INVENTORY STRATEGY ADDENDUM

DECEMBER 2024

Document Information

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Product Number	*IAMF {009b}*
Author	*James Wallis*
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Contents

1 Introduction

Asset Inventory – Items and Attributes

This Addendum document supports the 'Inventory Strategy'.

The following provides key asset inventory items, codes and attributes that are considered essential or desirable to support the operational service delivery needs of Newham Council and the Highway Authority. The relative importance of the inventory items is denoted by 'Primary' 'Secondary' and 'Tertiary' data collection designations reflective of Newham Council's essential service delivery needs.

The examples of inventory items and their attributes are neither definitive nor exhaustive, the Authority should determine their inventory attributes and priorities reflective of their service delivery needs.

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

ITEM	ITEM CODE	PRIMARY (P) SECONDARY (S) TERTIARY (T)	DEPARTMENT
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
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

ITEM	ITEM CODE	PRIMARY (P) SECONDARY (S) TERTIARY (T)	DEPARTMENT
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
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

2 Highways Asset Inventory & Attributes - Examples

Carriageway

Of fundamental importance and significance to highway infrastructure asset maintenance is the inventory registration of the road network which is probably the highest value asset that most Authorities have ownership of, in many cases running into multi-billion pounds.

Road length is characteristically measured in kilometres (or sometimes in miles for particular reporting needs) and it may be referenced as Road Length (A-B) or Carriageway Length (A-B)+(B-A) e.g. for dual carriageways. Reference to the number of traffic lanes on the road is also useful to denote the trafficking and use status of the highway.

The road length may also be referenced in two ways against the network definition, either by Road Classification A, B, C, U or by Maintenance Hierarchy as shown in Table 1.1 below.

Road length information is defined by road classification for reporting to central government and generally by maintenance hierarchy for local needs. The road lengths and their definition are maintained within the Authority's Asset Management System and is updated and reported to the Department for Transport (DfT) on an annual basis.

For the purposes of determining maintenance standards and inspection frequencies, it is good practice to categorise roads, (along with footways and cycle tracks) based on the hierarchy descriptions as given in 'Well-managed Highway Infrastructure – A Code of Practice: Oct 2016'. These hierarchy category definitions are further developed into 'maintenance hierarchies' which form the foundation of a coherent and auditable maintenance strategy and is also crucial to asset management in establishing 'Levels of Service'. It is important that the maintenance hierarchy adopted reflects the needs, priorities and actual use of each road in the network and in this way, it denotes road risk and importance which governs the frequency of safety and serviceability inspections. For more information on how the maintenance hierarchy is created refer to IAMF-003.

CARRIAGEWAY	Primary
Inventory Code	CW
DfT Road Classification/No	A, B, C, Unclassified (UU/RU)
Road Name	✓
Environment	Urban / Rural
District	✓
Road Section Number	✓
Maintenance Hierarchy	(refer to hierarchy)
Road Length (Km)	Length [A to B]
Road Width (Average) (m)	✓
Road Area (m^2)	✓ (calculated by L x W_{ave})
Construction Type	Flexible, Rigid, Semi-Rigid, Unmade
Surface Course Type	HRA, Bitmac, Microasphalt SD, Anti-Skid (HFS), Block Paving, Concrete, Setts, Cobbles, Gravel, Permeable Paving, (unmade)
Carriageway Type/Lanes	S1L, S2L, S3L, D1L, D2L, D3L
Road Designation	Through Road, Roundabout Cul-de-Sac/Court/Mews, Back/Service Road Bus Lane (BU) Hard Shoulder (HS) Layby (LB) Parking Bay (PB) Traffic Calming (TC) Cross Over (XO)

	Central Island (CI) Central Reserve) (CR)
OS Coordinates (Road / Section)	Start & End (Eastings/Northings)
Owner/Adoption Status	Adopted, Unadopted, Private Street
Engineering Difficulty	✓
Traffic Sensitive	✓
Construction Date	✓
Surface Course Depth (mm)	✓
Binder Course Depth (mm)	✓
Base Course Depth (mm)	✓
Sub-Base Depth (mm)	✓

