electrical (fixed/ stand-by) – power meter
ELEC-SPD	Power/electrical (fixed/ stand-by) – surge protection device
ELEC-SSU	Power/electrical (fixed/ stand-by) – soft start unit
ELEC-SWT	Power/electrical (fixed/ stand-by) – switch
ELEC-TRB	Power/electrical (fixed/ stand-by) – termination block
ELEC-TRNS	Power/electrical (fixed/ stand-by) – transformer
ELEC-UPS	Power/electrical (fixed/ stand-by) – UPS
ELEC-VSD	Power/electrical (fixed/ stand-by) – variable speed drive
FIRE-ASD	Fire protection – aspirating smoke detector
FIRE-COB	Fire protection – CO bottle
FIRE-DELG	Fire protection – deluge system lines
FIRE-DTV	Fire protection – drain & test valve

Code	Description
FIRE-EEC	Fire protection – emergency eq. cabinets
FIRE-FDM	Fire protection – fire damper
FIRE-FDR	Fire protection – fire door
FIRE-FEX	Fire protection – fire extinguisher
FIRE-FIP	Fire protection – fire indication panel
FIRE-FSW	Fire protection – flow switch
FIRE-FSYS	Fire protection – foam system lines
FIRE-FTR	Fire protection – flow transmitter
FIRE-GAC	Fire protection – gas actuator
FIRE-GSGP	Fire protection – gas suppression gas bottle
FIRE-GSS	Fire protection – gas solenoid switch
FIRE-HRL	Fire protection – hose reel
FIRE-IVL	Fire protection – isolation valve
FIRE-LHD	Fire protection – linear heat detector
FIRE-LHDC	Fire protection – linear heat detection controller
FIRE-LTR	Fire protection – level transmitter
FIRE-PCP	Fire protection – pipe coupling
FIRE-PDM	Fire protection – pulsation dampener
FIRE-PGG	Fire protection – pressure gauge
FIRE-PMP	Fire protection – pump
FIRE-PTR	Fire protection – pressure transmitter
FIRE-SCF	Fire protection – smoke control fan
FIRE-SDT	Fire protection – smoke detector
FIRE-SGL	Fire protection – sight glass
FIRE-SIN	Fire protection – surfactant injection
FIRE-SNB	Fire protection – snubber
FIRE-SND	Fire protection – sounders
FIRE-SPLN	Fire protection – sprinkler lines
FIRE-SPR	Fire protection – sprinkler heads
FIRE-STR	Fire protection – strainer
FIRE-TMS	Fire protection – temperature sensor
FIRE-TNK	Fire protection – tank
FIRE-TSN	Fire protection – tank sensor
FIRE-VLV	Fire protection – valve

Code	Description
SECU-AVIDC	Security – auto video incident detection camera
SECU-CAM	Security – camera
SECU-CCTV	Security – CCTV camera
SECU-CNTL	Security – controller
SECU-DOOR	Security – door
TRAFF-ILP	Traffic management devices – inductive loop
TRAFF-LUS	Traffic management devices – lane use signals
TRAFF-OHD	Traffic management devices – Over height detector
TRAFF-TCB	Traffic management devices – traffic control barrier
TRAFF-TSG	Traffic management devices – traffic signals
TRAFF-VMS	Traffic management devices – variable message sign
VAC-ACN	Ventilation & air conditioning – air conditioner
VAC-ASN	Ventilation & air conditioning – air sensor
VAC-DCT	Ventilation & air conditioning – duct
VAC-DIF	Ventilation & air conditioning – diffuser
VAC-DUCT	Ventilation & air conditioning – ducts
VAC-FLT	Ventilation & air conditioning – filter
VAC-HCM	Ventilation & air conditioning – hydrocarbon compressor
VAC-HTR	Ventilation & air conditioning – hydrocarbon trap
VAC-HYS	Ventilation & air conditioning – hydrocarbon sensor
VAC-JFN	Ventilation & air conditioning – jet fan
VAC-LVR	Ventilation & air conditioning – louver
VAC-PIPE	Ventilation & air Conditioning – pipes
VAC-PTR	Ventilation & air conditioning – pressure transducer
VAC-SAT	Ventilation & air conditioning – sound attenuator
VAC-SNS	Ventilation & air conditioning – sensor
VAC-VFN	Ventilation & air conditioning – ventilation fan

Code	Description
VAC-VSD	Ventilation & air conditioning – variable speed drive

Table 9:26 Maintenance activity

Code	Description
CALIBRATE	Calibration (e.g. weigh in motion)
CLEAN	Clean (e.g. signs, guide posts, toilets, catchpits)
COLLECT	Data collection (e.g. traffic counting)
CRACK FILL	Crack filling
CRACK SEAL	Crack sealing
DIGOUT	Digout
EDGE	Edge repair (e.g. edge break)
EMPTY	Empty (e.g. bins, stock effluent)
ENERGY	Energy charges (e.g. streetlighting)
FIRE	Fire management
GRADING	Grading
INSIT STAB	In situ stabilisation
INSPECT	Inspections (e.g. routine, cyclic, planned)
MAINT PREVENT	Maintenance (preventative e.g. culvert cleaning, bus stops, landscaping, barriers)
MAINT REACTIVE	Maintenance (routine repairs)
MILLING	Milling
MIN LEVEL	Minor levelling/regulation
MONITOR	Monitoring (e.g. surveillance, traffic monitoring)
MOWING	Mowing (e.g. verges, medians)
OVERLAY	Overlay
POT HOLE	Pot hole repairs
PROGR	Programming
PROTECT	Protection (e.g. trees, security fencing)
REALIGN	Realign (e.g. signs)
REINSTATE	Reinstate (e.g. fallen sign)
REMOVE	Remove (e.g. graffiti, debris, trees)
REPAINT	Repaint
REPAIRS	Repairs (reactive e.g vandalism, signs)
REPLACE	Replace (e.g. missing sign, missing RRPRM's, missing guide posts, bridge components)
REPORTNG	Reporting
RE-SHEET	Re-sheet (e.g. unsealed roads)
RESPONSE	Incident response (e.g. stock, crashes, floods, fires, storms, ice gritting, snow clearing)
RESURFACE	Resurface
RIP REMAKE	Rip and remake
SERV COV ADJUST	Service cover adjustment
SHLDR MAINT	Shoulder maintenance
SWEEEPING	Sweeping (e.g. street cleaning)
TRAFF MAN	Traffic management
TRIMMING	Trimming (e.g. trees)
WATER CUT	Water cutting

Table 9:27 Material

Code	Description
ABL	Asphalt – black
AL	Aluminium
ARD	Asphalt – red
BED	Bedrock
BITUMEN	Bitumen
BOULDER	Boulders
BRASS	Brass
BRICK	Brick
BSTN	Bluestone
CCONC	Coloured concrete
CLAY	Clay
CONC	Concrete
CORR	Corrugated steel/aluminium
CU	Copper
EAG	Exposed aggregate
EARTH	Earth
FIBERG	Fibreglass
FIBRERC	Fibre reinforced concrete
GEW	Glazed earthenware
GMT	Gunmetal
GR	Grass
GRAVEL	Gravel
GUNN	Gunnite

Code	Description
GWI	Galvanised wrought iron
HDPE	High density polyethylene
IRON	Iron
KD	Kiln dust
LIME	Lime
MDPE	Medium density polyethylene
MI	Malleable iron
MSW	Mild steel welded
NYL	Nylon
OPVC	Oriented PVC
ORG	Organic
PAINT	Paint
PE	Polyethylene
PHB	Phosphor bronze
PPP	Polypropylene
PVC	Polyvinylchloride
RC	Reinforced concrete – no class
RC1	Reinforced concrete Class 1
RC2	Reinforced concrete Class 2
RC3	Reinforced concrete Class 3
RC4	Reinforced concrete Class 4
RUBBER	Rubber
SAND	Sand
SPD	Glazed stoneware
SPIR	Spiral wound steel/aluminium
SSTEEL	Stainless steel
SSTEEL316	Stainless steel (grade 316)
STEEL	Steel
STONE	Stone
THERMOPLASTIC	Thermoplastic
TILE	Tiles
TIMBER	Timber
UCON	Un-reinforced concrete
UNK	Unknown
UPVC	Un-plasticised polyvinyl chloride
UPVC-P	Profile-wall un-plasticised polyvinylchloride
UPVC-S	Un-plasticised polyvinylchloride
VC	Vitreous clay
WC	Wood chip
WI	Wrought iron

Table 9:28 Parking purpose

Code	Description
BUS	Bus
DIP	Diplomatic
DIS	Disabled
LOZ	Loading zone
MC	Motorcycle
POL	Police
REG	Regular
RES	Residents
TAX	Taxi

Table 9:29 Pathway type

Code	Description
BA	Beach access
BW	Bikeway
CL	Cycle lane
CT	Cycle track
FP	Footpath
HT	Horse trail
PA	Pedestrian access
PR	Pram crossing
SP	Shared path (cycles/pedestrians)
WT	Walking track

Table 9:30 Performance category

Code	Description
ACHIEVE	Achievement
ALIFE	Asset life
CUSTEXP	Customer experience
CUSTSAF	Customer safety (condition)
DEVPROG	Development program/project assessment
FINANCE	Financial
INCIDNT	Unplanned incidents
INVENT	Inventory
INVEST	Investment
JNYINT	Journey interruptions
OUTPUT	Output
PUBLIC	Public transport
RDSAFE	Road safety
TSPEED	Travel speed
USERSAT	User satisfaction

Table 9:31 Pipe shapes

Code	Description
ARCH	Arch pipe
CIRC	Circular pipe
EGG	Egg pipe
EGG2	Egg pipe (elongated)
OVAL	Oval pipe
RECT	Rectangular pipe
UTOP	U-shape pipe
PARB	Parabolic channel (broad)
PARN	Parabolic channel (narrow)
RCTC	Rectangular channel
TRAP	Trapezoidal channel
USCH	U-shape channel
VSCH	V-shape channel

Table 9:32 Pipe type

Code	Description
CLEAN	A pipe that carries clean roof water
INLET	Inlet
OUTFALL	Outfall discharge point
OVERFLOW	Pipe that carries excess water to or from a pit
PIPE	A pipe used to convey liquids
SUBSOIL	A slotted or perforated pipe laid below ground

Table 9:33 Pit construction type

Code	Description
AN	Annealed
CAST	Cast-in situ
CORR	Corrugated
EX	Extruded
F	Folded
GC	Gravity cast
HD	Hard drawn
LB	Lock bar
MC	Mandrill cast
PC	Precast
RIV	Riveted
S	Seamless
SC	Spun cast
UNK	Unknown

Table 9:34 Pit lid type

Code	Description
CA	Cast iron
CI	Concrete insert
CO	Concrete
F	Fibreglass
GA	Steel-gatic
GR	Grate

Table 9:35 Pit litter type

Code	Description
GPT	Gross pollutant trap
LTSK	Litter sock
OWSP	Oil & water separator
SDTR	Sediment trap
SNTR	Sand trap
TRRT	Trash rack/rubbish trap

Table 9:36 Power source

Code	Description
BATTERY	Battery supply
GENERATOR	Power generator (petrol or diesel)
GRID	Direct off the power grid
MAIN	Mains power supply
SOLAR	Solar panels
WIND	Wind turbine

Table 9:37 Remaining asset life calculation method

Code	Description
DESK	Desktop assessment
ENG	Engineering model
FIELD	Field assessment

Table 9:38 Restriction reason

Code	Description
BUILT	Built asset
GEOM	Geometrics
HAZARDM	Hazardous materials
NATURAL	Natural asset (i.e. tree, cutting etc.)
REG	Regulatory
VEHICLE	Vehicle type
WEATHER	Weather

Table 9:39 Restriction type

Code	Description
ACCESS	Access
AGRI	Agricultural machinery
AXLE	Axle limit
DIR	Direction
HAZCHEM	Hazardous material
HEIGHT	Height (vertical) clearance
LENGTH	Length
TOLL	Toll fee applicable
WEIGHT	Weight
WIDTH	Width clearance

Table 9:40 Restriction user group

Code	Description
ALL	All vehicles
ALLXB	All vehicles except buses
BUS	Buses
CAR	Cars
CYCL	Cyclists
HCV	Heavy commercial vehicles
MOTORB	Motorbikes
PED	Pedestrians

Table 9:41 Retain wall restraint type

Code	Description
CANT	Cantilever
CSTEM	Cantilever stem/counterfort
FACE	Facing
GRAVITY	Gravity
NONE	None
PIN	Pins and nails
TIED	Tied

Table 9:42 Retain wall type

Code	Description
ANCHORED	Anchored
BORED	Bored pile
CANTILEVER	Cantilevered
GRAVITY	Gravity
MECHANICAL	Mechanical stabilisation
SHEET	Sheet pile
SOIL-NAIL	Soil nailing
SOIL-STREN	Soil strengthening

Table 9:43 Road barrier type

Code	Description
GUARD	Guardrail
NJB	New Jersey barrier
NOISE	Noise attenuation
SAFETY	Safety barrier
SIGHT	Sight rail
WIRE	Wire rope

Table 9:44 Safety related risk rating

Code	Description
LOW	Collective risk ≤ 0.039 Personal risk ≤ 4
LOWMED	Collective risk 0.04 ≤ 0.069 Personal risk 4 ≤ 4.9
MED	Collective risk 0.07 ≤ 0.10 Personal risk 5 ≤ 6.9
MEDHIGH	Collective risk 0.11 ≤ 0.189 Personal risk 7 ≤ 8.9
HIGH	Collective risk 0.19+ Personal risk 9+

Table 9:45 SCRIM vehicle

Code	Description
UNKNOWN	Unknown vehicle
NSW	NSW SCRIM
VIC	Victorian SCRIM
UK	UK certified SCRIM vehicle

Table 9:46 Shelter type

Code	Description
BUS	Bus
PED	Pedestrian
TRAM	Tram

Table 9:47 Side of road

Code	Description
B	Both
C	Centre
L	Left
R	Right

Table 9:48 Skid resistance test device

Code	Description
GRIPTESTER	Grip tester
ROAR	Norsemeter ROAR
SCRIM	SCRIM
UNKNOWN	Unknown vehicle

Table 9:49 Slope anchors

Code	Description
GROUND	Ground anchor
ROCK	Rock bolts
SOIL	Soil anchors

Table 9:50 Slope drain liner

Code	Description
CONCRETE	Concrete
GRAVEL	Gravel
PLASTIC	Plastic
ROCK	Rock
SOIL	Soil
VEGE	Vegetation

Table 9:51 Slope fabric

Code	Description
COIR	Coir matting
GEOGRID	Geogrid
GEOMAT	Geomat
GEOTEXTILE	Geotextile
JUTE-MAT	Jute matting
JUTE-MESH	Jute mesh

Table 9:52 Slope material

Code	Description
ROCK	Rock
SOIL	Soil

Table 9:53 Slope monitoring

Code	Description
ACCOUSTIC	Acoustic emission technique
CRACK	Crack monitor
EXTENSION	Extensometers
GPS	Global Positioning System
GROUND	Ground survey
INCLINE	Inclinometers
LASER	Laser image scanning
PHOTOS	Photographic
PIEZO	piezometers
RADAR	Slope stability radar
TILT	Tiltmeters
SURVEY	Total station
VISUAL	Visual

Table 9:54 Slope seismic rating

Code	Description
H	High (1.0–2.5% landslide area or 10–30 1 s/km^2)
L	Low (< 0.5% landslide area and < 3 1 s/km^2)
M	Moderate (0.5–1.0% landslide area or 3–10 1 s/km^2)
VH	Very high (> 2.5% landslide area or > 30 1 s/km^2)

