ITN to OS MasterMap Highways Network: Similarities and differences

Contents

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Preface

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Chapter 1   Purpose

From October 2016, Ordnance Survey released a new generation of product for road and path information in Great Britain. OS MasterMap Highways Network brings together definitive geographic information from OS and data from authoritative sources such as the National Street Gazetteer (NSG) to create a single authoritative view of the road and path network. Consequently, one of the main benefits of OS MasterMap Highways Network is bringing together disparate datasets across government, which in turn allows for improved and consistent decision making across government and the commercial markets.

OS MasterMap Highways Network will replace OS MasterMap Integrated Transport Network (ITN) and Urban Paths (UPN) products, which are scheduled for withdrawal on the 31st March 2019. The last update to ITN will be scheduled for 25 February 2019 and the last update to UPN will be scheduled for March 2019.

The purpose of this document is to give you a detailed comparison between the two products, highlighting similarities and differences between the data models, as well as giving you a technical explanation on how the core network features and their attribution are mapped across from ITN to OSMM Highways Network. Finally, this document includes a comparison of how the two products are supplied to customers.

OS MasterMap Highways Network(Highways) will contain a combination of routing information and asset information to meet requirements gathered from the existing customer base. The data contains all the information that is contained within Integrated Transport Network (ITN), although is packaged differently to meet the changing demands of OS customers over the last 10 years.

The core road and path network in the OS MasterMap Highways Network product has been built from the same source as ITN and will have persistent IDs carried over from ITN. Both ITN and OS MasterMap Highways Network have the same coverage, providing a routable network for all of Great Britain.

 ITN data that is being used in live systems and has attached additional information to it, can be transferred across to OSMM Highways, as all the TOIDs in OS MasterMap ITN are persistent and have been carried over into OS MasterMap Highways Network.

Additionally, OS MasterMap Highways Network will contain street information and asset management information at local highway authority level for England and Wales. The benefit of this is that the data capture is at the earliest point of creation within the local highway authority and there is detailed local knowledge driven by statutory requirements. This information has not been yet acquired for Scotland, however the product is ready to accommodate this information as soon as it is available.

Attribution of features contains similar information across all features in both ITN and OS MasterMap Highways Network, however Highways attribution has a slight difference in language and is structured to accommodate a better representation of the real world, in order to bring value and facilitate a better and quicker analysis of the data.

Network referencing is used in ITN to relate routing information back to the core road and path network and is using the Road Routing Information theme with its three components: Road Node Information, Road Link Information and Road Route Information. Likewise, in Highways, network referencing contains similar information plus additional attributes on location and feature relationships and has the following components: Element Network Reference, Node Reference, Link Reference, Multiple Link Reference and Point Reference.

Chapter 2   Product Comparison

This chapter is looking at product comparison between ITN and Highways portfolio. The Highways Network is our new generation of product for road and path information replacing the ITN product. As opposed to ITN, Highways portfolio has been designed to be INSPIRE compliant. The INSPIRE Transport Networks Data Specification form the basis of the Roads, Routing and Asset Management Information and Paths product specifications within Highway portfolio. Another difference in standards is also the adherence of Highways to the British Standard 7666-1:2006, spatial datasets for geographical referencing.

With regards to the structuring of the product data, Highways portfolio contains three products which replace the equivalent three themes within the ITN product as follows:

1.   OS MasterMap Highways Network – Roads

Our Roads product provides a structured link and node network for roads and vehicular ferries across Great Britain with associated naming, numbering, classification and junction information.

This product replaces OS MasterMap Integrated Transport Network Layer – Road Network Theme.

2.   OS MasterMap Highways Network – Routing and Asset Management Information

The Routing and Asset Management Information (RAMI) product provides the same base of information as the Roads product alongside detailed information on road routing including turn restrictions, access restrictions, road hazards and height, weight and width restrictions. In addition, there is also information relating to managing the road network as an asset such as who is responsible for maintaining this section of road, lane rental schemes and the quality of which the road must be reinstated after any form of road work.

This product replaces OS MasterMap Integrated Transport Network Layer – Road Routing Information Theme with the added asset management information which was not present in the ITN products.

3.   OS MasterMap Highways Network – Paths

 Our Paths product provides structured link and node network for paths and pedestrian only ferries in urban areas across Great Britain. It provides additional information for asset management.