Table 1.1 – Carriageway Inventory

Footway & Cycleways

Footway length information is held and maintained within the Highway Authority's Asset Management System and it is designated to a network maintenance hierarchy for maintenance purposes in accordance with the Highways Code of Practice 'Well Maintained Highways'. Cycleways (cycle lanes and cycle tracks) are similar to footways in their nature and construction so are included in this section. The following Table 1.2 provides examples of inventory and attributes associated with footways and cycleways.

FOOTWAY	Primary
Inventory Code: Footway Footpath (Remote Footway) Cycle Lane Cycle Track	 FW FP CL CT
Footway Location	Road Name Location Description Adjacent to c/w, remote from c/w, pedestrian precinct, bridge, underpass, etc
Maintenance Hierarchy	Refer to hierarchy
Footway Section Number	✓
Construction Type	Flexible, Rigid, Gravel (unmade)
Surface Type	Concrete, Flags, Bitmac, Micro asphalt, Block Paving, Surface Dressed, Gravel (unmade)
Footway/Cycleway Length (Km)	✓
Footway/Cycleway Width (m)	✓
Footway/Cycleway Area (m^2)	✓ (Calculated by L x W_{ave})
Ownership/Adoption Status	Adopted, Unadopted, Private
OS Coordinates	Start & End (Eastings / Northings)

Table 1.2 – Footway Inventory

Public Rights of Way

Public Rights of Way (PROW) are generally maintained in accordance with the Highway Authority's PROW Improvement Plan and associated policies, they do however form part of the definitive highway network and are designated as highways maintained at public expense under the Highways Act 1980.

The following Table 1.3 provides examples of inventory and attributes associated with PROW.

PUBLIC RIGHTS OF WAY	Primary
Inventory Code	PW
PROW Location	✓
PROW Type (1)	Right of Way Bridleway Byway Restricted Byway Byways open to all traffic (BOAT)
PROW Type (2)	Long distance trails and designated recreational routes. Strategic link path Recreational path Other access rights
PROW Number	✓
Surface Type	Concrete, Flags, Bitmac, Microasphalt, Block Pavings, Surface Dressed, Gravel (unmade)
Length (m)	✓
Width (m)	✓
Safety Inspection Required	Yes/No
OS Coordinates	Start & End (Eastings / Northings)

Table 1.3 – Public Rights of Way Inventory

Signs and other features and furniture that are ancillary to the PROW and that impact on the safety and enjoyment of the asset user may also be registered under the PROW inventory item.

Some PROWs may be metalled and within or on the fringe of urban areas. For consistency purposes and to recognise user requirements and safety risks, these PROW's should be considered for **safety inspection** and maintenance consistent with similar adopted footways or footpaths and they should be incorporated in the respective footway hierarchy, irrespective of their designation as a PROW.

Kerbs & Channels

Kerbs and channels are usually located at the edge of the road and are important highway features that: -

- Supports, retains and protects the structure of the edge of the highway.
- Delineates the edge of road.
- Facilitates effective road drainage.
- Protects the footway and verge assets.
- Protects the safety of the footway user.

The following Table 1.4 provides examples of inventory and attributes associated with kerbs and channels.

KERB **CHANNEL**	Primary Primary
Inventory Code – Kerb	KB
Inventory Code – Channel	CH
Location	✓
Kerb Type	Linear, Safety (Trieff), Drainage, Transverse, Conservation, Other Half-Batter, Bullnose, Straight, Radius, Quadrant, Dropped/Shoulder
Kerb Material	Precast Concrete, Stone, Granite, Setts, Brick, Blocks, Plastic, Metal, Other
Channel Type	Linear Channel, Slot Drain, Grid Drainage Channel (e.g., ACO-Poly)
Channel Material	Precast Concrete, Stone, Setts, Brick, Blocks, Tile, Metal Grating, Plastic, Other
Length (m)	✓
OS Coordinates	Start & End (Eastings / Northings)

Table 1.4 – Kerb and Channel Inventory

Street Lighting

Street lighting inventory often run into tens of thousands of units which are managed and maintained by the Highway Authority. It is important to individually register and identify each unit for the asset set to be quantified and valued and to enable them to be located, inspected and performance measured for maintenance purposes.