Table 9:55 Slope vegetation

Code	Description
GRASS	Grass
SHRUB-DEC	Shrub – deciduous
SHRUB-EVE	Shrub – evergreen
TREE-DEC	Tree – deciduous
TREE-EVE	Tree – evergreen

Table 9:56 Surface additive type

Code	Description
CRBR	Crumb rubber
EFXC	Emoflex C (NZ proprietary PMB)
EMO	Emoflex (NZ proprietary PMB)
EVA	Ethyl vinyl acetate general polymer for Australian A35P grade
NRLX	Natural rubber latex general latex for addition to emulsions
PEEH	Techniflex EH polymer (type of polymer)

Code	Description
PM01	Techniflex PMB 101 (NZ proprietary PMB)
PM05	Techniflex PMB 105 (NZ proprietary PMBs
PM30	Techniflex PMB 130 (NZ proprietary PMB)
PMB1	Techniflex PMB 100 (NZ proprietary PMB)
PMB4	Techniflex PMB 400 (NZ proprietary PMB)
PMB6	Techniflex PMB 600 (NZ proprietary PMB)
PMB8	Techniflex PMB 800 (NZ proprietary PMB)
PMBP	Paveflex PMB (NZ proprietary PMB)
POL1	Polybilt 101 (not available)
POL2	Polybilt 102 (polymer)
POL3	Polybilt 103 (polymer)
POLY	Polymer
SAMC	Sam C
SAMF	Samfilla
SBR	Styrene butadiene Rb (polymer)
SX50	Fulton hogan paveflex 50 (proprietary)
SX60	Fulton hogan paveflex 60 (proprietary)
UNKN	UNKNOWN
XCS4	XCS 104

Table 9:57 Surface adhesion type

Code	Description
AA	Ammonia (added to bitumen emulsions)
BP50	BP50C
BTRN	Bitran H
CC10	CC101
CECA	CECA EXP 3747 (emulsifier for emulsions)
D184	Dinoram 184 (emulsifier for emulsions)
DHBG	Diamin HBG (emulsifier for emulsions)
DMPL	Duomeen T(Pastille) (emulsifier for emulsions)
DMPS	Duomeen T(Paste) (emulsifier for emulsions)
DMT	DMT
DOLB	Diamin OLB (emulsifier for emulsions)
DT	ours
MGA1	Megamine 100 (emulsifier for emulsions)
MGBA	Megamine BA (emulsifier for emulsions)
N422	Redicote N422 (emulsifier for emulsions/adhesion agent)
N561	Redicote N561 (emulsifier for emulsions/adhesion agent)
N606	Redicote N606 (emulsifier for emulsions)
N893	Redicote N893 (emulsifier for emulsions)
P200	Polyram L200 (emulsifier for emulsions)
RDIZ	Redicote Z (emulsifier for emulsions)
SHTA	Shell Tenicon A (emulsifier for emulsions)
TAA3	Tomah 3000 (emulsifier for emulsions)
UNKN	UNKNOWN
WTFX	Wetfix C (emulsifier for emulsions)

Table 9:58 Surface binder type

Code	Description
B130	Bitumen 130/150 (no equivalent Aust. bitumen grade)
B180	Bitumen 180/200 (similar to former Aust. Class 50)
B45	Bitumen 45/55 (similar to Aust. Class 320)
B60	Bitumen 60/70 (similar to Aust. Class 170)
B80	Bitumen 80/100 (similar to Aust. Class 170)
E180	Emulsion 180/200 (no Aust. equivalent)
E80	Emulsion 80/100 (similar to emulsion made with Class 170)
EC55	Emulsion Cationic quick set, 55 (similar to CRS emulsion made with 55% bitumen)
EC60	Emulsion Cationic quick set, 60 (similar to CRS emulsion made with 60% bitumen)

Code	Description
EC64	Emulsion Cationic quick set, 64 (similar to CRS emulsion made with 64% bitumen)
EC65	Emulsion Cationic quick set, 65 (similar to CRS emulsion made with 65% bitumen)
EC68	Emulsion Cationic quick set, 68 (similar to high binder content CRS emulsion made with 68% bitumen)
EC80	Emulsion Cationic quick set, 80 (similar to high binder content CRS emulsion made with 80% bitumen)
PME	Polymer modified emulsion (generic polymer modified emulsion)
PORT	Portland cement
QS	QSK 1
RE	Rubber emoflex
RUB	Rubberised bitumen (crumbed rubber binder)
SKS	SKS-EN
SL	SLKP – EN
UNKN	Unknown
WATR	Water

Table 9:59 Surface treat type

Code	Description
1C	First coat (an initial seal on a prepared unsealed surface, which is usually a basecourse)
2C	Second coat (previously the term given to a seal placed on top of a primed or first coat sealed surface and before subsequent reseals. The term is obsolete as all second coat seals are now considered as Reseals)
MEM	Membrane seal (a seal composed of straight run bitumen with little or no cutback and a light covering of chip/aggregate. Covered soon after construction with asphaltic concrete)
RSL	Reseal

Table 9:60 Surface type

Code	Description
ASPHALT	Asphalt
CHIP	Stone chip (stone aggregate)
CONCRETE	Concrete
GRAVEL	Gravel
OTHER	Other

Table 9:61 Traffic flow direction

Code	Description
C	Counterflow/changeable direction
O	One way
T	Two-way traffic flow

Table 9:62 Traffic device

Code	Description
BOL	Bollard
CHI	Chicane
IP	Intersection platform
MS	Median strip
PC	Pedestrian crossing
PR	Pedestrian refuge
RBT	Roundabout
RPAV	Raised pavement
RS	Rumble strip
SB	Speed bump
SC	School crossings
SI	Splitter island

Table 9:63 Tree age

Code	Description
MA	Mature – 20–80% of life expectancy in situ
OM	Over-mature – > 80% of life expectancy in situ
SM	Semi-mature – < 20% of life expectancy in situ
YN	Young – recently planted

Table 9:64 Tree environment for roots

Code	Description
CELLB	Cell block
FOOTPATH	Footpath
NO TREATMENT	No treatment
PIT	Tree pit
UNKNOWN	Unknown

Table 9:65 Tree height

Code	Description
1	< 5 m
2	5 m – 10 m
3	10 m – 15 m
4	15 m – 25 m
5	> 25 m

Table 9:66 Tree planting method

Code	Description
PL	Planted
RM	Remnant
SS	Self-sown
UNK	Unknown

Table 9:67 Tree significance

Code	Description
CUL	Cultural
END	Endangered
HIS	Historical
LNS	Landscape
NONE	None
SCI	Scientific
STS	Streetscape

Table 9:68 Tunnel function

Code	Description
CUL	Cultural
END	Endangered
HIS	Historical
LNS	Landscape
NONE	None
SCI	Scientific
STS	Streetscape

Table 9:69 Tunnel structure type

Code	Description
ARCH	Arch
OVER	Overpass
UND	Underpass

Table 9:70 Type of pavement construction

Code	Description
B	Bridge
C	Concrete
GB	Granular bound
GU	Granular unbound
IB	Interlocking block
SA	Structural asphalt
U	Unsealed

Table 9:71 Units

Code	Description
cu	Cubic metres
Ea	Each
hr	Hours
kg	Kilograms
km	Kilometres
l	Litres
m	Metres
sqm	Square metres
t	Tonnes

Table 9:72 User satisfaction

Code	Description
1	Very satisfied
2	Satisfied
3	Acceptable
4	Dissatisfied
5	Very dissatisfied

Table 9:73 Valuation type

Code	Description
CRC	Current replacement cost
OCRC	Optimised current replacement cost
RC	Replacement cost

Table 9:74 Work status

Code	Description
COMPL	Completed
DEF	Deferred
INPRO	In progress
ONHOLD	On hold
PROG	Programmed
SIGNED	Warning signage installed
UNDERINV	Under investigation

10. Summary of Review and Update Findings

10.1 General

The Data Standard has been independently reviewed and revised based on input from the various stakeholders who have supported a review of the alignment of the PDS against the data requirements for common reporting. Examination of the Data Standard data items, apart from the PHS data items, was undertaken as part of this review, including the development of appropriate data item metrics for the PHS.

10.1.1 Missing Information

A number of new section numbers for additional data items were identified for inclusion in the tables as summarised in Table 10.1.

Table 10:1 Summary of new data items and section numbers

Table no.	Table title	New section no.	Data item description
8.3	Inventory – Depreciable Amount – Replacement Cost less Residual Value – dra	8.3.29	Depreciable Amount – Replacement Cost less Residual Value

10.2 Further Work by Others

Further work needs to be undertaken over the longer term to address the following issues with the Data Standard in conjunction with those of the PDS development:

- Austroads (2018b) has documented the recent development of the Locational Reference Method (LRM) that gives a model-specific methodology to assign unique references to a location which needs to be considered. A review by Austroads (2018a) noted the potential inconsistencies in the Data Standard with other data standards, namely the UK Government's *Uniclass 2015* and *buildingSMARTS IFC4*. Further effort will need to be made in the longer term with the Data Standard to harmonise and/or align locational referencing to international approaches.
- A number of additional data items may need to be included in the Data Standard and PDS (see Appendix C, Austroads 2018c) where the existing data items are not sufficiently componentised to be of practical value to stakeholders for monitoring agency performance (financial). This componentisation needs to occur in the areas of capacity expansion (construction component costs, quantity of construction works and road use (ex-ante and ex-post)).
- A range of key data control items that serve to support the use of the data are outlined in Table 7.7, and Section 8.2. These supply critical or important details about the date the data was collected, its precision, the collection standard that was utilised as relevant etc. As Austroads continues to support industry adoption of the Data Standard and collection of PDS data sets for collaboration, analysis and reporting of attribution of the confidence levels that can be applied to data sets becomes more critical. The domain of data providence and confidence as it relates to different functional groups requires significant further development and engagement. It is anticipated that future editions will contain more sophisticated approaches.

- The Data Standard and PDS have adopted a ‘functional classification’ approach to the classification of roads using the One Network Road Classification (ONRC) approach developed by New Zealand. In Australia, there may be a need for a further level of subcategories that allow for a level of disaggregation that takes into consideration features such as road usage data (AADT, ESA-km, GVM-km, %HV, etc., posted speed limit, and urban/rural location) which are contained in the Data Standard and PHS. Other considerations such as government policy objectives (e.g. in the areas of community service obligations), underlying cost structures which are impacted by factors such as location (remoteness), and climatic conditions should be examined.

11. Glossary of Terms and Definitions

Assessed is a term used to describe the accuracy of the data being recorded. It indicates that data has been calculated or estimated using available and related information or data.

Asset is something that has potential or actual value to an organisation. Value can be tangible or intangible, financial or non-financial. Tangible assets are physical assets, which refer to equipment, inventory and properties owned by the organisation. Tangible assets are the opposite of intangible assets, which are non-physical assets such as leases, brands, digital assets, use rights, licences, intellectual property rights, reputation or agreements.

Asset function is used to represent one or more asset types that perform the same function within an asset type.

Asset type refers to assets having common characteristics that distinguish them separately (different manufacturer, different specification or different components) within an asset function.

Asset information is the combined set of data (graphical and non-graphical) and documents (drawings, manuals, plans, certificates) required to support the management of assets over the asset's life cycle.

Asset information management is the discipline of managing the asset-related data and documents to a sufficient quality to support organisational objectives and outcomes.

Asset information repository is a recognised physical or electronic location for the storage and management of asset information.

Asset information repository custodian is a person responsible for managing an asset information repository and the processes related to the creation and maintenance of the information, and provision of access to the information in the repository.

Asset information system is a set of interrelated repositories of structured asset information and related processes required to manage an asset portfolio over its life cycle.

Asset life is the period from conception to end-of-life.

Asset portfolio are groups of assets that are within the scope of the asset management system.

Asset register contains the definition and description of each asset in the asset portfolio. The asset register includes all the data required to ensure unique identification of the asset.

Asset system represents a top-level grouping of related asset types.

Attribute is a piece of data forming a partial description of an object or entity.

Availability is the measure of the percentage of time that an item or system is available to perform its designated function.

Configuration is the interrelated functional and physical characteristics of an asset.

Configuration change refers to a change in functional or physical configuration of an asset.

Corridor is a linear zonal area within a boundary and defined by a start and end node that contains road infrastructure assets to support the operation of transport services.

Data is information collected and stored but not yet interpreted or analysed (graphical and non-graphical).

Data harmonisation is the combination of data definition and format from heterogeneous sources into integrated, consistent and unambiguous data specification to create unified understanding and to facilitate data sharing between organisations.

Data standardisation is specification of data definition and data format.

Defect is an irregularity or fault in the asset that requires attention. Actions may include cleaning, repair, or further inspections.

Depreciable Amount is the cost of an asset or other amount substituted for cost, less its residual value. The Depreciable Amount excludes the value of any non-depreciating assets such as earthworks and land included in the financial statements.

Document is information for use in the briefing, design, construction, operation, maintenance and disposal of a project or asset, including but not limited to correspondence, drawings, schedules, specifications, calculations, spreadsheets, reports, manuals and certificates.

Drawing is a static, printed or geographical representation of part or all a project or asset.

Dynamic data is collected over time about how the asset is operating and/or performing, its condition, work done and measurements which change through its operation and maintenance.

Graphical data is data that is typically conveyed using geometric data.

Guessed is a term used to describe the accuracy of the data being recorded; it indicates best judgement of the person providing the data, without any basis of measure.

Life cycle refers to the stages for an asset from conception through to disposal and any residual risks or liability period.

Maintainability is a characteristic of design and installation, expressed as the probability that an item will be restored to operating condition within a given period, using prescribed procedures and resources.

Routine maintenance, also referred to as recurrent maintenance, is a collective of all preventative and repair activities excluding renewals. It includes planned inspections, preventative maintenance, corrective maintenance and emergency response.

Renewals maintenance, also referred to as capital maintenance or major periodic maintenance (MPM), includes the cyclic renewal and upgrading of assets to avoid deterioration in their condition to ensure long-term asset performance.

Measured is a term used to describe the accuracy of the data being recorded; it indicates that the data is based upon a recognised standard and system of measure.

Metadata is data that provides information about other data. Two types of metadata exist: structural metadata and descriptive metadata. Structural metadata is data about the containers of data. Descriptive metadata uses individual instances of application data or the data content.

Non-graphical data is data that is conveyed using alphanumeric characters.

Priority Data Sets are a series of smaller priority subsets of the full Data Standard that target the most important data for collection, harmonisation and sharing. The PDS are tailored respectively for local and state road managers.

Reliability is the probability that a specified item will perform a specified function within a defined environment, for a specified length of time.

Rural Classification is where the posted road speed limit is greater than 70 km/hr.

Static data (or configuration data) defines the assets themselves (their design data) and the normal conditions in which they operate and interact with other assets.

Urban Classification is where the posted road speed limit is 70 km/hr or lower.

