INVENTORY STRATEGY

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Document Information

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1. Introduction

This Inventory Strategy is aligned with the recommendations given in the Highways Code of Practice and the Highways Infrastructure Asset Management Guidance and it sets out to define the approach that may be taken by the Highway Authority for the collection of its highway infrastructure asset inventory in support of its asset management decision making and planning protocols.

The highway infrastructure network comprises of numerous asset types along with their associated inventory and condition. A comprehensive knowledge of inventory and condition status is of fundamental importance to achieving effective asset maintenance management regimes. These two key components of asset data underpin all asset management protocols, and they are essential to establishing evaluation and performance criteria, priority maintenance needs and financial investment requirements.

The objective of registering asset data is firstly to describe the asset and its performance in order to support a robust asset management approach to infrastructure maintenance and to provide the basis for informed decision making aligned to a risk-based approach to service delivery. Asset data will also facilitate reliable stakeholder communications based on a 'single source of truth' and it will support the management of statutory requirements as denoted in the Highways Act 1980.

HIGHWAYS CODE OF PRACTICE

RECOMMENDATION 9 – NETWORK INVENTORY

'A detailed inventory or register of highway assets, together with information on their scale, nature and use, should be maintained. The nature and extent of inventory collected should be fit for purpose and meet business needs. Where data or information held is considered sensitive, this should be managed in a security-minded way.'

2. Scope

The strategy document is not intended to be prescriptive in denoting specific inventory items and attributes to be collected, rather it considers why asset inventory data is required, what it supports and how it may be used to reflect the business needs of the Authority.

This document explores the scope, need and extent of the various highway infrastructure asset types that have a significant impact and cost on the operational performance of the highway network. The accompanying addendum document demonstrates some suggested core inventory items and attributes that serve to support asset management principles and the delivery of infrastructure works and services.

'Inventory Data' is grouped amongst a core group of 'Asset Data' entities which together underpin and inform on the processes and calculations associated with effective asset maintenance management.

'Asset Data' is typically held by the Highway Authority through the following mutually supporting entities:

2.1. Inventory

At a base level, inventory registers the existence of the asset, its description, location on the network and some form of quantitative measure such as number, length, width, height, area, etc. If required it may then proceed to register other ancillary attributes and supporting characteristics such as type, colour, material, construction, also asset owner, maintenance responsibility, reinstatement type, etc.

2.2. Condition:

Asset condition data provides a measure of performance, facilitates lifecycle planning and supports condition projection modelling and value management calculations. In instigating this it also identifies priority maintenance needs and supports asset depreciation calculations.

2.3. Financial:

Budget management, financial planning and value for money considerations are all supported through invoking financial data management protocols. This further facilitates the asset valuation calculations for GRC and DRC under the auspices of the annual 'Whole of Government Accounts' submissions.

In this document we are primarily concerned with the provision of inventory asset data in support of effective asset management planning and decision making.

HIGHWAYS CODE OF PRACTICE

RECOMMENDATION 10 – ASSET DATA MANAGEMENT
'The quality, currency, appropriateness and completeness of all data supporting asset management should be regularly reviewed. An asset register should be maintained that stores, manages and reports all relevant asset data. (HIAMG Recommendation 5).'

It should be noted that any asset inventory and associated attributes collected will subsequently need to be checked, reviewed and maintained for its current and future correctness and completeness, along with any new inventory that is added to the network. This update process can be a considerable draw on stretched resources and finances, it is therefore strongly advised that only those assets and attributes necessary and relevant for the support of the Highway Authority's business and operational needs should be collected and maintained.

3. Network Inventory

Highway Authorities have a legal duty to keep and maintain an asset register holding information, maps and statements for roads that are maintainable at the public expense.

A key component of the register is a record of essential asset inventory information and associated attribute data which underpins the core business needs of the Highway Authority and the operational needs of the service.