Street Lighting inventory may be split into two core groups:

1. High-level inventory showing that the unit exists, along with its reference number, location, type, material, etc.
2. Detailed inventory often collected through specialist means giving information as to the units electrical components, wattages, model details, product references, manufacturer, luminaire information, control gear, etc

The following Table 1.5 below provides examples of the basic high-level lighting point inventory attributes that may be collected directly from a walked, driven or video/AI survey.

LIGHTING POINT	Primary
Inventory Code	LP
Unit Description	Lighting column, high mast, flood light, pole, etc
Location/Position	✓ e.g., Road Name House Number Address/USRN Road, footway, margin, verge, grass/amenity area, cycle route, PROW, subway, ped precinct, etc
LA Serial/Ref Number	✓
Lamp Type	LED SONT SOX CDOTT MBFU (Subway Units) GLS - Beacons
Lantern Type	SINGLE DOUBLE Caterary Post Top Wall Heritage

Column Material	Concrete Steel Cast Iron Aluminium Poly Carbon
Number of Lamps	✓
Number of Brackets	✓
Column Height (m)	✓
OS Coordinates	Point Location (Eastings / Northings)

Table 1.5 – Lighting Point Inventory

Other detailed lighting inventory attributes in support of the asset maintenance management needs of the street lighting service may also be collected via alternative data collection means. Newham Council Street lighting engineers will consider the essential/desirable merits of such wide-scoping inventory attribute data collection reflective of their operational business and asset maintenance management needs.

Traffic Signs, Safety Fences, Bollards & Barriers

The Highway Authority holds a large stock of inventory items relating to traffic signs, safety fences, bollards, beacons and barriers, which are registered on their Asset Management System.

Signs

Traffic signs are used to give orders, warning, direction, information and road works notifications, these units may be lit or unlit.

The following Table 1.6 provides examples of traffic sign attributes that may be considered for inventory collection.

SIGNS	Primary
Inventory Code: Sign	 SG
Serial/Reference Number	✓
Location	Address, USRN Position: e.g., road, footway, cycle route, verge, PROW, subway, pedestrian precinct, etc
Type	Regulatory, warning, advisory, direction, information, finger post, street nameplate, beacon, bollard (illuminated), etc
Sign Diagram Number	✓
Illumination Status	Internally, Externally, Remote, None
Height (m)	✓
Width/Diameter (m)	✓
Mounting Method:	e.g., post, bridge, bracket, gantry, wall, lamp post, traffic signal, etc
Mounting Post Type	e.g., tubular, lattice
Mounting Height	✓
Number of Mounting Posts	✓

Owner	✓
OS Coordinates	Start & End (Eastings / Northings)

Table 1.6 - Summary of Signs Inventory

Signs inventory can often run into many of thousands of units which are managed and maintained by the Highway Authority. It is recommended to individually register and identify each sign unit in order for the asset data set to be quantified and valued and to enable them to be located and performance measured for maintenance purposes.

Other detailed illuminated sign inventory attributes in support of the asset maintenance management needs of the service may also be collected via alternative data collection means. Newham Council engineers will consider the essential/desirable merits of such wide-scoping inventory attribute data collection reflective of their operational business and asset maintenance management needs.

Safety Barriers & Safety Fences

Safety barriers (also referred to as vehicle restraint systems VRS) are used to stop 'out of control' vehicles from: leaving the road and hitting pedestrians, roadside infrastructure, (including slopes), roadside barriers and from crossing into the path of on-coming vehicles.