This product replaces OS MasterMap Integrated Transport Network – Urban Path Theme.

Data Models

Both ITN and OS MasterMap Highways Network have the same core road and path network structure and the same feature types that make it up for example; Road Link and Road Node. However, the routing information has had significant change to how it is structured into feature types but still contains the same routing information as ITN with additional new information, for example vehicle weight restrictions. In addition, OS MasterMap Highways Network includes additional information sourced from the National Street Gazetteer to support asset management.

The OS MasterMap Highways Network is a 3D network (road and path) heighted from Ordnance Survey's detailed height content which has a resolution of 2m. In comparison, ITN is a 2D network and therefore does not provide a height value.

A visual representation of the comparison of the two data models can also be seen in figure 1.
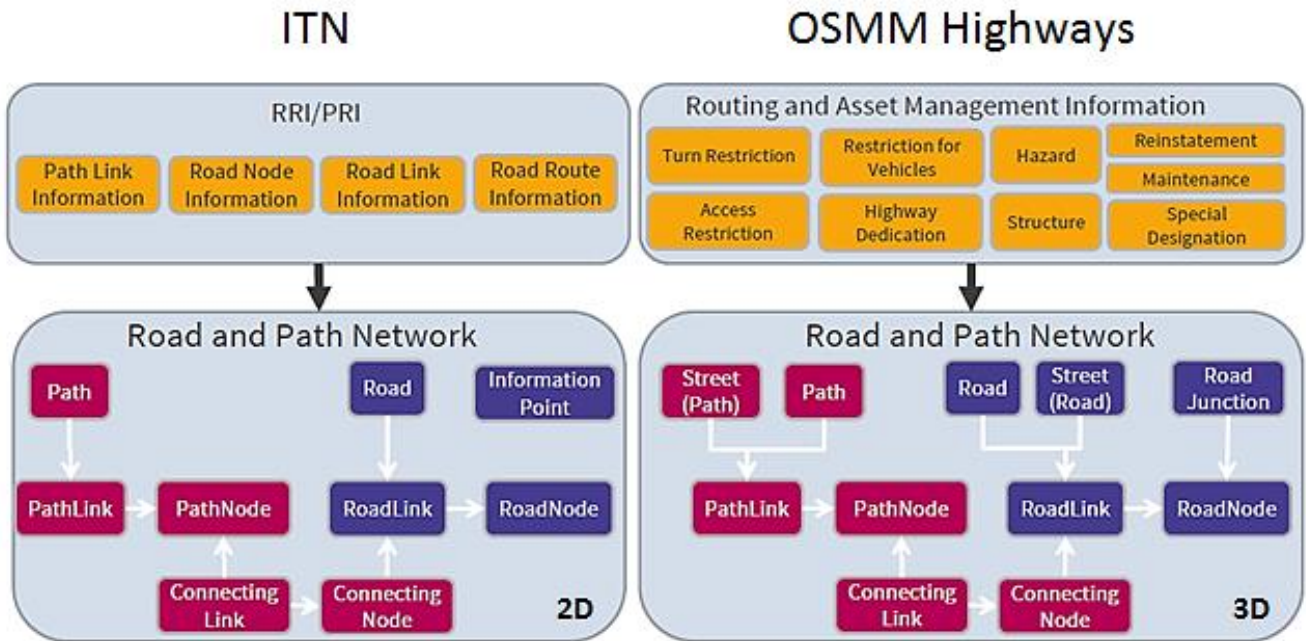
Figure 1 ITN and OS MasterMap Highways Network data models

Persistent Identifiers

Both ITN and OS MasterMap Highways Network contain the same features of the road and path network. Moreover, the TOIDs in OS MasterMap ITN have moved across to OS MasterMap Highways Network and are persistent. Therefore, all TOIDs within OS MasterMap Integrated Transport Network will be carried over into OS MasterMap Highways Network.

Common Attributes

There are common attributes across both ITN and Highways features such as the unique identifiers(TOID/id) and lifecycle information features.

There are a few attributes that were in ITN and not in Highways: version (iteration of the feature); change history (when attribute changes), descriptive group and theme. These attributes were considered superfluous and not really used for any analysis purposes and therefore were not included in Highways. This was established through customer feedback on the ITN product.