Inventory data is used for numerous purposes such as:

- Defining the existence of the asset against which its condition and performance can be assigned.
- Providing a platform for managing risk and assessing potential maintenance liabilities.
- Compliance with statutory obligations and to support continuous service delivery improvements and the determination of service levels.
- Making informed decisions and supporting investment initiatives.
- As the basis of a 'single source of truth' when responding to legal challenge, responding to stakeholder enquiries and general reporting needs.
- For asset valuation calculations in the determination of GRC and DRC.

From this platform, the Highway Authority can ascertain the scope, nature and extent of the highways assets they are responsible for, for which they have an obligation to maintain in a safe and serviceable condition. Knowing this and combined with an evaluation of asset condition, Newham will be well placed to formulate a maintenance management strategy for their key asset groups based on a consideration of priority needs and funding availability and affordability.

3.1. Inventory Data Collection:

Primary asset inventory data will be collected for the following key asset types:

- Carriageways and Footways, Cycle Lanes/Tracks
- Highway Structures (Bridges, Retaining Walls, Tunnels, Culverts, Subway, Gantry, etc)
- Flood Risk and Highway Drainage
- Street Lighting
- Signs and Pedestrian Crossings

Ancillary asset inventory collection may be undertaken for the following assets, subject to resource and funding provisions and operational business and service needs:

- Road Markings and Studs
- Street Furniture
- Safety Fences and Barriers
- Verge / Land
- Highway Trees

Note: The above list provides examples of inventory assets, the list is neither definitive nor exhaustive and the Highway Authority will determine and refine their inventory assets and attributes reflective of service delivery needs and priorities.

The collection of inventory data should be undertaken through a planned and staged approach to service delivery in order to reflect on available data collection resource allocations, cost/benefit considerations and an appreciation of and alignment to the Highway Authority's core business and operational needs. In addition, consideration should be given to the data being available, appropriate, reliable and accurate. A gap analysis should be undertaken of what is currently available against what is required to complete or update the inventory data set. From this appraisal the determination of need and time can be determined, and a data collection strategy may be established.

3.2. Inventory data collection can be achieved in several ways:

Manual data collection via planned surveys or in conjunction with other service delivery operational activities such as condition surveys, highways inspections, cyclical activities, e.g., gully cleansing, grass cutting, street lighting inspections, etc. In addition, data may be collected through manual post survey processing from video surveys and from Google Street View.

Machine data collection via digital technology, e.g., Artificial Intelligence (AI) extraction from 360° HD imaging via LiDAR scanners and from drone surveys.

Remote data extraction from reliable external sources, e.g., Ordnance Survey, Utility Organisations, Central Government-DfT, Environment Agency, DEFRA, TfL, etc.

In practice a combination of data collection methods can be used which reflects staff resource availability, funding, value for money, safety and risk-based collection considerations, the urgency and priority for data collection, project and network management needs.

The asset inventory data will be periodically checked, reviewed and maintained for its current and future correctness, accuracy, quality and completeness. Changes and additions to the inventory e.g., reflective of highway maintenance works and new highways developments will be added to the register in a timely manner once the works are completed. This update process can be a considerable draw on stretched resources and finances, therefore initially only those assets and inventory attributes necessary and relevant for the support of the Highway Authority's core business and operational needs will be collected and maintained.

The asset inventory register on which the inventory data is held will form part of the Alloy asset management system operated by the Highway Authority. The data held on the system will be in a format that facilitates its ready access, is reliable and is cost effective to store, maintain and retrieve.

The data collected will be appropriate, reliable and accurate and it will be made available to those who require it.

3.3. Inventory Data Attributes:

Of primary importance to inventory collection is the registration of the asset itself in order to establish its existence, quantity, location and condition, from this base knowledge the asset may then be valued, and an appreciation of its maintenance needs may be determined from which a maintenance and investment strategy may be considered. Ancillary to this are the further characteristics and attributes of the asset such as type, colour, material, etc, which can assist in fully scoping the asset and fine-tuning the maintenance needs and costs associated with its renewal or refurbishment.