Safety fences serve to keep vehicles within their roadway and help prevent them from veering off the roadway, hitting pedestrians and colliding with roadside features such as dangerous obstacles, boulders, sign supports, trees, bridge abutments, buildings.

The following Table 1.7 provides examples of safety barrier and safety fence attributes that may be considered for inventory collection.

SAFETY BARRIER **SAFETY FENCE**	Primary Primary
Inventory Code:- Safety Barrier (VRS) Safety Fence	 SB SF
Location	✓ Road class, road name. Verge, footway, central reserve, etc
Material	Concrete, timber beam, wire rope, corrugated sheet, box section, other
Type	Tensioned, Untensioned
Shape	Single sided, double sided
Post Material	Timber, metal, concrete, other
Owner	Highways, Bridges, PROW, National Highways, Network Rail, etc
OS Coordinates	Start & End (Eastings / Northings)

Table 1.7 - Summary of Safety Barrier and Safety Fence Inventory

Pedestrian Guardrail

A protective fence, usually on the edge of a footway intended to prevent pedestrians from stepping on to the carriageway or other hazardous areas and as a safety mitigation measure to protect pedestrians from traffic incursions.

The following Table 1.8 provides examples of pedestrian barrier attributes that may be considered for inventory collection.

PEDESTRIAN GUARDRAIL	Primary
Inventory Code	PG
Location	Road class, road name. Verge, footway, central reserve, pedestrian crossing, roundabout, road junction, etc
Material	Galvanised steel, aluminium, other
Painted	Yes / No
Tensioned	Yes / No
Length (m)	✓
Height (m)	✓
Owner	✓
OS Coordinates	Start & End (Eastings / Northings)

Table 1.8 - Summary of Pedestrian Guardrail Inventory

Pedestrian Crossing

A transverse strip of carriageway marked to indicate where pedestrians have priority to cross the road.

Pedestrian crossings are critical traffic management and public safety assets that need to be operational and well maintained at all times. Knowledge of their existence, location, condition and performance is fundamental to effective asset management.

The following Table 1.9 provides examples of pedestrian crossing attributes that may be considered for inventory collection.

PEDESTRIAN CROSSING	Primary
Inventory Code	PX
Location	Road class, road name.
Crossing Type	Pelican, zebra, puffin, toucan, pegasus, belisha (uncontrolled)
Pedestrian Refuge	Yes / No
Control Type	Signal, beacon, uncontrolled
Crossing Surface Material Type	Thermoplastic, paint, pads, studs, other
Road Surface Type	DBM, Concrete, HRA, SMA, Surface Dress, Micro-Asphalt, Asphalt, Blockwork
OS Coordinates	(Eastings / Northings)

Table 1.9 - Summary of Pedestrian Crossing Inventory

Road Markings

Road (or highway) markings are extensive upon the network and are to be found on the carriageway, footway, cycle tracks, car parks, etc. They come in many forms and they serve numerous purposes by way of supporting legislative traffic regulations, safety, advisory, information, travel and lane control disciplines, autonomous vehicles, etc. The highway user reliance on having clear and discernible road markings makes them an important safety feature in supporting highway travel protocols and as such a knowledge of their existence and maintenance status is highly desirable.

The collection and subsequent update and maintenance of road markings can be challenging, time consuming and a costly exercise. Therefore careful consideration needs to be taken in determining the type and extent of such markings that should be collected in a first trawl of inventory data and attribute collection and which markings may be of lesser operational and safety importance and may therefore be consigned to a secondary data collection regime later.

The collection of extensive road marking inventory is made more feasible through AI technology using tools such as 360° HD imaging via LiDAR scanners which can automatically register and plot road markings inventory through adopting this a cost-efficient process.

Road Markings may be designated by the following types and attributes:

Road Markings (Longitudinal):- Road markings which lie within the carriageway or along the edge of the carriageway to delineate road lanes, edge of carriageway and overtaking and stopping/parking restrictions and such related measures.