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Appendix A Example Network Reporting Measures

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
Network dimensions	Road	Length	km	road_len	sum of [road_len]
		Lane kilometre	km	lanekm_len	sum of [lanekm_len]
		Sealed road	km	link_s_len psurf_stat	Sum of [link_s_len] where [psurf_stat] = “S”
		Unsealed road	km	link_s_len psurf_stat	Sum of [link_s_len] where [psurf_stat] = “U”
		Sealed urban road	km	link_s_len psurf_stat traf_set	Sum of [link_s_len] where [psurf_stat] = “S” and where [traf_set] = “U”
		Sealed rural road	km	link_s_len psurf_stat traf_set	Sum of [link_s_len] where [psurf_stat] = “S” and where [traf_set] = “R”
		Unsealed urban road	km	link_s_len psurf_stat traf_set	Sum of [link_s_len] where [psurf_stat] = “U” and where [traf_set] = “U”
		Unsealed rural road	km	link_s_len psurf_stat traf_set	Sum of [link_s_len] where [psurf_stat] = “U” and where [traf_set] = “R”
	Bridges	Number	Num	asset_id asset_clas no_str_bri no_str_cul	Count of [asset_id) where [asset_clas] = “bridge major culvert” Or [no_str_bri] + [no_str_cul]
		Length	m	br_len	Sum of [br_len]
		Length timber	m	br_len br_dek_mat	Sum of [br_len] where [br_dek_mat] = “timber”
	Tunnels	Number	Num	asset_id asset_clas	Count of [asset_id] where [asset_clas] = “tunnel”
		Length	m	tun_len	Sum of [tun_len]
		Length lined and serviced	m	tun_len tun_serv	Sum of [tun_len] where [tun_serv] = “S”
	Valuation	Replacement cost	$	value value_type asset_clas	Sum of [value] where [value_type] = “replacement cost” and where [asset_clas] = “pavement + pavement surfacing + bridge major culvert + tunnel”

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
Network use and demand	Traffic volume	Average AADT ALL national classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “NAT” or “NHV”
		Average AADT ALL regional classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “REG”
		Average AADT ALL arterial classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “ART”
		Average AADT ALL primary collector classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “PC”
		Average AADT ALL secondary collector classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “SC”
		Average AADT ALL access classification	Num	aadt_all link_s_len ctype_onrc	Weighted average [aadt_all] by [link_s_len] where [ctype_onrc] = “ACC” or “ALV”
	Percentage HCV	Average AADT HCV national classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “NAT” or “NHV”
		Average AADT HCV regional classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “REG”
		Average AADT HCV arterial classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “ART”
		Average AADT HCV primary collector classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “PC”
		Average AADT HCV secondary collector classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “SC”
		Average AADT HCV access classification	Num	aadt_hcv link_s_len ctype_onrc	Weighted average [aadt_ hcv] by [link_s_len] where [ctype_onrc] = “ACC” or “ALV”
	Traffic growth	Average %Growth ALL national classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “NAT” or “NHV”
		Average %Growth ALL regional classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “REG”
		Average %Growth ALL arterial classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “ART”

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
		Average %Growth ALL primary collector classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “PC”
		Average %Growth ALL secondary collector classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “SC”
		Average %Growth ALL access classification	%	trf_gr_all link_s_len ctype_onrc	Weighted average [trf_gr_all] by [link_s_len] where [ctype_onrc] = “ACC” or “ALV”
	HCV growth	Average %Growth HCV national classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_hcv] by [link_s_len] where [ctype_onrc] = “NAT” or “NHV”
		Average %Growth HCV regional classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_ hcv] by [link_s_len] where [ctype_onrc] = “REG”
		Average %Growth HCV arterial classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_ hcv] by [link_s_len] where [ctype_onrc] = “ART”
		Average %Growth HCV primary collector classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_ hcv] by [link_s_len] where [ctype_onrc] = “PC”
		Average %Growth HCV secondary collector classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_ hcv] by [link_s_len] where [ctype_onrc] = “SC”
		Average %Growth HCV access classification	%	trf_gr_hcv link_s_len ctype_onrc	Weighted average [trf_gr_ hcv] by [link_s_len] where [ctype_onrc] = “ACC” or “ALV”
Condition profile (using visually assessed data)	Sealed roads	Average visual sealed pavement condition national classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “NAT” or “NHV” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual sealed pavement condition regional classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “REG” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual sealed pavement condition arterial classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “ART” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual sealed pavement condition primary collector classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “PC” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
		Average visual sealed pavement condition secondary collector classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “SC” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual sealed pavement condition access classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “S” and [ctype_onrc] = “ACC” or “ALV” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
	Unsealed Roads	Average visual unsealed pavement condition national classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “NAT” or “NHV” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual unsealed pavement condition regional classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “REG” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual unsealed pavement condition arterial classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “ART” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average visual unsealed pavement condition primary collector classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “PC” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Average Visual Unsealed Pavement Condition Secondary Collector Classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “SC” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
		Profile visual unsealed pavement condition access classification	km	link_s_len psurf_stat ctype_onrc cond_vis	Sum of [link_s_len] where [psurf_stat] = “U” and [ctype_onrc] = “ACC” or “ALV” and [cond_vis] = “1” *(repeat for [cond_vis] = 2, 3, 4 and 5)*
	Bridges	Timber bridge condition	m	br_len br_dek_mat br_cond	Sum of [br_len] where [br_dek_mat] = “timber” and [br_cond] = “1” *(repeat for [br_cond] = 2, 3 and 4)*
		Other bridge condition	m	br_len br_dek_mat br_cond	Sum of [br_len] where [br_dek_mat] ≠ “timber” and [br_cond] = “1” *(repeat for [br_cond] = 2, 3 and 4)*

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
	Tunnels	Lined tunnel condition	m	tun_len tun_serv cond_vis	Sum of [tun_len] where [tun_serv] = “S” and [cond_vis] = “1” *(repeat for [br_cond] = 2, 3, 4 and 5)*
		Unlined tunnel condition	m	tun_len tun_serv cond_vis	Sum of [tun_len] where [tun_serv] = “U” and [cond_vis] = “1” *(repeat for [br_cond] = 2, 3, 4 and 5)*
Condition profile (using machine measured data)	Sealed roads (roughness)	Average measured sealed pavement roughness national classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “NAT” or “NHV” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
		Average measured sealed pavement roughness regional classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “REG” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
		Average measured sealed pavement roughness arterial classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “ART” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
		Average measured sealed pavement roughness primary collector classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “PC” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
		Average measured sealed pavement roughness secondary collector classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “SC” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
		Average measured sealed pavement roughness access classification	km	iri_lane ctype_onrc	Sum of [iri_lane] where [ctype_onrc] = “ACC or “ALV” and [iri_lane] “>2.3 and <=3.1” *(repeat for [iri_lane] >3.1 and <=3.8, >3.8 and <=4.6, >4.6 and <=5.3, >5.3)*
	Sealed roads (rutting)	Maximum measured sealed pavement rutting national classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “NAT” or “NHV” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*
		Maximum measured sealed pavement rutting regional classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “REG” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*

Reporting category		Measure item	Unit	PHS data item(s)	Application algorithm for reporting
		Maximum measured sealed pavement rutting arterial classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “ART” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*
		Maximum measured sealed pavement rutting primary collector classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “PC” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*
		Maximum measured sealed pavement rutting secondary collector classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “SC” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*
		Maximum measured sealed pavement rutting access classification	mm	rut_owp rut_iwp ctype_onrc	Max of [rut_owp] or [rut_iwp] where [ctype_onrc] = “ACC” or “ALV” and [rut_xxx] “>10 and <=15” *(repeat for [rut_xxx] >15 and <=20, >20 and <=25, >25 and <=30, >30)*
Financial Perform-ance	All Assets	Average annual renewal expenditure	$	capex_ren	[capex_ren]
		Average annual maintenance expenditure	$	opex_maint	[opex_maint]
		Average annual operations expenditure	$	opex_oper	[opex_oper]

Appendix B Data Items Listing

Code	Name	Function & asset type	Ref
aadt_all	Average annual daily traffic	Utilisation-traffic volumes	8.6.12
aadt_bke	Percentage of AADT classified as motorbike	Utilisation-traffic volumes	8.6.20
aadt_bke_l	Percentage of AADT per lane classified as motorbike	Utilisation-traffic volumes	8.6.21
aadt_bus	Percentage of AADT classified as bus	Utilisation-traffic volumes	8.6.24
aadt_bus_l	Percentage of AADT classified as bus per lane	Utilisation-traffic volumes	8.6.25
aadt_car	Percentage of AADT classified as car	Utilisation-traffic volumes	8.6.22
aadt_car_l	Percentage of AADT per lane classified as car	Utilisation-traffic volumes	8.6.23
aadt_cl	Average annual daily traffic per class	Utilisation-traffic volumes	8.6.28
aadt_cl_l	Average annual daily traffic per class per lane	Utilisation-traffic volumes	8.6.29
aadt_hcv	Percentage of AADT classified as heavy vehicles	Utilisation-traffic volumes	8.6.26
aadt_hcv_l	Percentage of AADT per lane classified as heavy vehicles	Utilisation-traffic volumes	8.6.27
aadt_lane	Average annual daily traffic per lane	Utilisation-traffic volumes	8.6.18
aawt_all	Annual average weekday traffic	Utilisation-traffic volumes	8.6.13
aawt_lane	Annual average weekday traffic per lane	Utilisation-traffic volumes	8.6.19
act1_date	Actual date for performance actual	Performance (asset)-Achievement	8.10.7
added_by	Data editor	Inventory-all – C additional	8.3.0.25
added_date	Data added date	Inventory-all – C additional	8.3.0.26
advert	Advertising on shelter	Inventory-shelters	8.3.22.7
air_pass	Airport access passengers in motion	Classification-economic and social	8.2.6
amen_manuf	Manufacturer	Inventory-amenities	8.3.1.3
amen_mat	Material	Inventory-amenities	8.3.1.2
amen_model	Model number	Inventory-amenities	8.3.1.4
amen_type	Type	Inventory-amenities	8.3.1.1
anchor_typ	Type of anchors	Inventory-slopes	8.3.24.10
art_desc	Description of artwork	Inventory-public art	8.3.18.1
art_en_rep	Engineering report author	Inventory-public art	8.3.18.5
art_mat	Artwork material	Inventory-public art	8.3.18.2
art_type	Type	Inventory-public art	8.3.18.3
artist	Artist name only	Inventory-public art	8.3.18.8
asphalt_pc	Asphalt resurfacing coverage across sealed network	Performance (asset)-output	8.10.23
asset_age	Asset age	Performance (asset)-asset life	8.10.15
asset_type	Asset type	Inventory-All – A General	8.3.0.2
asset_id	Unique asset identifier	Inventory-All – A General	8.3.1
asset_stat	Operation status	Inventory-all – B valuation	8.3.17
atsu_amp	AM peak actual travel speed (urban)	Performance (service)-travel speed	8.12.57
atsu_day	All day actual travel speed (urban)	Performance (service)-travel speed	8.12.60

Code	Name	Function & asset type	Ref
atsu_off	Off peak actual travel speed (urban)	Performance (service)-travel speed	8.12.59
atsu_pmp	PM peak actual travel speed (urban)	Performance (service)-travel speed	8.12.58
Att	Actual travel time	Performance (service)-travel speed	8.12.54
avg_hei	Average height	Inventory-retaining walls	8.3.20.5
Bays	Bay number	Inventory-parking	8.3.12.1
Bcr	Benefit cost ratio	Works and costs-output	8.14.34
beam_mat	Beam material	Inventory-bridge major culvert	8.3.3.4
bin_cap	Capacity	Inventory-bins	8.3.2.1
bin_liner	Liner present	Inventory-bins	8.3.2.4
bin_manuf	Manufacturer	Inventory-bins	8.3.2.5
bin_mat	Material	Inventory-bins	8.3.2.6
bin_model	Model number	Inventory-bins	8.3.2.7
bin_suppl	Supplier	Inventory-bins	8.3.2.8
bin_type	Type	Inventory-bins	8.3.2.2
bin_use	Bin intended use	Inventory-bins	8.3.2.3
br_abu_mat	'Abutment Material'	Inventory-bridge major culvert	8.3.3.27
br_area	Area	Inventory-bridge major culvert	8.3.3.28
br_beam_no	Number of beams	Inventory-bridge major culvert	8.3.3.11
br_cel_mat	Cell material for major culvert	Inventory-bridge major culvert	8.3.3.22
br_cel_typ	Cell type for major culvert	Inventory-bridge major culvert	8.3.17
br_clear	Vertical clearance	Inventory-bridge major culvert	8.3.3.18
br_co_code	Component code	Inventory-bridge major culvert	8.3.3.35
br_co_len	Length	Inventory-bridge major culvert	8.3.3.30
br_co_mat	Component material	Inventory-bridge major culvert	8.3.3.34
br_co_type	Element type	Inventory-bridge major culvert	8.3.3.33
br_col_mat	Column or pile material	Inventory-bridge major culvert	8.3.3.5
br_col_no	Number of columns or piles	Inventory-bridge major culvert	8.3.3.12
br_comps	Number of components	Inventory-bridge major culvert	8.3.3.31
br_cond	Bridge condition state overall	Condition-bridge	8.4.83
br_cond_1	Bridge condition state 1	Condition-bridge	8.4.79
br_cond_2	Bridge conditIon state 2	Condition-bridge	8.4.80
br_cond_3	Bridge condition state 3	Condition-bridge	8.4.81
br_cond_4	Bridge condition state 4	Condition-bridge	8.4.82
br_cond_dt	Bridge survey date-time	Condition-bridge	8.4.84
br_cond_in	Bridge survey operator	Condition-bridge	8.4.85
br_dek_mat	Deck material	Inventory-bridge major culvert	8.3.3.6
br_eq_rate	Earthquake rating	Inventory-bridge major culvert	8.3.3.7
br_fnd_mat	Foundation material	Inventory-bridge major culvert	8.3.3.8
br_fnd_typ	Foundation type	Inventory-bridge major culvert	8.3.3.9
br_func	Function of the feature	Inventory-bridge major culvert	8.3.3.19
br_gate	Entrance gate	Inventory-bridge major culvert	8.3.3.10
br_hei	Height	Inventory-bridge major culvert	8.3.3.29
br_heritag	State or national heritage listing	Inventory-bridge major culvert	8.3.3.25
br_ld_lim	Vehicular load limit	Inventory-bridge major culvert	8.3.3.26
br_len	Length	Inventory-bridge major culvert	8.3.3.23

Code	Name	Function & asset type	Ref
br_pie_mat	Pier material	Inventory-bridge major culvert	8.3.3.14
br_pier_no	Number of piers	Inventory-bridge major culvert	8.3.3.13
br_rai_mat	Safety rail material	Inventory-bridge major culvert	8.3.3.15
br_rail	Safety rails present	Inventory-bridge major culvert	8.3.3.16
br_spans	Number of spans or cells	Inventory-bridge major culvert	8.3.20
br_struc	Feature structure type	Inventory-bridge major culvert	8.3.3.21
br_wid	Width of structure	Inventory-bridge major culvert	8.3.3.24
br_wid_co	Width of component	Inventory-bridge major culvert	8.3.3.32
br_wid_l	Bridge width left of centreline	Inventory-bridge major culvert	8.3.3.1
br_wid_r	Bridge width right of centreline	Inventory-bridge major culvert	8.3.3.2
bridge_pc	Bridges replaced	Performance (asset)-output	8.10.26
bus_route	Is a bus/public transport route	Demand-design	8.5.2
capex_ren	Capital spend – renewals	Performance (financial)-investment	8.11.13
capex_tot	Total capital spend	Performance (financial)-investment	8.11.11
capex_ue	Capital spend – upgrade and expansion	Performance (financial)-investment	8.11.12
cbox_typ	Pedestrian call box type	Inventory-traffic signals	8.3.29.8
cgi_amp	AM peak congestion indicator (urban)	Performance (service)-travel speed	8.12.62
cgi_day	All day congestion indicator (urban)	Performance (service)-travel speed	8.12.65
cgi_off	Off peak congestion indicator (urban)	Performance (service)-travel speed	8.12.64
cgi_pmp	PM peak congestion indicator (urban)	Performance (service)-travel speed	8.12.63