Asset locational data can be registered in several ways through network referencing and geo-spatial coordinates for GIS, it is advised that as a minimum level the asset data be referenced to National Grid Coordinates (Eastings and Northings) and within the National Street Gazetteer. In this way inventory data, which is identified as a point, linear or area item may readily be referenced and plotted on a GIS mapping platform to enable its existence and extent to be visually displayed on a plan and easily accessed via a database to show its supplementary attributes and characteristics.

The provision of an asset inventory register should also include information relating to the operational status of an asset such as:

- 'Special Engineering Difficulty' relates to features and structures which impact on planned works design and maintenance construction needs which result in special considerations being required when delivering these services. Features registered may for example be contaminated land, asbestos, use of specialist materials and processes, the presence of SUDS, the presence of utility apparatus presenting an inordinate level of difficulty if exposed or disturbed, eg oil pipelines, hv cables, and restrictions relating to height, width and weight.
- 'Traffic Sensitive' streets whereby works must only be undertaken within prescribed time limits in order to avoid excessive traffic disruption or inordinate local nuisance and disturbance.

The asset inventory register on which the inventory data is held will form part of the asset management system operated by the Highway Authority. The data held on the system is in a format that facilitates its ready access, is reliable and is cost effective.

3.4. Selective Data Collection:

It is evident that the provision of good inventory data collection plays a key role in promoting effective asset maintenance management disciplines. The more robust and scoping the inventory is, the better it can support the Highway Authority's asset management regimes. There is however a balance to be considered as there is significant cost and time to collecting the inventory in the first place and likewise further cost and resources to update and maintain it into the future. Careful consideration should be taken in order to determine exactly what inventory items are required to be collected and furthermore what associated attributes and characteristics are required to be registered against a particular inventory item. This selective determination should be reflective of supporting the Authority's corporate, business and operational needs and objectives as this will yield best value and the cost effective and efficient use of resources from the inventory collection process.

The following aspects of service delivery needs may be considered in the determination of core inventory and attribute collection:

- What does the Authority need to support its in-house business needs at the corporate, business and operational levels of service delivery?
- What's nice, what's essential, what can help drive efficiencies and better business?
- What do staff require to support their in-house service and operational roles, e.g., essential and mandatory information?
- What do external organisations require from the Authority in support of their business needs, e.g., the location and type of the Authority's utility apparatus such as piped drainage systems, service cables, district heating mains, communications systems, also core inventory registration in support of LSG/NSG, data reports to the DfT, etc.
- What inventory may be required to support an investigation or judicial challenge, e.g., in association with a 3rd party insurance claim, road traffic incident/fatality police investigation, etc?
- What financially linked inventory data is required to facilitate asset valuation needs, etc.

With the collection of inventory data comes the need to store, manage and update the data in a suitable and readily accessible storage system. This nature of the data repository should be integral to the Highway Authority's asset management system which is essential in supporting the business and ancillary needs of the Authority.

HIGHWAYS CODE OF PRACTICE

RECOMMENDATION 11 – ASSET MANAGEMENT SYSTEMS:
'Asset management systems should be sustainable and able to support the information required to enable asset management. Systems should be accessible to relevant staff and, where appropriate, support the provision of information for stakeholders. (HIAMG Recommendation 12).'

4. Summary

The requirement to hold highways asset inventory is both a legal duty in support of the Highways Act 1980 Section 36 Clause 6 – 'Highways maintainable at public expense' and an operational service need as an essential prerequisite of establishing a cost effective and adequate maintenance regime reflective of a risk-based approach to asset maintenance management.

It can clearly be seen that the nature and extent of the highway network inventory and associated attributes included in this document is complex and wide-ranging. There are many legislative, service delivery and operational impacts on the way the various highway services are provided and implemented and their management and delivery are supported and facilitated through the registration of their inventory.