Road Markings (Hatched):- Road markings on the carriageway with a distinctive hatched design often set upon a coloured road surface.

Road Markings (Transverse/Special):- Road markings which lie across or at the edge of the carriageway, at road junctions, on the kerb, or are special markings.

Road Markings (Text, Numbers, Roundels and Arrows):- Road markings that provide instructions, information and direction.

The following Table 1.10 provides examples of road markings attributes that are generally common to all types of road markings.

ROAD MARKINGS	Primary
Inventory Code: - Longitudinal Hatched Transverse Text Mini-Roundabout	 RL RH RT RM RR
Location	Road class, Road name.
Type - Linear Markings	Single, Double, Single Edge, Double Edge, Hazard, Continuous, Intermittent, Zig Zag, Other
Type - Patterned Markings	Diagonal, Chevron, Cross, Solid, Bars, Bus/Parking Box, Other
Type - Text/Number/Symbol	Stop, Give Way, Slow, Words/Numbers, Mini-Roundabout, Arrow, Loading, Triangle, Cycle, Other
Road Marking Colour	White, Yellow, Conservation Yellow, Other
Road Surface Colour	Red, Blue, Green, Other, No colour
TSRGD Diagram No	✓
Dimensions: - Length-Width-Area	(as required)
Material	Thermoplastic, Paint, Raised Edge Rib, Template, Other
OS Coordinates	Start / End (Eastings, Northings)

Table 1.10 - Summary of Road Markings Inventory

Verge/Land

Highway owned and maintained verges and land attract a maintenance upkeep cost that can be significant, and it may impact on highway safety needs reflective of visibility and sight line requirements and in some instances pedestrian footfall.

The full area of verge/land that exists on the highway network is quite challenging to identify (in terms of extent and ownership) and difficult to quantify and measure (in terms of variable shape and area).

AI surveys may assist in this exercise however spurious highway boundary and ownership definitions in this respect can result in data that may not be entirely correct and land boundary/ownership assumptions may need to be made in some instances.

OS Master Map may also assist in the identification and measure of highway verge/land areas through use of its highway boundary 'TOID' area facility. By obtaining the area of the roads and footways (taken from highway adoption/inventory records) and deducting this combined area from the whole highway boundary to boundary area (taken from OS Master Map) this effectively provides a measure of the remaining land area within the highway boundaries. This method of inventory determination may provide a reasonable evaluation of the combined verge/land area which may be sufficiently accurate when applying it to service activities such as grass cutting services and asset valuation calculations and other associated maintenance activities.

Land may be described as 'off-road non-trafficked areas' (other than designated as verge or central reserve).

Verges may also be described as an 'off-road strip often found separating the footway from the carriageway' or indeed in the case of dual carriageways the central reserve separating each independent carriageway.

The following Table 1.11 provides examples of verge/land provides examples of items for inventory collection.

VERGE/LAND	Primary
Inventory Code:-	VG
Location	Road class, Road name, USRN. Road central reserve, road edge, footway edge, off-highway land area
Surface Type	Grass, Gravel, Unmade, Bitmac, Setts, Block Paving, Flags, Concrete, Coloured Flexible, Grass-Grid, Other
Dimensions	Length, Width, Area
Grade	Level, shallow incline, steep incline, mixed grade
Owner	e.g., Highway Authority, PROW, Housing, Parks, Private, etc…
OS Coordinates	Start / End (Eastings, Northings)

Table 1.11 - Summary of Verge/Land Inventory

Highway Trees

Trees located adjacent to the highway can affect the structural integrity and safety of the highway through root damage to the metalled road or footway surfaces and they can present a danger to highway users in times of storm, high winds and through natural disease and decay. They may also obscure road lighting and signs if not maintained or pruned in a timely manner. In addition, trees support environmental sustainability as they provide an important source of carbon capture.