Code	Name	Function & asset type	Ref
chip_large	Largest chip	Inventory-Pavement Surfacing	8.3.15.10
chip_small	Smallest chip size	Inventory-pavement surfacing	8.3.15.9
clim_tmi	Thornthwaite Moisture Index	Condition-climate	8.4.11
coat_sys	Coating system	Inventory-road barriers	8.3.21.15
comments	Comments	Inventory-all – C additional	8.3.0.23
cond_crack	Visual cracking area	Condition-visually assessed condition	8.4.9
cond_date	Subjective condition survey date-time	Condition-subjective condition	8.4.2
cond_ed	Visual edge drop off	Condition-visually assessed condition	8.4.8
cond_name	Subjective condition survey operator	Condition-subjective condition	8.4.3
cond_patch	Visual patching	Condition-visually assessed condition	8.4.7
cond_rav	Visual ravelling	Condition-visually assessed condition	8.4.6
cond_rut	Visual measured rutting	Condition-visually assessed condition	8.4.10
cond_strip	Visual stripping	Condition-visually assessed condition	8.4.5
cond_subj	Subjective condition	Condition-subjective condition	8.4.1
cond_vis	Visual assessed condition	Condition-visually assessed condition	8.4.4
const_co	Construction organisation name	Inventory-all – A general	8.3.0.11
const_cost	Construction cost	Inventory-all – B valuation	8.3.16
const_date	Construction date	Inventory-all – B valuation	8.3.15

Code	Name	Function & asset type	Ref
cont_id	Contractor or supplier's unique asset ID	Inventory-all – A general	8.3.0.3
cost_unit	Unit cost	Inventory-all – B valuation	8.3.0.21
cr_all_ex	All cracking extent	Condition-pavement – cracking	8.4.12
cr_all_sv	All cracking severity	Condition-pavement – cracking	8.4.13
cr_croc_ex	Crocodile/block cracking extent	Condition-pavement – cracking	8.4.19
cr_croc_sv	Crocodile/ block cracking severity	Condition-pavement – cracking	8.4.18
cr_date	Cracking survey date-time	Condition-pavement – cracking	8.4.20
cr_long_ex	Longitudinal cracking extent	Condition-pavement – cracking	8.4.14
cr_long_sv	Longitudinal cracking severity	Condition-pavement – cracking	8.4.15
cr_name	Cracking survey operator	Condition-pavement – cracking	8.4.21
cr_tran_ex	Transverse cracking severity	Condition-pavement – cracking	8.4.17
cr_tran_sv	Transverse cracking extent	Condition-pavement – cracking	8.4.16
crash _p	Total crash count (population)	Performance (service)-road safety	8.12.37
crash _t	Total crash count (vehicle-kilometres travelled)	Performance (service)-road safety	8.12.38
crash_cnt	Crash count	Performance (service)-road safety	8.12.35
crash_date	Crash date	Performance (service)-road safety	8.12.31
crash_loc	Crash location	Performance (service)-road safety	8.12.32
crash_r_us	Road user involved	Performance (service)-road safety	8.12.33
crash_sev	Crash severity	Performance (service)-road safety	8.12.34
crash_yrs	Crash count number of years of data	Performance (service)-road safety	8.12.36

Code	Name	Function & asset type	Ref
crit_comp	Critical rating	Criticality-output	8.7.1
crit_conn	Criticality	Classification-economic and social	8.2.3
cross_dep	Vehicle crossing depth	Inventory-vehicle crossings	8.3.32.3
cross_mat	Crossing material	Inventory-pathways	8.3.13.14
cross_mat	Vehicle crossing material	Inventory-vehicle crossings	8.3.32.1
cross_reo	Vehicle crossing reinforcing mesh present	Inventory-vehicle crossings	8.3.32.4
cross_typ	Vehicle crossing type	Inventory-vehicle crossings	8.3.32.2
cross_type	Crossing type	Inventory-pathways	8.3.13.15
cross_wdth	Crossing width	Inventory-pathways	8.3.13.16
cross_wid	Vehicle crossing width excluding splays	Inventory-vehicle crossings	8.3.32.5
crs_b_dep	Vehicle crossing basecourse depth	Inventory-vehicle crossings	8.3.32.6
crs_b_typ	Vehicle crossing base course type	Inventory-vehicle crossings	8.3.32.7
crs_s_dep	Vehicle crossing subbase course depth	Inventory-vehicle crossings	8.3.32.8
crs_s_typ	Vehicle crossing subbase course type	Inventory-vehicle crossings	8.3.32.9
ctype_onrc	Functional classification – One Road Classification System	Classification-functional classification	8.2.1
cul_config	Pipe configuration	Inventory-culverts minor (pipes)	8.3.4.12
cul_dia	Internal pipe diameter or width	Inventory-culverts minor (pipes)	8.3.4.6
cul_dia_2	2nd pipe diameter	Inventory-culverts minor (pipes)	8.3.4.16
cul_dn_inv	Downstream invert level	Inventory-culverts minor (pipes)	8.3.4.17

Code	Name	Function & asset type	Ref
cul_dn_x	Downstream X coordinate	Inventory-culverts minor (pipes)	8.3.4.2
cul_dn_y	Downstream Y coordinate	Inventory-culverts minor (pipes)	8.3.4.3
cul_hei	Non-circular pipe height	Inventory-culverts minor (pipes)	8.3.4.7
cul_in_mat	Relined or renewed material	Inventory-culverts minor (pipes)	8.3.4.18
cul_in_met	Relining or renewal method	Inventory-culverts minor (pipes)	8.3.4.19
cul_in_out	Structure location	Inventory-culverts minor (pipes)	8.3.4.13
cul_len	Pipe section length	Inventory-culverts minor (pipes)	8.3.4.8
cul_mat	Pipe material	Inventory-culverts minor (pipes)	8.3.4.9
cul_pit_dn	Downstream pit number	Inventory-culverts minor (pipes)	8.3.4.1
cul_pit_no	Unique number derived from pit numbers	Inventory-culverts minor (pipes)	8.3.4.10
cul_shape	Pipe shape	Inventory-culverts cinor (pipes)	8.3.4.14
cul_type	Pipe type	Inventory-culverts minor (pipes)	8.3.4.11
cul_up_inv	Upstream end-of-pipe invert level	Inventory-culverts minor (pipes)	8.3.4.20
cul_up_pit	Upstream pit number	Inventory-culverts minor (pipes)	8.3.4.15
cul_up_x	Upstream X coordinate	Inventory-culverts minor (pipes)	8.3.4.4
cul_up_y	Upstream Y coordinate	Inventory-culverts minor (pipes)	8.3.4.5
Currency	Financial currency	Inventory-all – B valuation	8.3.18
cycl_hr_xx	Number of bicycles per hour	Utilisation-bicycles	8.6.1
cycl_mth	Trips per month	Utilisation-bicycles	8.6.2
cycl_user	User classification	Utilisation-bicycles	8.6.3
dat_confid	Data confidence	Data control-data control	7.2.4
dat_date	Data date	Data control-data control	7.2.1
dat_edit	Data edit date	Data control-data control	7.2.6
dat_editor	Data editor	Data control-data control	7.2.5
dat_owner	Data owner	Data control-data control	7.2.2
dat_source	Data source	Data control-data control	7.2.3
dat_source	Data source	Inventory-all – A general	8.3.0.5
defct_ligt	Reported number of service issues for lighting	Performance (service)-customer safety (condition)	8.12.19
defct_num	Reported number of defects	Performance (service)-customer safety (condition)	8.12.15
defct_path	Reported number of defects on pathways	Performance (service)-customer safety (condition)	8.12.16
defct_rail	Reported number of service issues for traffic restraining devices	Performance (service)-customer safety (condition)	8.12.18
defct_surf	Reported number of defects on pavement surface	Performance (service)-customer safety (condition)	8.12.17
design_co	Design company name	Inventory-all – A general	8.3.0.12
design_esa	Design ESA	Inventory-pavement all	8.3.14.10
donated_by	Donated by	Inventory-public art	8.3.18.9
dr_liner	Type of drainage liner	Inventory-slopes	8.3.24.11
drainage	Drainage mechanism	Inventory-retaining walls	8.3.20.6
drc	Current replacement cost	Works and costs-output	8.14.35
drn_dep	Table drain depth	Inventory-table drains	8.3.26.2
drn_len	Table drain length	Inventory-table drains	8.3.26.1
drn_mat	Table drain material	Inventory-table drains	8.3.26.3
drn_resp	Authority responsible for maintenance	Inventory-table drains	8.3.26.6

Code	Name	Function & asset type	Ref
drn_shape	Table drain shape	Inventory-table drains	8.3.26.4
drn_wid	Table drain width	Inventory-table drains	8.3.26.5
elec_cert	Electrical certification	Inventory-public art	8.3.18.10
eq_rating	Earthquake rating	Inventory-tunnels	8.3.31.5
Esa	Equivalent standard axle	Demand-design	8.5.1
ESA_km	Equivalent standard axles kilometres	Demand-road use	8.5.6
fen_func	Function	Inventory-fences	8.3.5.3
fen_hei	Height	Inventory-fences	8.3.5.4
fen_joint	Joint ownership	Inventory-fences	8.3.5.7
fen_len	Length	Inventory-fences	8.3.5.5
fen_manuf	Manufacturers name	Inventory-fences	8.3.5.8
fen_mat	Material	Inventory-fences	8.3.5.6
fen_prot	Drop protection	Inventory-fences	8.3.5.1
fen_typ	Type	Inventory-fences	8.3.5.2
fin_arfr	Asset renewal funding ratio	Performance (financial)-financial	8.11.9
fin_asr	Asset sustainability ratio	Performance (financial)-financial	8.11.10
fin_nflr	Net financial liabilities ratio	Performance (financial)-financial	8.11.8
fin_osr	Operating surplus ratio	Performance (financial)-financial	8.11.7
found_mat	Bank foundation material	Inventory-slopes	8.3.24.12
found_mat	Foundation material	Inventory-structures	8.3.25.6
found_typ	Foundation type	Inventory-retaining walls	8.3.20.9
fr_sig_val	Freight value in motion	Classification-economic and social	8.2.4
fr_sig_wgt	Freight weight in motion	Classification-economic and social	8.2.5
fwp_cest	Forward works treatment estimated cost	Works and costs-FWP	8.14.8
fwp_cost_a	Forward work treatment actual completed cost	Works and costs-output	8.14.31
fwp_end	Forward works program treatment location end	Works and costs-FWP	8.14.5
fwp_end_yr	Planned forward treatment end year	Works and costs-FWP	8.14.9
fwp_param	Forward work program intervention parameter	Works and costs-FWP	8.14.6
fwp_reason	Forward works program treatment reason	Works and costs-FWP	8.14.2
fwp_start	Forward works program treatment location start	Works and costs-FWP	8.14.4
fwp_thresh	Forward work program intervention threshold	Works and costs-FWP	8.14.7
fwp_treat	Forward works program category	Works and costs-FWP	8.14.1
fwp_yr_s	Planned forward work treatment start year	Works and costs-FWP	8.14.3
geotextile	Geotextile fabric used	Inventory-slopes	8.3.24.13
GVM_km	Gross vehicle mass kilometres	Demand-road use	8.5.5
hazards	Reported number of hazards	Performance (service)-customer safety (condition)	8.12.14
Hospitals	Hospital access road	Classification-economic and social	8.2.8
hr_vol	Number of vehicles per hour	Utilisation-traffic volumes	8.6.17
inc_r_time	Time to respond to incident	Performance (service)-unplanned incidents	8.12.70
int_type	Intersection control type	Utilisation-capacity	8.6.4

Code	Name	Function & asset type	Ref
iri_date	Roughness survey date-time	Condition-pavement – roughness	8.4.36
iri_iwp	Inner wheel path roughness	Condition-pavement – roughness	8.4.34
iri_lane	Lane roughness quarter car	Condition-pavement – roughness	8.4.33
iri_name	Roughness survey operator	Condition-pavement – roughness	8.4.37
iri_owp	Outer wheel path roughness	Condition-pavement – roughness	8.4.35
its_abobel	Above or below surface level	Inventory-ITS assets	8.3.6.3
its_access	Access requirements	Inventory-ITS assets	8.3.6.4
its_l_clen	Conduit material	Inventory-ITS line	8.3.6.11
its_l_cnid	Controller ID	Inventory-ITS line	8.3.6.8
its_l_coid	Contractors unique ID	Inventory-ITS line	8.3.6.7
its_l_dl	Design life	Inventory-ITS line	8.3.6.13
its_l_ints	Installer	Inventory-ITS line	8.3.6.16
its_l_len	Conduit length	Inventory-ITS line	8.3.6.9
its_l_liae	Defects liability end date	Inventory-ITS line	8.3.6.12
its_l_lias	Defect liability start date	Inventory-ITS line	8.3.6.15
its_l_manu	Manufacturer	Inventory-ITS line	8.3.6.17
its_l_mreq	Maintenance requirements	Inventory-ITS line	8.3.6.14
its_l_suid	Contractor suppliers unique ID	Inventory-ITS line	8.3.6.6
its_l_supp	Supplier	Inventory-ITS line	8.3.6.18
its_l_type	Housing type	Inventory-ITS line	8.3.6.10
its_l_wend	Warranty end date	Inventory-ITS line	8.3.6.19
its_p_cnid	Controller ID	Inventory-ITS point	8.3.6.20
its_p_comm	Communication method	Inventory-ITS point	8.3.6.25
its_p_des	Design life in years	Inventory-ITS point	8.3.6.28
its_p_htyp	Housing type	Inventory-ITS point	8.3.6.26
its_p_ints	Installer	Inventory-ITS point	8.3.6.32
its_p_ipad	IP address	Inventory-ITS point	8.3.6.33
its_p_liae	Defects liability end date	Inventory-ITS point	8.3.6.29
its_p_lias	Start date of defects liability period	Inventory-ITS point	8.3.6.31
its_p_log	Data logger present	Inventory-ITS point	8.3.6.22
its_p_manu	Manufacturer	Inventory-ITS point	8.3.6.34
its_p_mod	Model number	Inventory-ITS point	8.3.6.35
its_p_moun	Mounting type	Inventory-ITS point	8.3.6.36
its_p_mreq	Maintenance requirements	Inventory-ITS point	8.3.6.30
its_p_pass	Pin number or password	Inventory-ITS point	8.3.6.37
its_p_rad	Connected radar unit	Inventory-ITS point	8.3.6.23
its_p_seri	Serial number	Inventory-ITS point	8.3.6.38
its_p_supp	Supplier	Inventory-ITS point	8.3.6.39
its_p_type	Control system type	Inventory-ITS point	8.3.6.21
its_p_uniq	Unique ID of the asset	Inventory-ITS point	8.3.6.24
its_p_ups	UPS is connected	Inventory-ITS point	8.3.6.27
its_p_ware	Warranty end date	Inventory-ITS point	8.3.6.40
its_pl_com	Communication method	Inventory-ITS polygon	8.3.6.41
its_pl_cs	Control system type	Inventory-ITS polygon	8.3.6.42
its_pl_ups	UPS is connected	Inventory-ITS polygon	8.3.6.43
its_power	Power source	Inventory-ITS assets	8.3.6.5
its_site	Site name	Inventory-ITS assets	8.3.6.1
its_type	Type	Inventory-ITS assets	8.3.6.2
kc_cond	Kerb and channel visual condition	Condition-kerb and channel	8.4.86
kc_date	Kerb and channel survey date-time	Condition-kerb and channel	8.4.87
kc_len	Length	Inventory-kerb and channel	8.3.7.4
kc_mat	Material	Inventory-kerb and channel	8.3.7.1