Chapter 3   Core Network Comparison

Road Network

Between ITN and Highways, the core road network is structured in a similar way. Both products include RoadLink, RoadNode and Road feature types but the attribution for these features are quite different which this chapter will cover. Information about motorway junctions has been renamed from InformationPoint to RoadJunction in addition to a new feature type in Highways, being Street. For an overview comparison of the structure of the road network in both products please see figure 2.
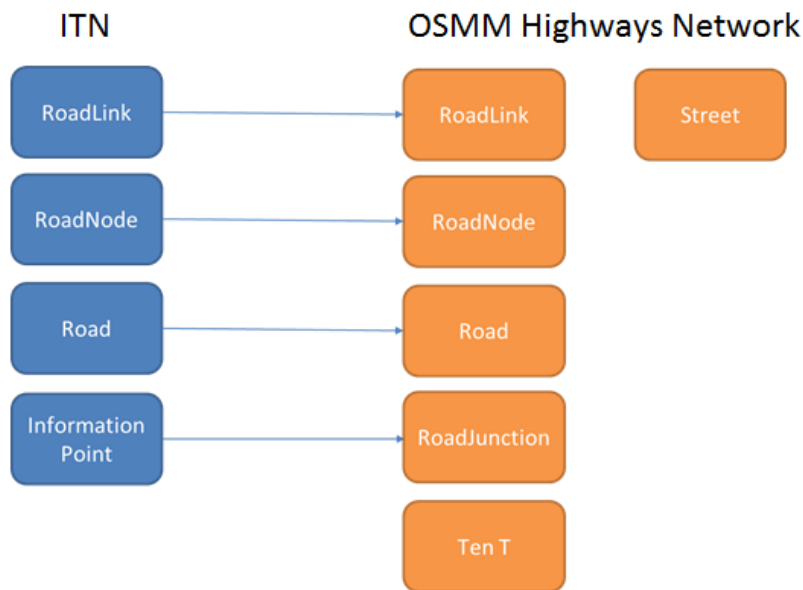
Figure 2 Overview comparison of the road network in ITN and OS MasterMap Highways Network

Road Link

In both products the road link represents the general alignment of the road network. The road link geometry is sourced from OS large scale content for both products. However, in ITN the geometry is 2D, whereas in Highways the geometry is 3D.

The attribution between the two products is different which includes direct mapping of information to new attributes, superfluous attribution has been removed and new attribution has been incorporated through bringing in authoritative information and enhanced data processing A detailed comparison is shown in the table below.

| ITN		OSMM Highways Network	Additional information
TOID		id	Persistent identifier from one product to another.
reasonForChange		reasonForChange	
versionDate		beginLifespanVersion	
version			The version number was not carried through into Highways.
changeHistory			Change History has not been carried through into Highways.
descriptiveGroup			Attribute value not required in Highways.
theme			Attribute value not required in Highways.
descriptiveTerm		roadClassification	The descriptive term attribute provided information on the classification of the road link. In Highways this has been provided across two attributes. Road Classification identifies the legally designated classification of the Road Link whilst Route Hierarchy provides a classification of the road to give an appropriate route.
		routeHierarchy	
natureOfRoad		formOfWay	natureOfRoad has been renamed to formOfWay and provides the same information.
Length		length	
polyline		centrelineGeometry	
directedNode	xlink:href	startNode endNode	Both ITN and Highways reference the RoadNodes which are at the start and end of the road link. ITN holds this as through the complex attribute, directedNode. The orientation attribute identifies whether the TOID reference is the start node or the end node. In Highways this is explicit through the attribute name.
	orientation		
	gradeSeparation	startGradeSeparation endGradeSeparation	Both ITN and Highways include grade separated information. ITN holds this through the complex attribute, directedNode. The gradeSeparation