Individual trees, tree corridors and copses can be identified through either manual inventory collection surveys, AI or drone surveys, or through a combination survey type. Tree data may also be available to procure through specialist websites.

Tree inventory should be held on the Highway Authority's asset management system in order to support safety inspections and the registration of associated maintenance activities.

The following Table 1.12 provides examples of tree a provides examples of items for inventory collection.

TREE	Secondary
Inventory Code:-	TR
Location	Road class, Road name, USRN. Verge, central reserve, off-highway land area, retained land, private land
Surface Type	Grass, Gravel, Unmade, Bitmac, Setts, Block Paving, Flags, Concrete, Coloured Flexible, Grass-Grid, Other
Tree Type / Species	✓ Deciduous/Non-Deciduous
Dimensions	Height, Trunk Diameter, Girth
Owner	Highway Authority, PROW, Housing, Parks, Private, etc…
OS Coordinates	Start / End (Eastings, Northings) This may relate to individual trees (as point items) or an avenue/area of trees (as combined linear/area items)

Table 1.12 - Summary of Trees Inventory

Highway Drainage

'Highway Drainage' is a term that covers a wide-scoping group of asset inventory items that enables water from paved highway areas to be collected, stored, transported and discharged to a defined watercourse or into the surrounding ground. It is important to have a record and knowledge of drainage asset inventory and its associated condition and maintenance status. A well-managed and maintained drainage system that is working correctly, will effectively remove the water from the highway and it will help allay the onset of structural highway degradation and the occurrence of flooding and standing water.

Drainage inventory is however probably the asset group that is least known about on account of it being buried underground with only a small amount of the drainage asset being visible from the surface. The matter is further compounded by ownership issues, i.e. whether the drainage system is a highway drain that is owned and maintained by the Highway Authority or a public sewer owned and maintained by the respective Water Authority/other Utility Organisation, or a private drainage asset or one that comes under riparian ownership.

Surface drainage features such as gullies, manholes and drainage channels, may effectively be collected by manual or machine survey collection processes or through AI or drone survey collection systems. Sub-surface piped drainage asset inventory and condition can only be collected through manual and CCTV survey techniques which are costly, time consuming, resource heavy, constrained by site availability and can impact adversely on trafficking thereby causing delays. It is advised when undertaking such surveys that a combined asset inventory and condition evaluation survey be carried out in order to minimise disruption and optimise the use of resources and funding. In addition, when undertaking reactive or planned drainage maintenance works the opportunity to collect and update drainage inventory data should be taken.

The following highway drainage assets shown in Table 1.13 below provides examples of items for inventory collection and storage within the Highway Authority's asset management system.

The list it is not prescriptive nor exhaustive and the primary and secondary importance and collection of such assets and their inventory attributes and subsequent updates is a matter for careful consideration by the Drainage service in terms of their operational support and business importance and the affordability and cost benefit of collection and their periodic update. This data collection should be undertaken reflective of resource availability, funding and operational service needs.

Drainage Inventory Item	Attributes
Gully (GY)	Type: Road, Side Inlet, Recessed, Footway, T-Pot, Other Gully Discharge: Highway Drain, Public Sewer, Private Sewer, Water Course, Soakaway, Unknown, Other. Cover & Frame: Round, Square, Rectangular, Hinged, Unhinged, Metal, Plastic, Other
Manhole (MH)	Type: Highway Drain, Surface Water, Foul Water, Combined, Soakaway, Interceptor, Catchpit, SUDS, Unknown, Other. Dimensions: Diameter, Length/Width, Depth to invert. Manhole Cover & Frame Shape: Round, Triangular, Double Triangular, Square, Other
Drainage Channel (DC)	Type: Linear Drainage Channel, Slot Drain, Slot Channel, Grid Drainage Channel (e.g., ACO, Poly), Other. Material: Concrete, Block, Setts, Metal, Other
Linear Drainage Kerb (LD)	Type: Beany, other Material: Concrete, Metal, Block, Other
Drainage Pipe (DR) (Highway Drain/Sewer)	Type: Surface water, foul water, combined Size: Internal Diameter Material: Concrete, clay, plastic, other
Filter Drain/French Drain (FD)	Material: Stone Pipe: Perforated
Grip (GP)	Material: Stone, open channel
Swale (SW)	Dimensions: Length, Width
SUDS (SUD)	(see below...plus additional attributes as the asset owner/maintainer requires)
Culvert (< 0.9m) (CU) (ref structures if ≥ 0.9m)	Type: Box, Pipe, Arch, Other Size: Diameter, Height/Width, Material: Concrete, clay, plastic, brick, stone, other
Headwall (HW)	Type: Square, Arch Size: Height / Width, Material: Concrete, brick, stone, other
Outfall (OF)	Type: Square, Arch Size: Height / Width,

