

National Underground Asset Register (NUAR)

NUAR Data Model Publication

Overview of Service Areas, Networks, Sites and Coverages

Publication History

Date	Version	Description
12/08/2024	0.1	First publication of the NUAR Data Model

Purpose of this document

This document provides an overview of the representation of Service Areas, Networks, Sites and Coverages in the UK: Excavation Profile of the MUDDI Model, with examples from the NUAR Harmonised Data Model provided where appropriate.

1 Service Areas

A service area is a representation of the geographical coverage of a whole or partial network. As such, it must have a geometry associated with it in order to represent the spatial extent of that coverage. The **ServiceArea** Feature Type in the data model inherits from the **MUDDISpace** entity in the MUDDI Conceptual Model.

There are several types of Service Area defined in the data model, in the **ServiceAreaTypeValue** codelist.

These service areas may describe well-established boundaries and extents of networks – broadly “license areas” (although there are a number of different scenarios for this representation depending on the type of organisation and network – see below).

They may also be used to represent more transient or process-specific areas which will be described below.

1.1 Licensed Areas

Many of the types of Service Area are concerned with well-established boundaries and extents of networks – what we might consider generally to be “Licensed Areas”. This terminology does not apply to all organisations and networks however, and the Service Area Type codelist values represent this variability.

The values that represent this type of coverage are as described in the table below.

Value(s)	Description
Administrative Boundary / Licence Area Boundary / Franchise Area	<p>These values are broadly synonymous but may support the use of appropriate terminology for different types of organisations. A Licence or Franchise Area would typically represent the scenario of a regional utility or network operator with an official licence to operate a network in a given area, normally granted by a regulator.</p> <p>An Administrative Boundary may be considered conceptually equivalent, but more closely represents the area under the responsibility of a public body such as a local authority which may be responsible in that area for apparatus included in the data model.</p>
Operational Patch	<p>License Areas will very often be broken up into smaller geographical units for operational and maintenance purposes, and this value allows these sub-areas to be represented.</p>



Value(s)	Description
Right of Access	<p>This value represents a scenario which applies for example to operators of cross-country pipelines.</p> <p>Routes of these and similar assets may traverse private land and the public highway across multiple regions but differs from the dense urban networks of distribution network operators.</p> <p>The operators of these assets usually have legally protected “Wayleaves and Easements” giving them rights of access and a requirement to notify of works within the “corridor” of the asset.</p> <p>The Right of Access service area type is intended to support this “corridor” method of representing coverage.</p> <p>The extents of wayleaves and easements will vary for different assets. As well as the legally negotiated “right of way”, operators may also specify a “Zone of Interest” around their asset beyond the wayleave or easement, which indicates the proximity of works for which they need to be notified in order to ensure strict safety standards are adhered to for the avoidance of damage.</p> <p>Contact must be made with any pipeline operator prior to any works within their legally negotiated right of way, and possibly within a broader “Zone of Interest” (which in turn may vary depending on the nature of the work). Such operators are likely to request further details of any planned works and may arrange a site visit or supervision to reduce the risk of encroachment or damage.</p>



Value(s)	Description
Site	<p>Some asset owners and network operators may have assets installed in one or more discrete, non-contiguous sites. This model would typically apply to Independent Gas Transporters (IGTs), Independent Distribution Network Operators (IDNOs), owners of private networks, small telecommunications networks and possibly district heating networks. These “site” networks will often connect to the main network within their sector at some point on the site boundary.</p> <p>The Site value allows this form of network coverage to be represented. Individual sites may be represented as separate geometries, or an aggregation of sites may be represented as a multi-part geometry.</p>
National or Regional Coverage	<p>In some exceptional cases a network operator’s coverage may be described in terms of a region or country. In this case, the coverage should ideally be represented by an existing authoritative geometry representing that area.</p>

1.2 Other Types of Service Area

As described above, Service Area entities may be used to describe transient or process-specific areas as well as established “license areas”.

The values that represent this type of coverage are as described in the table below.

Value(s)	Description
Coverage of Works	<p>This value is provided for the scenario where there is a requirement to represent the extent of a particular project or works area (e.g. a phase of a mains replacement programme or a network extension project).</p>
Coverage inferred from data	<p>It may sometimes be required to infer or derive a coverage from other datasets, and this value can be used for Service Area entities created in this manner. If derived from another Service Area feature, the ability is provided to maintain a relationship to the originating feature (see below).</p>



Value(s)	Description
Data Supply Area	For some implementations, there may be a requirement to represent the coverage of a particular data submission, or a subset of a larger dataset, and this value supports that scenario.

As with most codelists in the data model, there is also an “Other” value for those service areas which do not meet the definition of the values described above. A representation of the source terminology or definition can also be retained as for most other codelist-constrained values.

1.3 Service Area Attributes

The attributes unique to the ServiceArea Feature Type (i.e. excluding those inherited from parent entities in the data model) are described in the table below.

Attribute Name	Type	Description
serviceAreaType	Value from codelist <i>ServiceAreaTypeValue</i>	The type of the Service Area as described in the previous section.
serviceAreaSubType	CharacterString	If required, the terminology used in source systems to describe the type.
nationalOrRegionalCoverage	Value from codelist <i>NationalOrRegionalCoverageValue</i>	A standard value describing a region or country of the UK, to be used if serviceAreaType is set to “National or Regional Coverage”. Defaults to “N/A”.
buffered	Boolean	Indicates, for a Service Area which has been derived from another Service Area, whether a buffer has been applied to the original in order to generate this one. Defaults to FALSE.
bufferSize	<i>WidthType</i>	If buffered is set to TRUE, indicates the size of the buffer applied, along with measurement units.