Code	Name	Function & asset type	Ref
kc_name	Visually measure condition survey operator	Condition-kerb and channel	8.4.88
kc_resp	Responsible authority	Inventory-kerb and channel	8.3.7.5
kc_typ	Type	Inventory-kerb and channel	8.3.7.2
kc_wid	Width	Inventory-kerb and channel	8.3.7.3
kerb_typ	Traffic management device kerb type	Inventory-traffic management devices polygon	8.3.28.9
l_brk_ang	Bracket angle	Inventory-lighting	8.3.9.12
l_brk_hei	Bracket height	Inventory-lighting	8.3.9.1
l_brk_len	Bracket length	Inventory-lighting	8.3.9.2
l_brk_mat	Bracket material	Inventory-lighting	8.3.9.13
l_brk_mnt	Bracket mounting type	Inventory-lighting	8.3.9.14
l_brk_orie	Bracket orientation	Inventory-lighting	8.3.9.15
l_brk_typ	Bracket type	Inventory-lighting	8.3.9.16
l_cap	Luminaire capacity	Inventory-lighting	8.3.9.4
l_col	Light colour	Inventory-lighting	8.3.9.18
l_conn	Bulk circuit connection	Inventory-lighting	8.3.9.17
l_conn_typ	Connection type	Inventory-lighting	8.3.9.3
l_des_std	Lighting design standard	Inventory-lighting	8.3.9.24
l_icp_no	Control point number	Inventory-lighting	8.3.9.11
l_led_manu	LED chip manufacturer	Inventory-lighting	8.3.9.19
l_lum_num	Number of luminaires	Inventory-lighting	8.3.9.6
l_manu_imp	Manufacturer importer name	Inventory-lighting	8.3.9.21
l_manuf	Luminaire manufacturer	Inventory-lighting	8.3.9.20
l_model	Luminaire model type	Inventory-lighting	8.3.9.5
l_power_co	Power supply company	Inventory-lighting	8.3.9.22
l_shd_typ	Light shade type	Inventory-lighting	8.3.9.23
l_smart_gd	Connected to smart grid	Inventory-lighting	8.3.9.8
l_tilt_ang	Upcast angle	Inventory-lighting	8.3.9.25
l_typ	Lighting type	Inventory-lighting	8.3.9.9
l_wattage	Luminaires wattage	Inventory-lighting	8.3.9.10
land_dep	Depth	Inventory-landscaping	8.3.8.1
land_mat	Material	Inventory-landscaping	8.3.8.2
land_typ	Type of landscaping	Inventory-landscaping	8.3.8.3
lanekm_len	Lane kilometre length	Network-road	8.1.15
life_ach	Life achieved	Performance (asset)-asset life	8.10.14
life_cons	Design life at construction	Inventory-all – A general	8.3.0.14
life_des	Design life	Performance (asset)-asset life	8.10.8
life_e	Out of service date	Performance (asset)-asset life	8.10.12
life_e_r	End of life reason	Performance (asset)-asset life	8.10.13
life_rem_a	Remaining life assessed	Performance (asset)-asset life	8.10.16
life_rem_c	Remaining life calculated	Performance (asset)-asset life	8.10.17
life_rem_m	Remaining life calculation method	Performance (asset)-asset life	8.10.18
life_use_a	Useful life assessed	Performance (asset)-asset life	8.10.9
life_use_c	Useful life calculated	Performance (asset)-asset life	8.10.10
life_use_m	Useful life calculation method	Performance (asset)-asset life	8.10.11
lin_app_r	Application rate	Inventory-linemarking all	8.3.10.6
lin_aud	Audible	Inventory-linemarking all	8.3.10.1
lin_colour	Colour	Inventory-linemarking all	8.3.10.2
lin_manuf	Manufacturer	Inventory-linemarking all	8.3.10.7
lin_paint	Paint brand	Inventory-linemarking all	8.3.10.8
lin_refl	Reflect	Inventory-linemarking all	8.3.10.3

Code	Name	Function & asset type	Ref
lin_spcng	Spacing	Inventory-linemarking all	8.3.10.4
lin_thick	Thickness	Inventory-linemarking lines and polygons	8.3.10.9
lin_typ	Type	Inventory-linemarking all	8.3.10.5
line_p_thi	Thickness	Inventory-linemarking point	8.3.10.11
linem_wid	Width	Inventory-linemarking lines and polygons	8.3.10.10
link_id	Link ID	Network-link	8.1.9
link_len	Link length	Network-link	8.1.11
link_s_e	Link section end displacement	Network-link section	8.1.21
link_s_id	Link section ID	Network-link section	8.1.19
link_s_len	Link section length	Network-link section	8.1.22
link_s_s	Link section start displacement	Network-link section	8.1.20
link_s_uni	Link section uniform width	Network-link section	8.1.24
link_s_wid	Link section average width	Network-link section	8.1.23
link_tflow	Link traffic flow	Network-link	8.1.10
links_div	Separate link sections for traffic flow direction	Network-link section	8.1.31
links_lanl	Number of lanes left of centreline	Network-link section	8.1.27
links_lanr	Number of lanes right of centreline	Network-link section	8.1.28
links_lwl	Average lane width left of centreline	Network-link section	8.1.29
links_lwr	Average lane width right of centreline	Network-link section	8.1.30
loc_desr	Location description	Location referencing-point	7.1.1.1
loc_desr	Location description	Location referencing-polyline	7.1.2.01
loc_desr	Location description	Location referencing-polygon	7.1.3.01
loc_dis_e	End lateral offset	Location referencing-polyline	7.1.2.07
loc_dis_s	Start lateral offset	Location referencing-polyline	7.1.2.06
loc_dist	Location distance	Location referencing-point	7.1.1.2
loc_e	End location	Location referencing-polyline	7.1.2.03
loc_e_si	side of road end	Location referencing-polyline	7.1.2.05
loc_l_e	End location left	Location referencing-polygon	7.1.3.04
loc_l_e_of	End lateral offset left	Location referencing-polygon	7.1.3.08
loc_l_s	Start location left	Location referencing-polygon	7.1.3.02
loc_l_s_of	Start lateral offset left	Location referencing-polygon	7.1.3.06
loc_offset	Offset	Location referencing-point	7.1.1.4
loc_proj	Projection	Location referencing-point	7.1.1.5
loc_proj	Projection	Location referencing-polyline	7.1.2.1
loc_proj	Projection	Location referencing-polygon	7.1.3.1
loc_r_e	End location right	Location referencing-polygon	7.1.3.05
loc_r_e_of	End lateral offset right	Location referencing-polygon	7.1.3.09
loc_r_s	Start location right	Location referencing-polygon	7.1.3.03
loc_r_s_of	Start lateral offset right	Location referencing-polygon	7.1.3.07
loc_s	Start location	Location referencing-polyline	7.1.2.02
loc_s_si	Side of road start	Location referencing-polyline	7.1.2.04
loc_side	Side	Location referencing-point	7.1.1.3
loc_vert	Vertical datum	Location referencing-point	7.1.1.6

Code	Name	Function & asset type	Ref
loc_vert	Vertical datum	Location referencing-polyline	7.1.2.11
loc_vert	Vertical datum	Location referencing-polygon	7.1.3.11
loc_wid_e	End width	Location referencing-polyline	7.1.2.09
loc_wid_s	Start width	Location referencing-polyline	7.1.2.08
loc_x	X coordinate	Location referencing-point	7.1.1.7
loc_x_e	X coordinate end	Location referencing-polyline	7.1.2.14
loc_x_e_l	X coordinate end left	Location referencing-polygon	7.1.3.16
loc_x_e_r	X coordinate end right	Location referencing-polygon	7.1.3.18
loc_x_s	X coordinate start	Location referencing-polyline	7.1.2.12
loc_x_s_l	X coordinate start left	Location referencing-polygon	7.1.3.12
loc_x_s_r	X coordinate start right	Location referencing-polygon	7.1.3.14
loc_y	Y coordinate	Location referencing-point	7.1.1.8
loc_y_e	Y coordinate end	Location referencing-polyline	7.1.2.15
loc_y_e_l	Y coordinate end left	Location referencing-polygon	7.1.3.17
loc_y_e_r	Y coordinate end right	Location referencing-polygon	7.1.3.19
loc_y_s	Y coordinate start	Location referencing-polyline	7.1.2.13
loc_y_s_l	Y coordinate start left	Location referencing-polygon	7.1.3.13
loc_y_s_r	Y coordinate start right	Location referencing-polygon	7.1.3.15
loc_z	Z coordinate	Location referencing-point	7.1.1.9
loc_z_e	Z coordinate end	Location referencing-polyline	7.1.2.17
loc_z_e_l	Z coordinate end left	Location referencing-polygon	7.1.3.22
loc_z_e_r	Z coordinate end right	Location referencing-polygon	7.1.3.23
loc_z_s	Z coordinate start	Location referencing-polyline	7.1.2.16
loc_z_s_l	Z coordinate start left	Location referencing-polygon	7.1.3.2
loc_z_s_r	Z coordinate start right	Location referencing-polygon	7.1.3.21
maint_con	Maintenance contract reference	Network-link section	8.1.38
maintained	Maintained by organisation	Inventory-retaining walls	8.3.20.14
Maintainer	Maintainer organisation	Network-link section	8.1.37
maj_cul_pc	Major culverts replaced	Performance (asset)-output	8.10.27
mat_s_name	Material source name	Inventory-pavement all	8.3.14.7
mat_source	Material source	Inventory-pavement all	8.3.14.6
me_ab_surf	Absolute surface height	Inventory-mechanical and electrical assets	8.3.11.2
me_access	Access requirements	Inventory-mechanical and electrical assets	8.3.11.9
me_commtyp	Communicatio n method	Inventory-mechanical and electrical point	8.3.11.15
me_con_mat	Material	Inventory-mechanical and electrical line	8.3.11.14
me_cont_id	Controller ID	Inventory-mechanical and electrical point	8.3.11.16
me_cs_typ	Control system type	Inventory-mechanical and electrical point	8.3.11.17
me_dat_log	Data logger present	Inventory-mechanical and electrical point	8.3.11.18
me_des_lif	Design life	Inventory-mechanical and electrical assets	8.3.11.5

Code	Name	Function & asset type	Ref
me_dia	Diameter	Inventory-mechanical and electrical line	8.3.11.12
me_dl_star	Defects liability start date	Inventory-mechanical and electrical assets	8.3.11.8
me_housing	Housing type	Inventory-mechanical and electrical point	8.3.11.19
me_install	Installer	Inventory-mechanical and electrical assets	8.3.11.10
me_liab_e	Defects liability end date	Inventory-mechanical and electrical assets	8.3.11.6
me_lin_len	Length	Inventory-mechanical and electrical line	8.3.11.13
me_maintre	Maintenance requirements	Inventory-mechanical and electrical assets	8.3.11.7
me_manu	Manufacturer	Inventory-mechanical and electrical assets	8.3.11.11
me_mod_no	Model number	Inventory-mechanical and electrical point	8.3.11.22
me_mount	Mounting type	Inventory-mechanical and electrical point	8.3.11.23
me_power	Power source	Inventory-mechanical and electrical point	8.3.11.24
me_purch	Purchase date	Inventory-mechanical and electrical point	8.3.11.21
me_seri_no	Serial number	Inventory-mechanical and electrical point	8.3.11.25
me_site	Site name	Inventory-mechanical and electrical assets	8.3.11.1
me_sub_typ	Asset sub type	Inventory-mechanical and electrical assets	8.3.11.3
me_supp	Supplier	Inventory-mechanical and electrical point	8.3.11.26
me_typ	Type	Inventory-mechanical and electrical assets	8.3.11.4
me_ups	UPS is connected	Inventory-mechanical and electrical point	8.3.11.20
me_warrend	Warranty end date	Inventory-mechanical and electrical point	8.3.11.27
meter	Metered parking	Inventory-parking	8.3.12.2
mt_act	Work activity	Works and costs-maintenance	8.14.29
mt_act_grp	Activity group	Works and costs-maintenance	8.14.28
mt_action	Action completed	Works and costs-maintenance	8.14.25
mt_compl	Date and time of completion	Works and costs-maintenance	8.14.26
mt_cost	Maintenance paid amount	Works and costs-maintenance	8.14.16
mt_crate	Work schedule rate	Works and costs-maintenance	8.14.15
mt_cyc	Maintenance cycle	Works and costs-maintenance	8.14.30
mt_date_a	Date approved for payment	Works and costs-maintenance	8.14.17
mt_date_cr	Date and time of creation	Works and costs-maintenance	8.14.22
mt_def	Defect description	Works and costs-maintenance	8.14.11
mt_def_id	Maintenance defect ID	Works and costs-maintenance	8.14.10
mt_dlp_e	Defect liability end date	Works and costs-maintenance	8.14.19
mt_dlp_s	Defect liability start date	Works and costs-maintenance	8.14.18
mt_id	Source identification	Works and costs-maintenance	8.14.20

Code	Name	Function & asset type	Ref
mt_int_par	Intervention parameter	Works and costs-maintenance	8.14.23
mt_int_thr	Intervention threshold	Works and costs-maintenance	8.14.24
mt_loc	Location reference type	Works and costs-maintenance	8.14.27
mt_quan	Work quantity	Works and costs-maintenance	8.14.14
mt_ref	Source identification reference	Works and costs-maintenance	8.14.21
mt_status	Status of work	Works and costs-maintenance	8.14.12
mt_unit	Unit for payment	Works and costs-maintenance	8.14.13
mtt	Mean travel time	Performance (service)-travel speed	8.12.55
network_na	Network name	Network-network	8.1.1
no_str_bri	Number of bridge structures	Network-road	8.1.17
no_str_cul	Number of major culvert structures	Network-road	8.1.18
no_str_tot	Number of major structures	Network-road	8.1.16
node_id	Node ID	Network-node	8.1.2
node_x_e	X coordinate end node	Network-node	8.1.6
node_x_s	X coordinate start node	Network-node	8.1.3
node_y_e	Y coordinate end node	Network-node	8.1.7
node_y_s	Y coordinate start node	Network-node	8.1.4
node_z_e	Z coordinate end node	Network-node	8.1.8
node_z_s	Z coordinate start node	Network-node	8.1.5
ntsu	Nominal travel speed (urban)	Performance (service)-travel speed	8.12.61
ntt	Nominal travel time	Performance (service)-travel speed	8.12.53
operator	Operator organisation	Network-link section	8.1.36
opex_dep	Depreciation expense	Performance (financial)-investment	8.11.17
opex_maint	Recurrent spend – maintenance	Performance (financial)-investment	8.11.15
opex_oper	Recurrent Spend – Operations	Performance (financial)-investment	8.11.16
opex_tot	Total Recurrent Spend	Performance (financial)-investment	8.11.14
owner	Owner of the asset	Inventory-all – A general	8.3.0.4
owner	Ownership organisation	Network-link section	8.1.35
p_axle_max	Load Limit	Inventory-pavement all	8.3.14.11
p_df_act	Actual applied load	Condition-pavement – deflection	8.4.28
p_df_d0	Pavement deflection d0	Condition-pavement – deflection	8.4.23
p_df_d1500	Pavement deflection d1500	Condition-pavement – deflection	8.4.27
p_df_d200	Pavement deflection d200	Condition-pavement – deflection	8.4.24
p_df_d300	Pavement deflection d300	Condition-pavement – deflection	8.4.25
p_df_d900	Pavement deflection d900	Condition-pavement – deflection	8.4.26
p_df_date	Deflection survey date-time	Condition-pavement – deflection	8.4.31
p_df_name	Deflection survey operator	Condition-pavement – deflection	8.4.32
p_df_veh	Deflection testing vehicle	Condition-pavement – deflection	8.4.22
p_lay_cbr	Layer CBR	Inventory-pavement	8.3.14.19
p_lay_dep	Layer depth	Inventory-pavement	8.3.14.12
p_lay_mat	Layer material	Inventory-pavement	8.3.14.13
p_lay_no	Layer number	Inventory-pavement	8.3.14.14
p_lay_stab	Layer Stabilising agent	Inventory-pavement	8.3.14.15
p_lay_typ	Layer type	Inventory-pavement	8.3.14.17
p_lay_ucs	layer UCS	Inventory-pavement	8.3.14.20
p_lay_wid	Layer width	Inventory-pavement	8.3.14.18
p_recy_mat	Recylced material	Inventory-pavement all	8.3.14.9