	Material: Concrete, brick, stone, other
Soakaway (SKA)	Type: Chamber, Rings, Stone Fill, Material: Concrete Rings, Brick Chamber, Plastic Dimensions: Diameter, Length/Width, Depth to invert. Cover & Frame: Round, Triangular, Double Triangular, Square, Other
Balancing Pond (BP)	(see below...plus additional attributes as the asset owner/maintainer requires)
Pumping Station (PS)	(see below...plus additional attributes as the asset owner/maintainer requires)
Water Course (WC)	(see below...plus additional attributes as the asset owner/maintainer requires)
Common to all drainage inventory:	Owner: Local Authority, Water Authority, Private, Riparian, Drainage Board, Unknown, Other
Common to all drainage inventory:	Location: Road Class/Name, USRN Road, footway, verge, etc
Common to all drainage inventory:	OS Coordinates: Start / End (Eastings, Northings) This may relate to individual point items or linear items

Table 1.13 - Summary of Drainage Asset Inventory

Highway Structures

Highway structures denotes a wide range of asset inventory, their structural elements and components and their related attributes. Such assets provide safe access and transportation arrangements throughout the Authority and carries and supports loadings from ancillary assets and equipment.

They are usually under the ownership and maintenance responsibility of the expert Structures Department and the asset data may be held in a separate bespoke asset management system designed specifically to meet the specialist needs of these assets.

Table 1.14 below denotes examples of various structure types and attributes that are of interest to asset maintenance management.

The list it is not prescriptive nor exhaustive and the primary and secondary importance and collection of such assets and their inventory attributes and subsequent updates is a matter for careful consideration by the Structures service in terms of their operational support and business importance and the affordability and cost benefit of collection and their periodic update. This data collection should be undertaken reflective of resource availability, funding and operational service needs.

Structures Inventory Item	**Attributes**
Bridge (BR) (Road/Foot Bridge)	Type: Suspension, Arch, Truss, Beam, Cable Stayed, Cantilever, Girder, Swing, Steel Box, etc Support Function: Road, Footway, Cycletrack, PROW, Rail, Viaduct, Waterway (River/Canal), Gantry, Other Construction Materials: Metal, Concrete, Timber, Stone, Masonry, Other Other: additional attributes as the asset owner/maintainer requires
Culvert (Pipe≥0.9m) (CV)	Type: Box, Pipe, Arch, Other Size: Diameter, Height/Width, Material: Concrete, clay, plastic, brick, stone, other Other: additional attributes as the asset owner/maintainer requires
Tunnel (TU)	Function (asset carried above): building, land, highway, river, rail