Attribute Name	Type	Description
originalServiceAreaID	CharacterString	Indicates, for a Service Area which has been derived from another Service Area, the dataProviderAssignedUniqueID value for the original Service Area record.

The inherited attributes ***description*** and ***objectName*** should be used to provide more detail, and other attributes for identifiers etc. should be populated as standard.

1.4 Service Area Relationships

The data model contains the following relationships for Service Areas:

- **relationship_actortoservicearea**. Relates an organisation to its service areas. Allows a “purpose” to be specified for this service area with respect to this organisation. In theory, multiple organisations could have a relationship with the same (standard/shared) service area, each with a different purpose. The purpose of a service area is of particular relevance to the NUAR implementation (see below).
- **relationship_networktoservicearea**. Allows a definition of a utility network (see below) to be related to real-world area.

1.5 Service Areas in NUAR

Service Areas play an important role in the NUAR implementation of the data model and provide information about asset coverage and operations areas as well as representing the license areas and boundaries for network operators.

An authoritative Service Area is a pre-requisite for publication of data in NUAR, and others are derived automatically from this authoritative representation.



2 Networks

A Network entity supports a conceptual (non-spatial) representation of an infrastructure network, a “tier” of that network with shared characteristics (see **Subordinate Networks** below) or a geographical subnetwork of a parent network (see **Subnetworks** below).

The Network Feature Type is part of the core MUDDI Conceptual Model and inherits from **MUDDIAsset** so that it can reflect the characteristics of the assets of which the network is comprised.

The actual implementation of the Network Feature Type is at the sector level via a ...Network Feature Type for each Domain/Sector, each of which inherits from the parent Network Feature Type.

In the NUAR implementation, each Asset Owner has a conceptual parent network defined, to which all subnetworks and subordinate networks are related.

2.1 Subnetworks

Subnetworks are a type of Network representing a geographical subset of a main network, i.e. a subsection of the main network contained within a defined geographical area. As a type of Network, subnetworks are also represented in the relevant ...Network Feature Type for the Domain/Sector.

Subnetworks are related to their parent Network via the **relationship_networktosubnetwork** relationship.

While it is possible to represent the geographical extent of the subnetwork in the geometry attribute of the Network Feature Type, it is preferable to represent this geometry via a relationship to a ServiceArea entity, via the **relationship_networktoservicearea** relationship.

2.2 Subordinate Networks

Subordinate Networks provide a conceptual representation of a network containing entities within that network which are related by common characteristics rather than spatial proximity or location. A subordinate network may represent a “tier” of a utility network (e.g. the High Voltage element of an electricity distribution network, or the Medium Pressure tier of a gas distribution network), or a collection of entities managed by a particular function or department (e.g. the Tree Preservation Orders for a Local Authority as opposed to other types of conservation area or entity).

Subordinate networks are related to their parent Network via the **relationship_networktosubordinatenetwork** relationship.



Subordinate networks are a powerful construct that provide great flexibility in how entities such as guidance or contact details are related to subsets of infrastructure networks. For example, guidance related specifically to working in proximity to High Voltage cables can be related to all assets of that type by creating a Subordinate Network dedicated to that “tier” and linking the guidance entity to that Subordinate Network.

Membership of assets to a given Subordinate Network is expressed via the **relationship_networktonetworkconveyance** relationship (note however that membership of a Subordinate Network is not inherently limited to conveyance assets). In addition, the **subordinatenetworkdefinition** Feature Type allows the criteria for membership of a Subordinate Network to be defined such that asset features can be assigned dynamically to the appropriate Subordinate Networks by an automated process interpreting those criteria.

3 Sites

Specific sites within a utility network – areas which may be delineated by walls or fencing and performing one or more functions within that network, or discrete/private areas containing network assets – can be represented by the Site Feature Type. This inherits from the **MUDDISpace** entity in the MUDDI Conceptual Model.

There are several types of Sites defined in the data model, in the **SiteTypeValue** codelist as follows:

- Compressor Station
- General Site
- Independent/Private Network Site
- Multi-purpose Site
- Pumping Station
- Regulator Site
- Section 50 Site
- Storage Site
- Substation
- Treatment Works
- Other

A Site entity may be related to a Network entity (see above) via the **relationship_networktosite** relationship. A network asset may be indicated as belonging to a specific site via the **relationship_sitetoasset** relationship.

4 Planning Areas

A Planning Area is an area which may need to be accounted for when planning works related to infrastructure networks. This inherits from the **MUDDISpace** entity in the MUDDI Conceptual Model.

Many types of Planning Area are defined in the **PlanningAreaTypeValue** codelist and there are several specialised Feature Types, such as different types of conservation area, SSSIs and others in the Reference Data domain package.

5 Supplemental Data Coverages

The final Feature Type inheriting from the **MUDDISpace** entity in the MUDDI Conceptual Model is the SupplementalDataCoverage Feature Type.

This Feature Type allows a geographical extent to be specified which has additional supplementary information associated with it, and which does not necessarily equate to a geographical subdivision of an infrastructure network.

This Feature Type allows external services to be specified to provide the actual data associated with a coverage and allows requests to any such services to be geospatially constrained by the coverage.

This mechanism allows geographically related datasets such as custom backdrop mapping or enlargements to be incorporated into the data.