In support of this there also exists several detailed auxiliary plans, policies and documents that are already in place that govern the operational delivery of the service reflective of best practice initiatives, industry accepted standards and value management protocols.

Underpinning and fundamental to the whole process of highways asset management is an appreciation of what the network comprises (inventory) and its present condition. Armed with this base knowledge it is then possible to consider where we are now with respect to service delivery and where we would wish to be reflective of 'Levels of Service' and asset performance.

Inventory collection, its update and maintenance is a significant exercise in the process of effective asset management, the determination of what in the first instance is necessary to support the delivery of highways services is of great importance in order to drive efficiencies and to promote the essential business and operational needs of the Highway Authority.

The Highway Authority will be selective of the inventory items and associated attributes they choose to collect and maintain reflective of their principal service delivery operational needs.

Inventory item and attribute updates should be undertaken periodically reflective of:

- New developments and associated new highways infrastructure introduced on the highway network.
- Infrastructure maintenance activities
- Changes to the highways network
- The introduction of new asset technology, materials, products and processes.

The period for inventory updates can vary reflective of the relative importance of the asset with respect to its maintenance management needs and its risk-based considerations.

Updates may be undertaken by:

- Scheme specific data collection, e.g., planned and reactive maintenance schemes and new developments
- Periodic updates e.g., annually, 2-yearly, 5-yearly, etc
- Ad hoc updates e.g., in conjunction with highway inspections and condition surveys
- As notified by the asset owner/maintainer

The method of inventory updates can be by manual or machine data collection or through the deployment of drone/AI data collection techniques.

Appendix 1

Provides a comprehensive list of asset inventory items and their respective codes.

Addendum

The Inventory Strategy should be read in conjunction with the accompanying addendum document titled 'Inventory Strategy Addendum' which provides a selection of inventory items and attributes that the Highway Authority may consider and select for their inventory data collection.

The suggested relative importance of the inventory items is denoted by 'Primary' 'Secondary' and 'Tertiary' data collection designations reflective of the Highway Authority's essential service delivery needs.

Appendix 1: Asset Inventory Items

The following wide-scoping list of asset inventory items reflect how infrastructure asset inventory collection may be applied in support of asset management decision making and planning protocols. The extent and coverage of these examples is not prescriptive, exhaustive nor definitive and they should be adapted to reflect the operational service delivery needs, business needs, and the corporate objectives and priorities of Newham Council and the Highway Authority, for example in support of engineering design and construction, asset valuation, legal challenge, investment planning, lifecycle planning, condition projection, stakeholder reporting, etc.

In the context of Newham's operational service delivery needs, business needs, and the corporate objectives and priorities, each inventory item is assigned a priority status designated by:

Primary (P):

Inventory that supports the principal operational service delivery needs and priorities of the Council and the Highway Authority, it can have a high asset value and it promotes the safety of the highway asset user.

Secondary (S):

Inventory that is of ancillary significance and operational interest to service departments in the performance of their operational duties and service delivery needs.

Tertiary (T):

Other inventory that is of lesser relevance and importance to the main and ancillary service delivery needs of the Council and the Highway Authority but may be of local interest in some circumstances.