			attribute will be populated where the value is greater than 1. In Highways, this has been made simpler as the grade separated information is held as a separate attribute and is a mandatory field.
referenceToTopographicArea		relatedRoadArea	Both attributes give reference to OSMM Topography Layer TOID of the relevant topographic areas the Road Link intersects.
		roadName	In ITN the road name is not held on the Road Link. In Highways the road name has been brought down on the Road Link.
		roadClassificationNumber	In ITN the road number is not held on the Road Link. In Highways the road number has been brought down on the Road Link.
		primaryRoute	In ITN, to identify links which make up the Primary Route Network the Road feature is required. In Highways this information has been brought down onto the Road Link.
		trunkRoad	In ITN, to identify links which make up the Trunk Road Network the Road feature is required. In Highways this information has been brought down onto the Road Link.
		alternateName	Where the Local Authority view of the road name differs to Ordnance Survey's view of the Road Name this attribute will be populated with Ordnance Survey's road name.
		matchStatus	New attribute in Highways which identifies if the Road Link has been matched to an NSG feature.
		alternateIdentifer	New attribute in Highways and provides the identifier of the elementary street unit (ESU) the Road Link has been matched to where there is a match.
		elevationGain	New attribute in Highways identifying the total elevation gain.
		roadWidth	New attribute in Highways to provide an indication of the Road Links width based upon OS MasterMap Topography Layer.

	provenance	New attribute in Highways which identifies the origin and derivation of the three dimensional geometry of the Road Link.
	directionality	New attribute in Highways which identifies in which direction the traffic flows.
	cycleFacility	New attribute in Highways which identifies if cycle infrastructure exists which is populated from the NSG.
	roadStructure	New attribute in Highways which identifies whether a RoadLink passes through or over a physical structure.
	operationalState	New attribute in Highways which identifies the construction status of the road according to the NSG.

Examples that illustrate the comparison of the road link feature type in both products can be observed in figure 3.

ITN
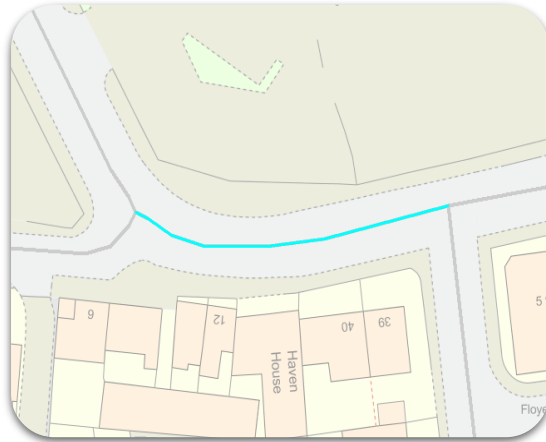
TOID: osgb4000000025335806

descriptiveTerm:Local Street

natureOfRoad: Single Carriageway

directedNode:

  xlink:href: osgb4000000025278000

  orientation: -

  xlink:href: osgb4000000025277993

  orientation: +

OS MasterMap Highways

id: osgb4000000025335806

roadClassification: Unclassified

routeHierarchy: Local Road

formOfWay: Single Carriageway

startNode: osgb4000000025278000

endNode: osgb4000000025277993

startNodeGradeSeparation: 0

endNodeGradeSeparation: 0

**Figure 3 Examples of the same road link in both products**

Road Node

In both products the Road Node is a point spatial object that provides the connecting breaks within the network. The network splits where an attribute changes, an intersection or crossing of Road Links occurs, a Road Link starts or ends. Likewise, in both products the geometry is a GM_Point, with the only difference being that in Highways the z value is also present (3D point).

All attributes are the same in ITN and Highways except for four attributes in Highways that extend and specialise the road node classification: formOfRoadNode, classification, junctionName and junctionNumber. This will help with queries and analysis at road node level.

ITN	OSMM Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
point	geometry	
referenceToTopographicArea	relatedRoadArea	Both attributes give reference to OSMM Topography Layer TOID of the relevant topographic area the Road Node intersects.
	formOfRoadNode	New attribute in Highways which is driven by the INSPIRE specification. It provides a classification of the node.
	classification	New attribute in Highways which is an additional specialisation of the formOfRoadNode.
	junctionName	New attribute in Highways which provides the names of any junction the Road Node forms part of.
	junctionNumber	New attribute in Highways which provides the number or any junction the node represents part of.

A comparison of examples from ITN and OSMM Highways is illustrated in Figure 4.