Code	Name	Function & asset type	Ref
p_recy_per	Recycled percentage	Inventory-pavement all	8.3.14.8
p_stab_pct	Stabilising agent percent	Inventory-pavement	8.3.14.16
p_wid_l	Lateral width left	Inventory-pavement all	8.3.14.1
p_wid_r	Lateral width right	Inventory-pavement all	8.3.14.2
paint_colo	Paint colour	Inventory-road barriers	8.3.21.17
park_type	Type	Inventory-parking	8.3.12.4
path_b_dep	Base depth	Inventory-pathways	8.3.13.2
path_b_typ	Base type	Inventory-pathways	8.3.13.3
path_c_dep	Depth crossing	Inventory-pathways	8.3.13.4
path_cond	Pathway visual condition	Condition-pathway/ footpaths	8.4.89
path_date	Pathways survey date-time	Condition-pathway/ footpaths	8.4.90
path_dep	Depth pathway	Inventory-pathways	8.3.13.5
path_instr	Instruction	Inventory-pathways	8.3.13.21
path_len	Length pathway	Inventory-pathways	8.3.13.17
path_mat	Material pathway	Inventory-pathways	8.3.13.18
path_name	Pathways survey operator	Condition-pathway/ footpaths	8.4.91
path_name	Local name	Inventory-pathways	8.3.13.1
path_obst	Obstruction type	Inventory-pathways	8.3.13.12
path_r_mat	Rail material	Inventory-pathways	8.3.13.13
path_r_typ	Rail type	Inventory-pathways	8.3.13.7
path_reo	Pathway is reinforced	Inventory-pathways	8.3.13.8
path_s_dep	Sub base depth	Inventory-pathways	8.3.13.9
path_s_typ	Sub base type	Inventory-pathways	8.3.13.10
path_steps	Number of steps	Inventory-pathways	8.3.13.6
path_treat	Treatment	Inventory-pathways	8.3.13.20
path_typ	Pathway type	Inventory-pathways	8.3.13.19
path_wid	Width	Inventory-pathways	8.3.13.11
pav_tiles	Number of paving tiles	Inventory-tactile paving	8.3.27.2

Code	Name	Function & asset type	Ref
pav_typ	Tactile paving type	Inventory-tactile paving	8.3.27.1
pave_const	Type of pavement construction	Network-link section	8.1.34
PCU_km	Passenger Car Unit equivalent kilometres	Demand-road use	8.5.7
peak_hr_v	Number of vehicles during peak hour	Utilisation-traffic volumes	8.6.16
ped_hr	Number of pedestrians per hour	Utilisation-pedestrians	8.6.10
ped_km	Passenger km travelled on public transport	Utilisation-pedestrians	8.6.11
perf_a_da	Actual date for performance actual	Performance (service)-achievement	8.12.7
perf_act	Performance actual	Performance (service)-achievement	8.12.6
perf_cat	Performance category	Performance (service)-achievement	8.12.1
perf_ta_ac	Performance measure target_achievable	Performance (service)-achievement	8.12.2
perf_ta_da	Target date for Performance measure target_achievable	Performance (service)-achievement	8.12.3
perf_tx	Performance measure target_aspirational	Performance (service)-achievement	8.12.4
perf_tx_da	Target date for Performance measure target_aspirational	Performance (service)-achievement	8.12.5
perfa_ach	Performance measure target_achievable	Performance (asset)-achievement	8.10.2
perfa_act	Performance actual	Performance (asset)-achievement	8.10.6
perfa_asp	Performance measure target_aspirational	Performance (asset)-achievement	8.10.4

Code	Name	Function & asset type	Ref
perfa_cat	Performance category	Performance (asset)-achievement	8.10.1
permit_no	Permit number	Inventory-all – A general	8.3.0.7
Permits	Permit availability	Inventory-parking	8.3.12.5
photo_ref	Photo reference	Inventory-all – C additional	8.3.0.24
pit_dep	Depth	Inventory-pits	8.3.16.9
pit_dia	Diameter width	Inventory-pits	8.3.16.3
pit_fence	Fence present	Inventory-pits	8.3.16.10
pit_len	Length	Inventory-pits	8.3.16.4
pit_level	Finished surface level	Inventory-pits	8.3.16.11
pit_li_typ	Lid type	Inventory-pits	8.3.16.5
pit_no	Pit number	Inventory-pits	8.3.16.6
pit_st_typ	Construction type	Inventory-pits	8.3.16.13
pit_steps	Number of step irons	Inventory-pits	8.3.16.12
pit_trap	Litter trap type	Inventory-pits	8.3.16.8
pit_typ	Type	Inventory-pits	8.3.16.7
pit_x	X coordinate	Inventory-pits	8.3.16.1
pit_y	Y coordinate	Inventory-pits	8.3.16.2
plan_no	As constructed plan number	Inventory-all – A general	8.3.0.8
plaque_des	Plaque description	Inventory-public art	8.3.18.4
plaque_yr	Plate or plaque year	Inventory-tunnels	8.3.31.24
pofoun_mat	Foundation material	Inventory-poles	8.3.17.5
pole_attac	Pole attachments present	Inventory-poles	8.3.17.9
pole_cntrl	Pole controller	Inventory-poles	8.3.17.7
pole_earth	Pole earth method	Inventory-poles	8.3.17.4
pole_finsh	Pole finish	Inventory-poles	8.3.17.8
pole_found	Foundation type	Inventory-poles	8.3.17.6
pole_hei	Pole height	Inventory-poles	8.3.17.1
pole_manuf	Pole manufacturer	Inventory-poles	8.3.17.10
pole_mat	Pole material	Inventory-poles	8.3.17.2
pole_model	Pole model number	Inventory-poles	8.3.17.11
pole_stand	Design standard	Inventory-poles	8.3.17.12
pole_typ	Pole type	Inventory-poles	8.3.17.3
pop	Estimated population served by road	Classification-economic and social	8.2.2
pop_catch	Population	Demand-population	8.5.3
Prm	Percent routine maintenance	Works and costs-output	8.14.33
psurf_stat	Road surface status	Inventory-pavement surfacing all	8.3.15.5
Psv	Polished stone value of chip for the seal layer	Inventory-pavement surfacing	8.3.15.15
pt_reliab	Public transport reliability	Performance (service)-public transport	8.12.29
Purpose	Purpose	Inventory-parking	8.3.12.3
rb_attach	Attachments on the barrier	Inventory-road barriers	8.3.21.7
rb_end_typ	Barrier end style	Inventory-road barriers	8.3.21.10
rb_grn_fix	Ground fixed method	Inventory-road barriers	8.3.21.11
rb_hei	Height of barrier	Inventory-road barriers	8.3.21.5
rb_len	Length of barrier	Inventory-road barriers	8.3.21.2
rb_mod_no	Model number	Inventory-road barriers	8.3.21.16
rb_offset	Lateral offset face	Inventory-road barriers	8.3.21.1
rb_pos_mat	Material barrier posts	Inventory-road barriers	8.3.21.6
rb_posts	Barrier number of posts	Inventory-road barriers	8.3.21.12
rb_rai_mat	Material barrier rail	Inventory-road barriers	8.3.21.3
rb_styl_e	Barrier end style	Inventory-road barriers	8.3.21.9
rb_styl_s	Barrier start style	Inventory-road barriers	8.3.21.13
rb_typ	Road barrier type	Inventory-road barriers	8.3.21.4
rb_typ_s	Barrier start type	Inventory-road barriers	8.3.21.14
rb_wid	Rail width	Inventory-road barriers	8.3.21.8
rce_1to2	Return on construction expenditure BCR 1-2	Performance (financial)-development program/ project assessment	8.11.2

Code	Name	Function & asset type	Ref
rce_2to3	Return on construction expenditure BCR 2-3	Performance (financial)-development program/ project assessment	8.11.3
rce_3to4	Return on construction expenditure BCR 3-4	Performance (financial)-development program/ project assessment	8.11.4
rce_4to5	Return on construction expenditure BCR 4-5	Performance (financial)-development program/ project assessment	8.11.5
rce_great5	Return on construction expenditure BCR >5	Performance (financial)-development program/ project assessment	8.11.6
rce_less1	Return on construction expenditure BCR <1	Performance (financial)-development program/ project assessment	8.11.1
rehab_pc	Pavement rehabilitation network coverage	Performance (asset)-output	8.10.24
res_wid_l	Reserve width left from centreline	Network-link section	8.1.25
res_wid_r	Reserve width right from centreline	Network-link section	8.1.26
resil_ava	Access state	Resilience-output	8.9.3
resil_dam	Damage state	Resilience-output	8.9.2
resil_out	Duration	Resilience-output	8.9.4
resil_sc	Event scenario that route/road section resilience is being considered for	Resilience-output	8.9.1
restr_app	User group restriction applies to	Access-identification	8.13.4
restr_cse	Restriction reason	Access-identification	8.13.3
restr_day	Restriction day	Access-time period	8.13.13
restr_e	Restriction end date	Access-time period	8.13.12
restr_id	Restriction ID	Access-identification	8.13.1
restr_ownr	Restriction owner	Access-identification	8.13.8
restr_peri	Restriction period	Access-time period	8.13.10
restr_resp	Organisation responsible	Access-identification	8.13.7
restr_s	Restriction start date	Access-time period	8.13.11
restr_stat	Restriction status	Access-time period	8.13.9
restr_t_e	Restriction end time	Access-time period	8.13.15
restr_t_s	Restriction start time	Access-time period	8.13.14
restr_type	Restriction type	Access-identification	8.13.2
restr_unit	Restriction unit	Access-identification	8.13.5
restr_val	Restriction value	Access-identification	8.13.6
risk_asses	Who undertook the Safety or Risk Assessment	Inventory-public art	8.3.18.6
risk_co	Consequence rating overall	Risk-consequence	8.8.1
risk_co_en	Consequence rating environmental	Risk-consequence	8.8.5
risk_co_fi	Consequence rating financial	Risk-consequence	8.8.4
risk_co_go	Consequence rating governance	Risk-consequence	8.8.6
risk_co_hs	Consequence rating health and safety	Risk-consequence	8.8.2
risk_co_se	Consequence rating socio cultural	Risk-consequence	8.8.3
risk_date	Risk date	Risk-general	8.8.8
risk_id	Risk ID	Risk-general	8.8.7
risk_le	Likelihood rating overall	Risk-Llkelihood	8.8.9
risk_mo_dt	Schedule monitoring plan review date	Risk-monitoring	8.8.10
risk_mo_id	Montioring plan identifier	Risk-monitoring	8.8.11
risk_rate	Risk rating overall	Risk-output	8.8.12
Rme	Routine maintenance efficiency	Works and costs-output	8.14.32
road_from	Chainage at start of street segment	Inventory-pavement all	8.3.14.3

Code	Name	Function & asset type	Ref
road_id	Road ID	Network-road	8.1.12
road_len	Road length	Network-road	8.1.14
road_name	Road name	Network-road	8.1.13
road_to	Chainage at end of street segment	Inventory-pavement all	8.3.14.4
rut_date	Rutting survey date-time	Condition-pavement – rutting	8.4.61
rut_iwp	Rut depth inner	Condition-pavement – rutting	8.4.39
rut_iwp_10	Rut depth inner wheel path > 5 mm – < 10 mm	Condition-pavement – rutting	8.4.42
rut_iwp_15	Rut depth inner wheel path > 10 mm – < 15 mm	Condition-pavement – rutting	8.4.43
rut_iwp_20	Rut depth inner wheel path > 15 – < 20 mm	Condition-pavement – rutting	8.4.44
rut_iwp_25	Rut depth inner wheel path > 20 – < 25 mm	Condition-pavement – rutting	8.4.45
rut_iwp_30	Rut depth inner wheel path > 25 – < 30 mm	Condition-pavement – rutting	8.4.46
rut_iwp_35	Rut depth inner wheel path > 30 – < 35 mm	Condition-pavement – rutting	8.4.47
rut_iwp_40	Rut depth inner wheel path > 35- < 40 mm	Condition-pavement – rutting	8.4.48
rut_iwp_5	Rut depth inner wheel path 0- < 5 mm	Condition-pavement – rutting	8.4.41
rut_iwp_sd	Rut depth standard deviation inner	Condition-pavement – rutting	8.4.40
rut_iwp_X0	Rut depth inner wheel path > 40 mm	Condition-pavement – rutting	8.4.49
rut_lane	Rut depth lane	Condition-pavement – rutting	8.4.38
rut_name	Rutting survey operator	Condition-pavement – rutting	8.4.62
rut_owp	Rut depth outer	Condition-pavement – rutting	8.4.50
rut_owp_10	Rut depth outer wheel path > 5 mm- < 10 mm	Condition-pavement – rutting	8.4.53
rut_owp_15	Rut depth outer wheel path > 10 mm- < 15 mm	Condition-pavement – rutting	8.4.54
rut_owp_20	Rut depth outer wheel path > 15- < 20 mm	Condition-pavement – rutting	8.4.55
rut_owp_25	Rut depth outer wheel path > 20- < 25 mm	Condition-pavement – rutting	8.4.56
rut_owp_30	Rut depth outer wheel path > 25- < 30 mm	Condition-pavement – rutting	8.4.57
rut_owp_35	Rut depth outer wheel path > 30- < 35 mm	Condition-pavement – rutting	8.4.58
rut_owp_40	Rut depth outer wheel path > 35- < 40 mm	Condition-pavement – rutting	8.4.59
rut_owp_5	Rut depth outer wheel path 0- < 5 mm	Condition-pavement – rutting	8.4.52
rut_owp_sd	Rut depth standard deviation inner	Condition-pavement – rutting	8.4.51
rut_owp_X0	Rut depth outer wheel path > 40 mm	Condition-pavement – rutting	8.4.60
rw_above	Features above the wall	Inventory-retaining walls	8.3.20.15
rw_below	Features below the wall	Inventory-retaining walls	8.3.20.17
rw_fac_are	Face area of wall	Inventory-retaining walls	8.3.20.7
rw_fac_mat	Face material	Inventory-retaining walls	8.3.20.8
rw_fac_thi	Face thickness	Inventory-retaining walls	8.3.20.18
rw_len	Length of retaining wall	Inventory-retaining walls	8.3.20.2
rw_max_hei	Maximum height	Inventory-retaining walls	8.3.20.11
rw_offset	Lateral offset face	Inventory-retaining walls	8.3.20.1
rw_pos_mat	Wall post material	Inventory-retaining walls	8.3.20.10
rw_restrai	Restraining mechanism of the asset	Inventory-retaining walls	8.3.20.3