	Design Load/Weight Limit: Construction Material: Concrete, Stone, Masonry, Other Other: additional attributes as the asset owner/maintainer requires.
Subway (SUB)	Function (asset carried above): building, land, highway, river, rail Design Load/Weight Limit: Construction Material: Concrete, Stone, Masonry, Other Other: additional attributes as the asset owner/maintainer requires.
Retaining Wall (RW) and Structural Earthworks (SE)	Material: Reinforced Concrete, Brick, Stone, Gabion, Metal Post/Panel, Gravel Board, Other Function: Supports the highway, supports adjacent land
Gantry (GA)	Type: Portal, Cantilever Construction: Truss Lattice, Concrete, Box Section Spanning: single c/w (1,2,3 lanes) dual c/w (1,2,3 lanes) Function: Information signs (illuminated/non-illuminated), digital signage, smart signs, information panel, cameras, signals, lighting, etc. Electrical Supply: Y / N Maintenance Walkway: Y / N
High-Mast Lighting (HML) (>20m)	(see below...plus additional attributes as the asset owner/maintainer requires)
Common to all structures inventory:	Dimensions: Length, height width, depth, area, span
Common to all structures inventory:	Owner:
Common to all structures inventory:	Location: Road Class, Road Name, USRN
Common to all structures inventory:	OS Coordinates: (Eastings/Northings)

Table 1.14 - Summary of Structures Inventory

Embankments and Cuttings

Highway embankments and cuttings can have both structural earthworks and Arboricultural considerations.

Table 1.15 below denotes examples of various embankment and cutting attributes that are of interest to asset maintenance management.

Embankments & Cuttings	Primary
Inventory Code	EC
Location	Road Class, Road Name, USRN
Feature Type	Embankment Cutting
Material Type	Natural soil, stone, gravel, concrete faced, block/brick faced, gabion, grass, other
Feature Purpose	Road, footway, cycle-track, watercourse
Incline	Vertical, stepped, sloping
Maintenance Needs	Annual Safety Inspection, grass cutting,
Length (m)	✓
Height (m)	✓
Area (m^2)	✓ (calculated by L x H_{ave})
Ownership/Adoption Status	Adopted, Unadopted, Private
OS Coordinates	Start & End (Eastings / Northings)

Table 1.15 - Summary of Embankment / Cutting Inventory

Miscellaneous Street Furniture and Highway Amenity Items

This range of inventory items is large scoping and there are many such ancillary items on the highway network that are owned and maintained by the Authority.

Table 1.16 below provides examples of miscellaneous street furniture and amenity items that are commonly found on the highway. The list is not prescriptive nor exhaustive and the collection of such assets and their inventory attributes and subsequent updates is a matter for careful consideration by the Council in terms of their operational support and business importance and the affordability and cost benefit of collection and their periodic update.

Inventory Item	Litter/Dog Bin, Seat, Information Board, Bus Stop Sign, Bus Shelter, Statue/Memorial/Monument, Advertising Board, Toilet, Post Box, Marker Post, Cycle Stand, CCTV Camera, Communications Cabinet, Pay & Display Meter, Parking Meter, Hedge, Coastal Flood Defence, Wall, Boundary Item, Cattle Grid, Fences & Barriers, Steps, Recycling Centre, Bollard (unlit), Traffic Control Barrier, Hydraulic Bollard, Feeder Pillar, Other Note: a number of the above inventory items may be of secondary or tertiary status…the Council should determine which inventory items and their associated attributes are required and should be maintained and updated in support of their operational service delivery needs.
Type	Specific to each inventory item
Location	Road class, Road name, USRN Carriageway, footway, verge, road central reserve, wall, roundabout, splitter island, other
Owner	
OS Coordinates	Point Item – (Eastings, Northings)
Other Attributes	To be determined by the asset owner/maintainer reflective of the operational maintenance, management and business needs of the asset.

Table 1.16 - Summary of Street Furniture & Amenity Items Inventory

Summary

The above inventory item schedule and their associated attributes generally reflect the infrastructure assets that are commonly found on the highways network, and they serve to underpin the establishment of a cost-effective maintenance regime reflective of a risk-based approach to asset maintenance management.

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.

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 Authority.

Newham Council will be selective of the inventory items and associated attributes they choose to collect and maintain reflective of their principal service delivery operational and risk-based needs.