ITN
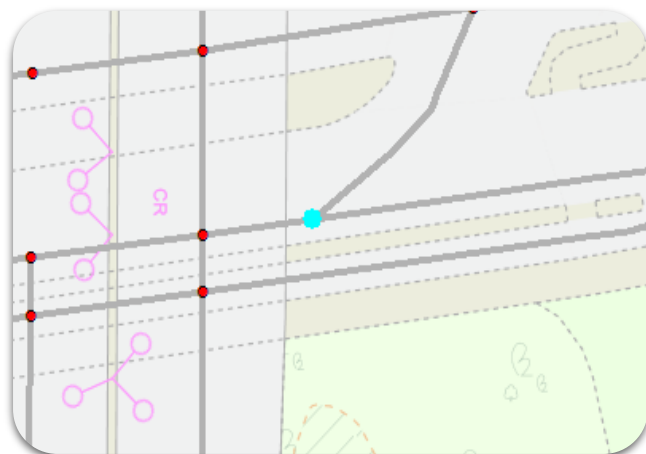
TOID: osgb4000000025280956

referenceToTopographicArea:
osgb5000005104743778
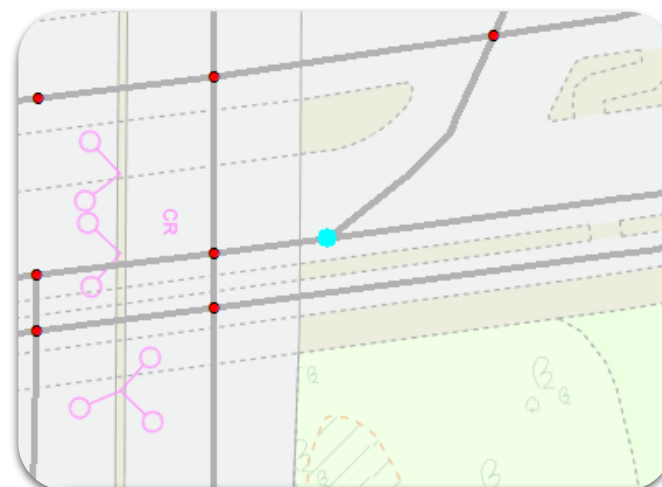
OS MasterMap Highways Network

id: osgb4000000025280956
relatedRoadArea :
osgb5000005104743778

formOfRoadNode: junction

classification: Motorway Junction

junctionNumber: M5 J29

Figure 4 Examples of the same Road Node in both products

Road

In both products the Road feature is a link set representing a collection of Road Link features used primarily by motorised vehicles that share the same name (e.g. Bilston Road) or classification number (e.g. A41). Likewise, for both products the Road feature will reference the complete collection of Road Links irrespective of which authority boundary it falls within.

Both products source the Road feature from the named Roads within OS Roads data.

In ITN the information about a Road feature being a primary or a trunk road is held within the descriptiveTerm attribute. However, in Highways this information has been moved as two separate attributes of the Road Link feature.

ITN	OSMM Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
theme		Attribute value not required in Highways.
boundedBy		Attribute value not required in Highways.
descriptiveGroup	roadClassification	Descriptive group is a mandatory attribute in ITN, whereas roadClassification is an optional attribute in Highways
descriptiveTerm		In Highways, the descriptive term attribute which is showing whether the road is a primary road, or a trunk road has been moved at Road Link level in two separate Boolean type attributes called primaryRoute and trunkRoad.
roadName	designatedName	The roadName attribute in ITN has been split in Highways in order to level and specialise the road name according to road type(named road or numbered road). In Highways, if the roadClassification = "Motorway" or "A Road" or "B Road" then the nationalRoadCode shall not be null.
	nationalRoadCode	
networkMember	link	

A comparison of examples from ITN and OSMM Highways is illustrated in Figure 5.

ITN

TOID: osgb4000000030575810

descriptiveGroup : A Road

roadName: A30

networkMember:
osgb4000000026191231

osgb4000000023256869

osgb4000000023256868

OS MasterMap Highways Network

id: osgb4000000030575810
roadClassification: A Road

nationalRoadCode: A30

link:

osgb4000000026191231

osgb4000000023256869

osgb4000000023256868

**Figure 5 Examples of the same Road in both products**

Road Junction

The Road Junction feature is represented differently in ITN and Highways. In ITN the Road Junction represents a floating point around an area where the junction is. Even though in ITN this feature has geometry, the attribution only contains the common attributes and the junctionName attribute. This attribute contains information about the junction name and its type, however it is difficult to query as it is a concatenated string (e.g. M5 J29/A3057).

In Highways the Road Junction feature has no geometry supplied, however includes reference to all the Road Nodes that make up the junction. All motorway junctions and named junctions are represented in OSMM Highways Network product. This allows for more efficient querying of the data in order to find identify numbered junctions (by type) and to accommodate named junctions without having to rummage in the attributes.