ITEM	ITEM CODE	PRIMARY (P) SECONDARY (S) TERTIARY (T)	DEPARTMENT
Embankments & Cuttings	EC	P	Highways
Planter	PL	T	Highways
Tree	TR	S	Highways
Balancing Pond	BP	P	Drainage
Culvert (<0.9m)	CU	P	Drainage
Drainage Pipe	DR	P	Drainage
Filter Drain	FD	S	Drainage
Grip	GP	S	Drainage
Gully	GY	P	Drainage
Head wall	HW	P	Drainage
Interceptor	IC	P	Drainage
Manhole	MH	P	Drainage
Outfall	OF	P	Drainage
Pumping Station	PS	P	Drainage
Soakaway	SKA	P	Drainage
Swale	SW	S	Drainage
Underground Retention/Treatment	URT	S	Drainage
Watercourse	WC	P	Drainage
Anti-Skid Surface	AS	P	Highways
Bus Lane	BU	P	Highways
Carriageway	CW	P	Highways
Central Island	CI	P	Highways
Central Reserve	CR	P	Highways
Channel (road edge)	CH	P	Highways
Cross Over	XO	S	Highways
Cycle Lane	CL	P	Highways
Cycle Track	CT	P	Highways
Finger Post	FP	S	Highways
Footpath (Remote)	FP	P	Highways
Footway	FW	P	Highways
Grit Bin	GB	S	Highways
Hard Shoulder	HS	P	Highways
Ice Sensor	IS	P	Highways
Kerb	KB	P	Highways
Lay by	LB	P	Highways
Linear Drainage (kerb unit)	LD	P	Highways
Parking Bays	PB	S	Parking
Pedestrian Guardrail	PG	P	Highways
Pedestrian Crossing	PX	P	Highways

ITEM	ITEM CODE	PRIMARY (P) SECONDARY (S) TERTIARY (T)	DEPARTMENT
Permeable Paving	PP	S	Highways
Public Rights of Way (PROW)	PW	P	Highways
Road Marking - Hatched	RH	P	Highways
Road Marking - Longitudinal	RL	P	Highways
Road Marking - Roundabout (Mini)	RR	P	Highways
Road Marking - Text	RM	P	Highways
Road Marking - Transverse	RT	P	Highways
Road Studs	RS	P	Highways
Safety Barrier	SB	P	Highways
Safety Fence	SF	P	Highways
Street Nameplate	SN	S	Highways
Traffic Calming	TC	S	Highways
Verge/Land	VG	P	Highways
Zebra Crossing	ZB	P	Highways
Advertising Board	AB	T	Highways
Bin (Litter/Dog)	BN	T	Highways
Bollard - unlit	BLU	S	Miscellaneous
Boundary Item	BI	T	Miscellaneous
Bus Shelter	BS	T	TfL
Camera (CCTV)	CM	S	Miscellaneous
Cattle Grids	CG	T	Miscellaneous
Coastal Flood Defence	CD	P	Miscellaneous
Communications Cabinet	CC	T	Miscellaneous
Cycle Stands	CS	T	Highways
Feeder Pillar	FE	T	Miscellaneous
Fences & Barriers	FB	S	Highways
Hedge	HE	T	Miscellaneous
Hydraulic Bollard	HBL	P	Miscellaneous
Information Board	IB	T	Miscellaneous
Marker Post	MP	S	Miscellaneous
Parking Meters	PM	S	Parking
Pay & Display Meter	PD	T	Miscellaneous
Post Box	PO	T	Miscellaneous
Public Toilet	PT	T	Miscellaneous
Recycling Centre	RC	T	Miscellaneous
Seat	ST	T	Highways
Statues/Monument	SM	S	Miscellaneous
Steps	ST	P	Miscellaneous
Traffic Control Barrier	CB	S	Miscellaneous

ITEM	ITEM CODE	PRIMARY (P) SECONDARY (S) TERTIARY (T)	DEPARTMENT
Wall	WL	S	Miscellaneous
Beacon	BE	P	Street Lighting
Bollard - Lit	BLL	P	Street Lighting
Lighting Point	LP	P	Street Lighting
Signs (Lit / Unlit)	SG	P	Street Lighting
Traffic Signals	TS	P	TfL
Bridge	BR	P	Structures
Culvert (≥0.9m)	CV	P	Structures
Gantry	GA	P	Structures
High Mast Lighting	HML	P	Structures
Retaining Wall	RW	P	Structures
Structural Earthworks	SE	S	Structures
Subway	SUB	P	Structures
Tunnels	TU	P	Structures