Code	Name	Function & asset type	Ref
rw_tie_row	Number of anchorage rows	Inventory-retaining walls	8.3.20.12
rw_tie_sys	Anchoring system	Inventory-retaining walls	8.3.20.13
rw_tilt	Back tilt angle	Inventory-retaining walls	8.3.20.16
s_add_quan	Additive quantity	Inventory-pavement surfacing	8.3.15.16
s_add_typ	Type of additive	Inventory-pavement surfacing	8.3.15.17
s_add_typ	Adhesion agent	Inventory-pavement surfacing	8.3.15.19
s_adh_quan	Adhesion agent quantity	Inventory-pavement surfacing	8.3.15.18
s_ald	Average least dimension	Inventory-pavement surfacing	8.3.15.20
s_bind_rat	Binder application rate	Inventory-pavement surfacing	8.3.15.21
s_bind_sp	Binder softening point	Inventory-pavement surfacing	8.3.15.31
s_bind_typ	Binder type	Inventory-pavement surfacing	8.3.15.22
s_cut	Cutter quantity	Inventory-pavement surfacing	8.3.15.23
s_cut_typ	Cutter type	Inventory-pavement surfacing	8.3.15.24
s_dep	Depth of the seal	Inventory-pavement surfacing	8.3.15.11
s_elas_rec	Elastic recovery	Inventory-pavement surfacing	8.3.15.25
s_flux	Quantity of flux	Inventory-pavement surfacing	8.3.15.26
s_func	Seal layer function	Inventory-pavement surfacing	8.3.15.12
s_lay_no	The surface layer number	Inventory-pavement surfacing	8.3.15.14
s_life_des	Design life	Inventory-pavement durfacing sll	8.3.15.7
s_mat	Surfacing material type	Inventory-pavement surfacing	8.3.13
s_ply_typ	Polymer type	Inventory-pavement durfacing	8.3.15.28
s_poly	Polymer percentage	Inventory-pavement surfacing	8.3.15.27
s_recy	Recycled component	Inventory-pavement surfacing	8.3.15.30
s_recy_mat	Percentage of recycle material	Inventory-pavement surfacing	8.3.15.29
s_source	Quarry source	Inventory-pavement surfacing	8.3.15.32
s_wid_l	Lateral width left	Inventory-pavement surfacing all	8.3.15.1
s_wid_r	Lateral width right	Inventory-pavement surfacing all	8.3.15.2
saferisk_c	Collective road safety risk	Performance (service)-road safety	8.12.51
saferisk_p	Personal road safety risk	Performance (service)-road safety	8.12.52
Scc	Number of serious casualty crashes	Performance (service)-road safety	8.12.39
scc_p	Serious casualty crashes (population)	Performance (service)-road safety	8.12.40
scc_t	Serious casualty crashes (vehicle-kilometres travelled)	Performance (service)-road safety	8.12.41
sci_path	Pathways meeting the level of service standard	Performance (service)-customer safety (condition)	8.12.20
sci_pave	Pavement surfacing meeting the level of service standard	Performance (service)-customer safety (condition)	8.12.21
sdtt	Standard deviation of travel times	Performance (service)-travel speed	8.12.56
seal_len	Length of seal	Inventory-pavement surfacing all	8.3.15.3
seal_spec	Seal specification	Inventory-pavement surfacing all	8.3.15.8
seal_wid	Width of seal	Inventory-pavement surfacing all	8.3.4.01

Code	Name	Function & asset type	Ref
seal_year	Year of current surface installation	Inventory-pavement surfacing all	8.3.15.6
seat_mat	Seating material	Inventory-shelters	8.3.22.6
seg_cl_len	Centreline segment length	Inventory-pavement all	8.3.14.5
sf	Number of road fatalities	Performance (service)-road safety	8.12.42
sf_p	Road fatalities (population)	Performance (service)-road safety	8.12.43
sf_t	Road fatalities (vehicle-kilometres travelled)	Performance (service)-road safety	8.12.44
sfc_date	SCRIM survey time-date	Condition-pavement surface – skid	8.4.66
sfc_iwp	SCRIM inner wheel path	Condition-pavement surface – skid	8.4.64
sfc_owp	SCRIM outer wheel path	Condition-pavement surface – skid	8.4.65
sfc_speed	SCRIM speed	Condition-pavement surface – skid	8.4.63
sfc_veh	SCRIM vehicle	Condition-pavement surface – skid	8.4.67
sh_dis_acc	Disabled access available	Inventory-shelters	8.3.22.2
sh_flr_mat	Floor material	Inventory-shelters	8.3.22.3
sh_manuf	Shelter manufacturer	Inventory-shelters	8.3.22.8
sh_model	Model number of shelter	Inventory-shelters	8.3.22.9
sh_roo_mat	Roof material	Inventory-shelters	8.3.22.4
sh_typ	Shelter type	Inventory-shelters	8.3.22.1
sh_wal_mat	Wall material	Inventory-shelters	8.3.22.5
sign_angle	Sign angle	Inventory-signs	8.3.23.16
sign_b_mat	Background material	Inventory-signs	8.3.23.11
sign_bcol	Background colour	Inventory-signs	8.3.23.10
sign_frame	Frame material	Inventory-signs	8.3.23.7
sign_elev	Ground height	Inventory-signs	8.3.23.2
sign_hei	Sign height	Inventory-signs	8.3.23.3
sign_manuf	Sign manufacturer	Inventory-signs	8.3.23.15
sign_mat	Panel material	Inventory-signs	8.3.23.17
sign_p_mat	Post material	Inventory-signs	8.3.23.5
sign_panel	Number of sign panels	Inventory-signs	8.3.23.8
sign_posts	Number of posts	Inventory-signs	8.3.23.4
sign_refno	Local sign reference number	Inventory-signs	8.3.23.19
sign_refsd	Australian Standard reference	Inventory-signs	8.3.23.18
sign_stren	Strengthening bar present	Inventory-signs	8.3.23.9
sign_supp	Support type	Inventory-signs	8.3.23.20
sign_typ	Sign type	Inventory-signs	8.3.23.1
sign_wid	Width of sign	Inventory-signs	8.3.23.6
sign_wordc	Legend colour	Inventory-signs	8.3.23.13
sign_wordm	Legend material	Inventory-signs	8.3.23.14
sign_words	Wording on sign	Inventory-signs	8.3.23.12
signal_hei	Ground height to bottom of signal	Inventory-traffic signals	8.3.29.6
sk_res_20	Skid resistance 20 m	Condition-pavement surface – skid	8.4.69
sk_res_50	Skid resistance 50 m	Condition-pavement surface – skid	8.4.70
skid_test	Skid Resistance Test	Condition-pavement surface – skid	8.4.68
slope_area	Area of slope face	Inventory-slopes	8.3.24.1
slope_drn	Active or passive drainage	Inventory-slopes	8.3.24.8
slope_grad	Gradient of batter slope	Inventory-slopes	8.3.24.3
slope_hei	Average height	Inventory-slopes	8.3.24.5
slope_len	Slope length	Inventory-slopes	8.3.24.4
slope_mon	Geotechnical monitoring equipment	Inventory-slopes	8.3.24.14
slope_plan	Planting exists	Inventory-slopes	8.3.24.6
slope_rein	Slope is reinforced	Inventory-slopes	8.3.24.7

Code	Name	Function & asset type	Ref
slope_seis	Slope seismic rating	Inventory-slopes	8.3.24.15
slope_typ	Slope in cut or fill	Inventory-slopes	8.3.24.2
smart_pad	Signal connected to a smart pad	Inventory-traffic signals	8.3.29.32
speed_85	85% speed	Utilisation-capacity	8.6.5
sph	Number of persons hospitalised	Performance (service)-road safety	8.12.45
sph_p	Persons hospitalised (population)	Performance (service)-road safety	8.12.46
sph_t	Persons hospitalised (vehicle-kilometres travelled)	Performance (service)-road safety	8.12.47
sreq_compl	Service request response time compliance	Performance (service)-customer safety (condition)	8.12.23
sreq_time	Achieved service request response time	Performance (service)-customer safety (condition)	8.12.22
ssc	Social cost of serious casualty crash	Performance (service)-road safety	8.12.48
ssc_p	Social cost of serious casualty Crashes (Population)	Performance (service)-road safety	8.12.49
ssc_t	Social cost of serious casualty crashes (vehicle-kilometres travelled)	Performance (service)-road safety	8.12.50
sseal_pc	Spray seal resurfacing coverage across sealed network	Performance (asset)-output	8.10.22
stage_no	Subdivision stage or project number	Inventory-all – A general	8.3.0.13
Standpipe	Standpipe installed	Inventory-slopes	8.3.24.16
ste_a_420	Smooth travel exposure all (4.2 IRI)	Performance (service)-customer experience	8.12.10
ste_a_533	Smooth travel exposure all (5.33 IRI)	Performance (service)-customer experience	8.12.13
ste_r_420	Smooth travel exposure rural (4.2 IRI)	Performance (service)-customer experience	8.12.9
ste_r_533	Smooth travel exposure rural (5.33 IRI)	Performance (service)-customer experience	8.12.12
ste_u_420	Smooth travel exposure urban (4.2 IRI)	Performance (service)-customer experience	8.12.8
ste_u_533	Smooth travel exposure urban (5.33 IRI)	Performance (service)-customer experience	8.12.11
struc_att	Structure attachments	Inventory-structures	8.3.25.9
struc_fin	Structure surface finish	Inventory-structures	8.3.25.5
struc_ftyp	Structure foundation type	Inventory-structures	8.3.25.7
struc_hei	Structure height	Inventory-structures	8.3.25.1
struc_manu	Structure manufacturer	Inventory-structures	8.3.25.10
struc_mat	Structure material	Inventory-structures	8.3.25.2
struc_typ	Structure type	Inventory-retaining walls	8.3.20.4
struc_typ	Structure type	Inventory-structures	8.3.25.3
struc_wid	Structure width	Inventory-structures	8.3.25.4
struct_pc	Major structures replaced	Performance (asset)-output	8.10.25
struct_sup	Structure number of supports	Inventory-structures	8.3.25.8
surf_pc	Resurfacing coverage across total network	Performance (asset)-output	8.10.19
surf_s_pc	Resurfacing coverage across sealed network	Performance (asset)-output	8.10.21
surf_us_pc	Resheeting coverage across unsealed network	Performance (asset)-output	8.10.20

Code	Name	Function & asset type	Ref
tach1_date	Target date for performance measure target_achievable	Performance (asset)-achievement	8.10.3
tasp1_date	Target date for performance measure target_aspirational	Performance (asset)-achievement	8.10.5
tboard_len	Target board length	Inventory-traffic signals	8.3.29.15
tboard_mat	Target board material	Inventory-traffic signals	8.3.29.16
tboard_wid	Target board width	Inventory-traffic signals	8.3.29.17
temp_air	Ambient air temperature	Condition-pavement – deflection	8.4.29
temp_pave	Pavement temperature	Condition-pavement – deflection	8.4.30
tm_in_mat	Traffic management device infill material	Inventory-traffic management devices polygon	8.3.28.8
tm_is_dia	Diameter of roundabout	Inventory-traffic management devices polygon	8.3.28.7
tm_manuf	Company name only	Inventory-traffic management devices point	8.3.28.3
tm_mat	Traffic management point material	Inventory-traffic management devices point	8.3.28.1
tm_mat	Traffic management device material	Inventory-traffic management devices polygon	8.3.28.5
tm_model	Model number	Inventory-traffic management devices point	8.3.28.4
tm_p_typ	Traffic management point type	Inventory-traffic management devices point	8.3.28.2
tm_typ	Traffic management device type	Inventory-traffic management devices polygon	8.3.28.6

Code	Name	Function & asset type	Ref
Tourism	Tourist route	Classification-economic and social	8.2.7
traf_cl_sy	Traffic classification used	Utilisation-traffic volumes	8.6.14
traf_class	Traffic classification system class number	Utilisation-traffic volumes	8.6.15
traf_dir	Traffic flow direction	Network-link section	8.1.32
traf_set	Traffic setting	Network-link section	8.1.33
treat_e_a	Actual work treatment end date	Works and costs-output	8.14.37
treat_s_a	Actual work treatment start date	Works and costs-output	8.14.36
tree_age	Tree age	Inventory-trees	8.3.30.6
tree_commo	Common name	Inventory-trees	8.3.30.11
tree_dia	Diameter of trunk	Inventory-trees	8.3.30.1
tree_genus	Genus	Inventory-trees	8.3.30.3
tree_guard	Tree guards present	Inventory-trees	8.3.30.4
tree_hei	Height at capture	Inventory-trees	8.3.30.2
tree_maint	Maintenance requirements	Inventory-trees	8.3.30.8
tree_metho	Tree planting method	Inventory-trees	8.3.30.12
tree_prune	Pruning time interval	Inventory-trees	8.3.30.10
tree_roots	Tree environment for roots	Inventory-trees	8.3.30.13
tree_sig	Tree significance	Inventory-trees	8.3.30.9
tree_speci	Tree species	Inventory-trees	8.3.30.14
tree_stat	Tree endemic status	Inventory-trees	8.3.30.7
tree_stock	Stock type	Inventory-trees	8.3.30.5
tree_supp	Support type for tree	Inventory-trees	8.3.30.15
tree_wires	Overhead wires present	Inventory-trees	8.3.30.16
trf_gr_all	Annual growth (%/year) of all vehicle classes	Demand-traffic growth	8.5.8
trf_gr_bus	Annual growth (%/year) of all buses	Demand-traffic growth	8.5.10