ITN	OSMMM Highways Network	Additional Information
Information Point	**Road Junction**	
TOID	id	Persistent identifier from one product to another
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
point		
junctionName	junctionName	New attribute in Highways which shows the name of the junction. If junction is a numbered junction only the full reference is given (e.g. M6 Junction 6). Where a name is given the name is provided as localised character string.
	roadClassificationNumber	New attribute in Highways which shows New Official Road Number as assigned by the relevant authority. E.g. M6
	junctionNumber	New attribute in Highways which shows the number of the junction. E.g. 6 or 10a
	junctionType	New attribute in Highways which shows the junction type such as: "Named Junction", "Numbered A Road Junction", "Numbered Motorway Junction".
	node	New attribute in Highways which gives reference to the Road Node features that make up the Road Junction feature.

A comparison of examples from ITN and OSMM Highways is illustrated in Figure 6.

ITN
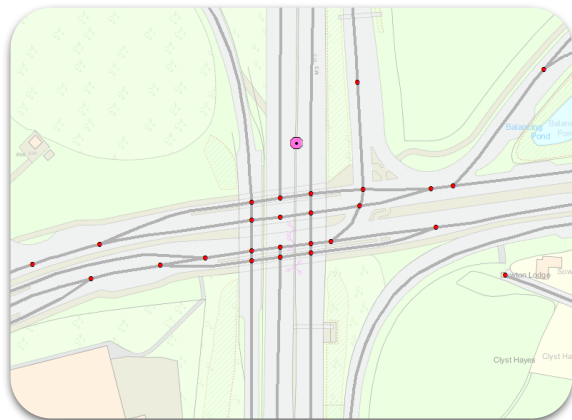
TOID: osgb4000000025379885

junctionName: M5 J29/A3057

OS MasterMap Highways Network

id: osgb4000000025379885
junctionName: M5 J29

roadClassificationNumber: M5

junctionNumber: 29

node: osgb5000005104743781
    osgb4000000025380035
    osgb4000000025380034
    osgb4000000025280991
    osgb4000000025280990
    osgb4000000025280958
    osgb4000000025280957

Figure 6 Examples of the same Road Junction in both products

Path Network

Between UPN and Highways, the core path network is structured in a similar way. Both products include Path Link, Path Node and Path feature types but the attribution for these features are quite different which this section will cover. Path Link and PathLinkInformation in UPN have been merged into a single Path Link feature in addition to a new feature type in Highways, being Street. For an overview comparison of the structure of the path network in both products please see figure 7.
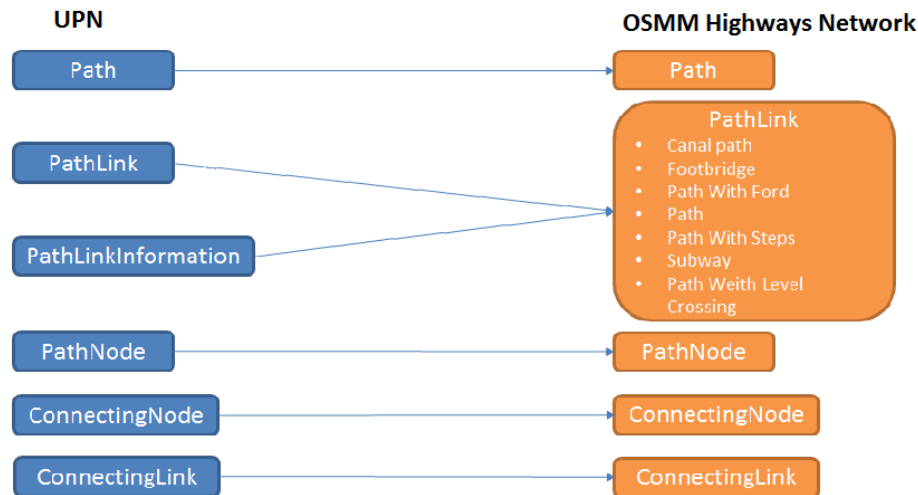

Figure 7 Overview comparison of the path network in UPN and OS MasterMap Highways Network

Path Link and Path Link Information

In both products the path link represents the general alignment of the path network. The path link geometry is sourced from OS large scale content for both products. However, in UPN the geometry is 2D, whereas in Highways the geometry is 3D.

The attribution between the two products is different which includes direct mapping of information to new attributes, superfluous attribution has been removed and new attribution has been incorporated through bringing in authoritative information and enhanced data processing. A detailed comparison is shown in the table below.

UPN		OS MasterMap Highways Network	Additional Information
PathLinkInformation	**Path Link**	**Path Link**	
	TOID	id	Persistent identifier from one product to another
TOID			Superfluous attribute
	reasonForChange	reasonForChange	
	versionDate	beginLifespanVersion	
	version		The version number was not carried through into Highways.
	changeHistory		Change History has not been carried through into Highways.
	descriptiveGroup		Attribute value not required in Highways.
	theme		Attribute value not required in Highways.
	descriptiveTerm	formOfWay	In UPN the path link classification was split into two attributes which were sitting into two separate features types. The descriptiveTerm attribute contains a high-level classification of the Path Link (e.g. Footpath) whereas the environmentQualifier specifies any known environmental conditions useful for routing (e.g. Step). In Highways this information has been synthetized into the formOfWay attribute which improves and eases querying the data for path link classification.
environmentQualifier			
	length	length	
	make	surfaceType	Same information represented, just different naming of the attributes.
	polyline	centrelineGeometry	
	directedNode xlink:href		

		orientation	startNode endNode	directedNode in UPN is giving you info on the PathNodes at the start or finish of the Path Link, referencing the Path Node TOIDs. The start node has a negative orientation and the end node a positive orientation. This reference includes a grade separation. However, grade separation is optional in UPN, but is mandatory in Highways and it is 0(when there is no overlapped paths) or 1(e.g. path on bridge over another path). Splits for grade separation are provided within the Path Network only, where a path crosses a road or vice versa no node is supplied to indicate the separation. In Highways, the reference to the Path Nodes is much more explicitly defined through the startNode and endNode in each Road Link(first and last vertex of the road link).
		gradeSeparation	startGradeSeparation endGradeSeparation	
	referenceToTopographicArea		relatedArea	Both attributes give reference to OSMM Topography Layer TOID of the relevant topographic areas the Road Link intersects.
referenceToPathLink			id	Same id of the Path Link feature as above
			pathName	In ITN the path name is not held on the Path Link. In Highways the path name has been brought down on the Path Link.
			alternateName	Where the Local Authority view of the path name differs to Ordnance Survey's view of the Path Name, this attribute will be populated with Ordnance Survey's path name.
			alternateIdentifier	New attribute in Highways and provides the identifier of the elementary street unit (ESU) the Path Link has been matched to where there is a match.
			matchStatus	New attribute in Highways which identifies if the Path Link has been matched to an NSG feature.

		provenance	New attribute in Highways which identifies the origin and derivation of the three dimensional geometry of the Path Link.
		cycleFacility	New attribute in Highways identifies whether the Path Link has facilities for cyclists. – Currently only "Unknown Type Of Cycle Route Along Footway" is populated.
		elevationGain	New attribute in Highways identifying the total elevation gain.

UPN

PathLinkInformation

TOID: osgb4000000045379275

environmentQualifier: step

referenceToPathLink:4000000066879848

UPN

PathLink

TOID: osgb4000000066879848

descriptiveTerm: Footpath

Length: 79.61
make: Manmade

OS MasterMap Highways Network

id: 4000000066879848

formOfWay: Path with Steps

Length: 79.61
surfaceType: Made Sealed

Path Node

In both products the Path Node is a point spatial object that provides the connecting breaks within the path network. The network splits where an attribute changes, an intersection or crossing of Path Links occurs, a Path Link starts or ends. Likewise, in both products the geometry is a GM_Point, with the only difference being that in Highways the z value is also present(3D point).

All attributes are the same in ITN and Highways except for four attributes in Highways that extend and specialise the road node classification: formOfRoadNode, classification, this will help with queries and analysis at Path Node level.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
point	geometry	
referenceToTopographicArea		
	formOfRoadNode	New attribute in Highways which is driven by the INSPIRE specification. It provides a classification of the node.
	classification	New attribute in Highways which is an additional specialisation of the formOfRoadNode.