Code	Name	Function & asset type	Ref
trf_gr_cyc	Annual growth (%/year) of cycles	Demand-traffic growth	8.5.12
trf_gr_hcv	Annual growth (%/year) of all heavy vehicles	Demand-traffic growth	8.5.11
trf_gr_lcv	Annual growth (%/year) of all light vehicles	Demand-traffic growth	8.5.9
ts_access	Access to asset	Inventory-traffic signals	8.3.29.24
ts_attach	Attachments type present on the poles	Inventory-traffic signals	8.3.29.25
ts_callbox	Pedestrian call box present	Inventory-traffic signals	8.3.29.13
ts_cbmodel	Call box model number	Inventory-traffic signals	8.3.29.27
ts_cont_id	Controller ID	Inventory-traffic signals	8.3.29.4
ts_cost	Traffic signal purchase cost	Inventory-traffic signals	8.3.29.22
ts_cs_typ	Control system type	Inventory-traffic signals	8.3.29.5
ts_dat_log	Data logger present	Inventory-traffic signals	8.3.29.9
ts_dl_sta	Defects liability start date	Inventory-traffic signals	8.3.29.19
ts_dlp_end	Defects liability end date	Inventory-traffic signals	8.3.29.18
ts_eth_typ	Earthing type for signal pole	Inventory-traffic signals	8.3.29.10
ts_lum_man	Luminaire manufacturer	Inventory-traffic signals	8.3.29.28
ts_lum_siz	Luminaire size	Inventory-traffic signals	8.3.29.11
ts_lum_typ	Luminaire type	Inventory-traffic signals	8.3.29.12
ts_mainreq	Maintenance requirements	Inventory-traffic signals	8.3.29.20
ts_maintco	Signal maintenance company	Inventory-traffic signals	8.3.29.21
ts_make	Manufacturer of call box	Inventory-traffic signals	8.3.29.26
ts_maunf	Manufacturer of the signal	Inventory-traffic signals	8.3.29.29
ts_mnt_typ	Mounting type	Inventory-traffic signals	8.3.29.31
ts_model	Model number	Inventory-traffic signals	8.3.29.30
ts_pole_id	Signal pole number	Inventory-traffic signals	8.3.29.1
ts_purchda	Purchase date	Inventory-traffic signals	8.3.29.23
ts_radar	Radar unit is connected	Inventory-traffic signals	8.3.29.14
ts_sig_typ	Signal type	Inventory-traffic signals	8.3.29.7
ts_site	Site name for the signals	Inventory-traffic signals	8.3.29.2
ts_supp	Signal supplier	Inventory-traffic signals	8.3.29.33
ts_unqi_id	Signal unique asset ID	Inventory-traffic signals	8.3.29.3
ts_war_end	Warranty end date	Inventory-traffic signals	8.3.29.36
ttime_rel	Public transport travel time reliability	Performance (service)-public transport	8.12.30
tun_ba_col	Barrel surface treatment colour	Inventory-tunnels	8.3.31.26
tun_ba_dat	Barrel installation date	Inventory-tunnels	8.3.31.23
tun_ba_hei	Barrel height	Inventory-tunnels	8.3.31.10
tun_ba_mat	Barrel material	Inventory-tunnels	8.3.31.11
tun_ba_sur	Barrel surface treatment installation date	Inventory-tunnels	8.3.31.25
tun_ba_thi	Barrel thickness	Inventory-tunnels	8.3.31.13
tun_ba_typ	Barrel surface treatment type	Inventory-tunnels	8.3.31.12
tun_ba_wid	Barrel width	Inventory-tunnels	8.3.31.14
tun_bu_hei	Buttress height	Inventory-tunnels	8.3.31.15
tun_bu_mat	Buttress material	Inventory-tunnels	8.3.31.16
tun_bu_num	Number of buttresses	Inventory-tunnels	8.3.31.19
tun_ca_mat	Capping beam material	Inventory-tunnels	8.3.31.17
tun_clear	Tunnel clearance	Inventory-tunnels	8.3.31.7
tun_e_exit	Number of emergency exits	Inventory-tunnels	8.3.31.18
tun_func	Tunnel function	Inventory-tunnels	8.3.31.8
tun_len	Tunnel length	Inventory-tunnels	8.3.31.3
tun_mx_hei	Maximum trafficable height	Inventory-tunnels	8.3.31.6
tun_po_hei	Portal height	Inventory-tunnels	8.3.31.20
tun_po_mat	Portal material	Inventory-tunnels	8.3.31.21
tun_po_wid	Portal width	Inventory-tunnels	8.3.31.22

Code	Name	Function & asset type	Ref
tun_serv	Tunnel services	Inventory-tunnels	8.3.31.4
tun_st_typ	Tunnel structure type	Inventory-tunnels	8.3.31.9
tun_wid_l	Left tunnel width	Inventory-tunnels	8.3.31.1
tun_wid_r	Right tunnel width	Inventory-tunnels	8.3.31.2
turn_count	Turn movement counts	Utilisation-capacity	8.6.6
tx_date	Texture survey date-time	Condition-pavement surface – texture	8.4.77
tx_MPD_bwp	MPD pavement texture between wheel path	Condition-pavement surface – texture	8.4.76
tx_MPD_iwp	MPD pavement texture inner wheel path	Condition-pavement surface – texture	8.4.74
tx_MPD_owp	MPD pavement texture outer wheel path	Condition-pavement surface – texture	8.4.75
tx_name	Texture survey operator	Condition-pavement surface – texture	8.4.78
tx_SMT_bwp	SMTD pavement texture between wheel path	Condition-pavement surface – texture	8.4.73
tx_SMT_iwp	SMTD pavement texture inner wheel path	Condition-pavement surface – texture	8.4.71
tx_SMT_owp	SMTD pavement texture outer wheel path	Condition-pavement surface – texture	8.4.72
us_date	Unsealed survey date-time	Condition-unsealed roads	8.4.95
us_drain	Unsealed drainage condition	Condition-unsealed roads	8.4.93
us_gv_dep	Gravel depth	Condition-unsealed roads	8.4.94
us_name	Unsealed survey operator	Condition-unsealed roads	8.4.96
us_profile	Unsealed road profile	Condition-unsealed roads	8.4.92

Code	Name	Function & asset type	Ref
Usi	User satisfaction index	Performance (service)-user satisfaction	8.12.71
util_cur	Current utilisation	Utilisation-output	8.6.8
util_fut	Future utilisation	Utilisation-output	8.6.9
util_mod	Model name/ version	Utilisation-output	8.6.7
Value	Assessed cost in Australian/ New Zealand Dollars	Inventory-all – B valuation	8.3.0.20
value_type	Valuation type	Inventory-all – B valuation	8.3.0.19
value_year	Valuation year	Inventory-all – B valuation	8.3.0.22
veg_typ	Vegetation type planted	Inventory-slopes	8.3.24.9
veh_hr_ln	Number of vehicles per lane per hour	Utilisation-traffic volumes	8.6.31
veh_p_h_ln	Number of vehicles during peak hour per lane	Utilisation-traffic volumes	8.6.30
vest_date	Vesting date	Inventory-all – C additional	8.3.0.27
vest_org	Vesting source	Inventory-all – C additional	8.3.0.28
video_det	Video detection present	Inventory-traffic signals	8.3.29.34
visor_type	Visor type	Inventory-traffic signals	8.3.29.35
vkt	Vehicle kilometers travelled	Demand-road use	8.5.4
vtt_amp	AM peak variability of travel time (urban)	Performance (service)-travel speed	8.12.66
vtt_day	All day variability of travel time (urban)	Performance (service)-travel speed	8.12.69
vtt_off	Off peak variability of travel time (urban)	Performance (service)-travel speed	8.12.68
vtt_pmp	PM peak variability of travel time (urban)	Performance (service)-travel speed	8.12.67
wc_baby	Number of baby change fixtures	Inventory-public toilets	8.3.19.9
wc_bench	Number of benches	Inventory-public toilets	8.3.19.8

Code	Name	Function & asset type	Ref
wc_change	Changing facilities present	Inventory-public toilets	8.3.19.1
wc_fem	Number of female WC fixtures	Inventory-public toilets	8.3.19.11
wc_fem_dis	Number of female disabled WC fixtures	Inventory-public toilets	8.3.19.10
wc_fem_shw	Number of female showers	Inventory-public toilets	8.3.19.3
wc_flo_mat	Floor material	Inventory-public toilets	8.3.19.2
wc_mal_dis	Number of male disabled WC fixtures	Inventory-public toilets	8.3.19.14
wc_mal_fix	Number of male WC fixtures	Inventory-public toilets	8.3.19.16
wc_mal_shw	Number of male showers	Inventory-public toilets	8.3.19.4
wc_mal_uri	Number of male urinal fixtures	Inventory-public toilets	8.3.19.15
wc_par_mat	Toilet partition material	Inventory-public toilets	8.3.19.19
wc_roo_mat	Roof material	Inventory-public toilets	8.3.19.6
wc_sharps	Sharp disposal present	Inventory-public toilets	8.3.19.17
wc_uni	Number of unisex WC fixtures	Inventory-public toilets	8.3.19.12
wc_uni_dis	Number unisex disabled WC fixtures	Inventory-public toilets	8.3.19.13
wc_uni_shw	Number of unisex showers	Inventory-public toilets	8.3.19.5
wc_wal_mat	Toilet wall material	Inventory-public toilets	8.3.19.7
wc_waste	Waste water disposal	Inventory-public toilets	8.3.19.18
work_atsu	Actual travel speed at planned work sites	Performance (service)-journey interruptions	8.12.27
work_close	Work sites meeting planned closure times	Performance (service)-journey interruptions	8.12.25
work_delay	Actual delay at planned work sites	Performance (service)-journey interruptions	8.12.28
work_dur	Duration of interruption due to planned works	Performance (service)-journey interruptions	8.12.24
works_id	Project or contract Id that created the asset	Inventory-all – A general	8.3.0.6
works_name	Subdivision or project name	Inventory-all – A general	8.3.0.9
works_type	Work type that created the asset	Inventory-all – A general	8.3.0.10
wsites_len	Proportion of planned work sites	Performance (service)-journey interruptions	8.12.26
ww_name	Waterway name	Inventory-bridge major culvert	8.3.3.3

Appendix C Activities Listing

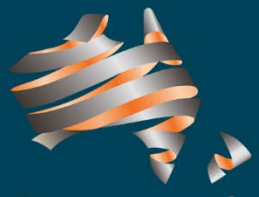
Activity group	Activity	Network location ref/ connectivity	Related function group							
			Inventory incl. asset loc. ref.	Condition	Classification	Access	Asset performance	Service performance	Demand	Works and costs
Network definition	Road network configuration	Y			Y	Y				
	Road classification (function based)	Y			Y	Y			Y	
	Road classification (form based)	Y	Y		Y	Y				
	Bridge classification	Y	Y		Y	Y				
	Road function assessment	Y			Y	Y			Y	
Information management	Asset inventory register – add	Y	Y		Y	Y				
	Asset inventory register – maintain	Y	Y	Y	Y	Y				Y
	Asset inventory register – delete	Y	Y	Y	Y	Y				Y
	Asset inventory register – merge	Y	Y	Y		Y				Y
	Asset inventory register – critical assets		Y		Y	Y	Y			
	Asset condition assessments – general	Y	Y	Y		Y	Y			
	Asset condition assessments – bridge		Y	Y	Y	Y	Y			
	Asset condition assessments – culvert		Y	Y			Y			
	Pavement condition – visual		Y	Y						
	Pavement condition – high speed	Y		Y		Y				
	Litigation defence	Y	Y	Y	Y	Y	Y			Y
	Traffic counting	Y			Y	Y				
	Weigh station data recording and monitoring	Y	Y		Y	Y				
	Over height monitoring	Y	Y							

Activity group	Activity	Network location ref/ connectivity	Related function group							
			Inventory incl. asset loc. ref.	Condition	Classification	Access	Asset performance	Service performance	Demand	Works and costs
Corridor management	Levels of service achievement (technical)	Y	Y	Y					Y	
	Levels of service achievement (customer)	Y	Y		Y	Y		Y	Y	
	Road capacity analysis	Y	Y		Y				Y	
	Restricted access vehicle – overweight	Y	Y	Y	Y	Y	Y			
	Restricted access vehicle – over dimension	Y	Y		Y	Y		Y		
	Restricted access vehicle – hazardous goods	Y				Y		Y		
	Restricted access vehicle – high perform motor vehicles	Y				Y		Y		
	Traffic network modelling	Y	Y		Y	Y			Y	
	Traffic planning	Y	Y		Y				Y	
	Traffic congestion analysis	Y	Y		Y	Y			Y	
	Traffic movement efficiency analysis	Y	Y		Y	Y	Y		Y	Y
	Traffic impact assessments	Y	Y		Y	Y			Y	
	Traffic management coordination	Y	Y		Y			Y	Y	Y
	Travel time reliability assessment	Y	Y		Y	Y	Y	Y	Y	Y
	Freight/bus route planning	Y	Y		Y	Y		Y		
	Multi-modal transport accessibility and planning	Y	Y		Y	Y		Y	Y	
	Heavy vehicle permit approvals	Y	Y	Y	Y		Y			Y
	Public transport performance analysis	Y	Y		Y			Y		
	Public transport service coverage planning	Y	Y		Y			Y		
	Real time journey planning	Y	Y		Y			Y	Y	Y
	Traffic predictions				Y	Y		Y	Y	
	Journey impact analysis	Y	Y		Y			Y	Y	Y
	Intersection analysis	Y	Y		Y			Y	Y	
	Amenity values assessment	Y	Y					Y		
	Noise control and monitoring	Y	Y	Y	Y		Y	Y		Y
	Service requests	Y						Y		Y

Activity group	Activity	Network location ref/ connectivity	Related function group							
			Inventory incl. asset loc. ref.	Condition	Classification	Access	Asset performance	Service performance	Demand	Works and costs
Maintenance management	Defect recording	Y		Y	Y					
	Defect repair	Y			Y					Y
	Defect analysis and reporting	Y		Y	Y				Y	Y
	Erosion and sediment control plans	Y	Y	Y	Y		Y			
	Dust control and monitoring	Y	Y	Y	Y		Y	Y	Y	
	Repair cost recovery	Y	Y		Y	Y				Y
	(Resource) consent compliance					Y				
Road safety management	Safety measure achievement (technical)	Y	Y		Y		Y			
	Safety measure achievement (customer)	Y	Y		Y			Y		
	Road safety index	Y			Y		Y	Y	Y	
	Road hazard register	Y	Y		Y		Y	Y		
	Crash investigations	Y	Y	Y	Y		Y			Y
Asset financial management	Asset valuation		Y	Y	Y	Y	Y		Y	Y
	Benefit cost analysis		Y	Y	Y	Y	Y		Y	Y
	Maintenance efficiency analysis	Y	Y		Y				Y	Y
	Triple bottom line analysis		Y	Y	Y	Y	Y	Y	Y	Y
	Efficiency index analysis	Y	Y		Y	Y	Y	Y	Y	
	Environmental index analysis	Y	Y		Y	Y	Y	Y	Y	
	Funding requests				Y	Y	Y	Y	Y	Y

Activity group	Activity	Network location ref/ connectivity	Related function group							
			Inventory incl. asset loc. ref.	Condition	Classification	Access	Asset performance	Service performance	Demand	Works and costs
Asset management planning	Asset demand assessment	Y	Y					Y	Y	
	Asset demand management	Y	Y		Y	Y		Y	Y	
	Asset capability assessment	Y	Y		Y		Y	Y		
	Condition index reporting		Y	Y						
	Asset performance (condition) modelling	Y	Y	Y			Y		Y	
	Asset performance (outcomes) modelling	Y	Y	Y	Y		Y	Y	Y	Y
	Asset remaining life assessments		Y	Y			Y		Y	
	Levels of service definition (technical)	Y	Y		Y	Y	Y			
	Levels of service definition (customer)	Y	Y		Y			Y		
	Forwards works plan development	Y	Y		Y	Y	Y	Y	Y	Y
	Asset portfolio rationalisation	Y	Y	Y	Y	Y	Y	Y	Y	Y
Asset management system (ISO 55001)	AM policy development							Y		
	SAMP development	Y	Y	Y	Y	Y	Y	Y	Y	Y
	AM objectives development				Y	Y	Y	Y	Y	Y
	AMP development	Y	Y	Y	Y	Y	Y	Y	Y	Y
	SOP development			Y			Y		Y	Y
Asset reporting and communication	COAG level benchmarking		Y	Y				Y		
	Road network reporting		Y	Y	Y	Y	Y	Y	Y	Y
	Road asset reporting		Y	Y	Y	Y	Y			Y
	ALGA state of assets reporting		Y	Y	Y					
	NZTA network performance reporting		Y	Y	Y		Y	Y		Y
	Road user feedback register							Y		
	Real time journey advisory services	Y			Y			Y		Y
	Journey experience reporting	Y					Y	Y		
	Road user information	Y			Y	Y	Y	Y		Y
	Road network mapping	Y	Y		Y	Y				Y

Activity group	Activity	Network location ref/ connectivity	Related function group							
			Inventory incl. asset loc. ref.	Condition	Classification	Access	Asset performance	Service performance	Demand	Works and costs
Asset development	Geometric design	Y				Y			Y	
	Pavement design	Y	Y	Y	Y	Y	Y		Y	
	Surfacing design	Y	Y		Y	Y		Y	Y	
	Modifying existing assets		Y	Y	Y	Y	Y		Y	



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