UPN

TOID: osgb4000000064523848

OS MasterMap Highways Network

id: osgb4000000064523848

**formOfRoadNode:** junction

Path

In both products the Path feature is a link set representing a collection of Path Link features. Likewise, for both products the Path feature will reference the complete collection of Path Links irrespective of which authority boundary it falls within. Both products source the Path feature from the named Paths within OS Paths data.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.

reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
boundedBy		Attribute value not required in Highways.
pathName	pathName	
networkMember	link	

UPN

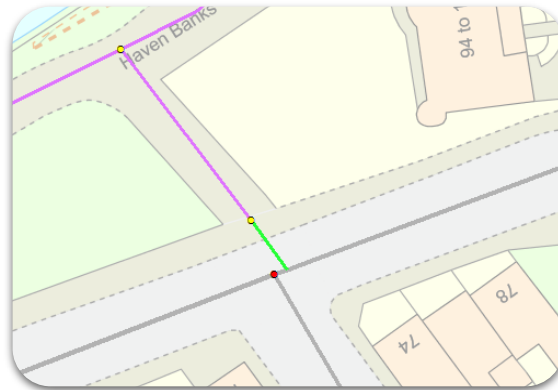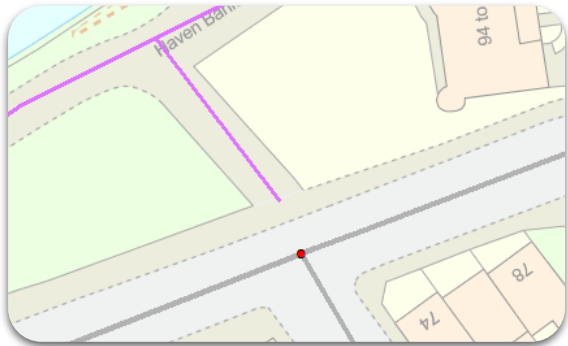**TOID: osgb**4000000025335806

pathName:HAVEN BANKS
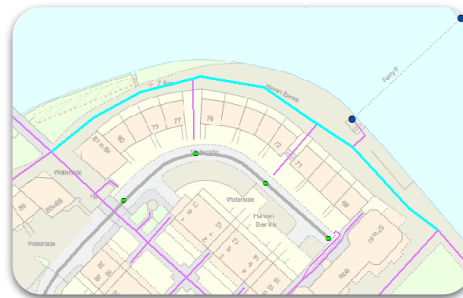
OS MasterMap Highways Network

id: 4000000025335806

pathName: HAVEN BANKS

Connecting Link

In both products the connecting link feature and connecting node feature represent the connection between the path network and the road network. The connecting link geometry is inferred in ITN, however in Highways the geometry is explicitly given through the connecting link geometry attribute. This allows for a much better connectivity between and the road and path network and enhances the routing functionality of the network. A detailed comparison is shown in the tables below.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	

ITN		Highways	Notes
versionDate		beginLifespanVersion	
version			The version number was not carried through into Highways.
changeHistory			Change History has not been carried through into Highways.
descriptiveGroup			Attribute value not required in Highways.
theme			Attribute value not required in Highways.
directedNode	xlink:href orientation	connectingNode pathNode	Both ITN and Highways reference the path node and connecting node which are at the start and end of the connecting link. ITN holds this as through the complex attribute, directedNode. The orientation attribute identifies whether the TOID reference is the start node or the end node. In Highways this is explicit through the attribute name.
		geometry	New attribute in Highways which provides the geometry of the connecting link.
		fictitious	New Boolean attribute in Highways which indicates whether the geometry of the link is a logical connecting straight line with no intermediate control points (true)– unless the straight line is a real topological representation of the geography in the data(false).

UPN

TOID: osgb4000000066885806

directedNode

 xlink:href: osgb4000000064522574

orientation: +

directedNode

xlink:href: osgb4000000064524063

orientation: -

OS MasterMap Highways Network

id: osgb4000000066885806

**connectingNode: osgb4000000064522574**

pathNode: osgb4000000064524063

Connecting Node

In both products the Connecting Node is a point feature that identifies the point along the RoadLink which the PathLink connects to. The ConnectingNode has been snapped to a vertex along the RoadLink and provides a reference to the RoadLink it has been snapped to. The RoadLink is not split at the location of the ConnectingNode. The ConnectingNode is referenced by a ConnectingLink. A detailed comparison is shown in the tables below.

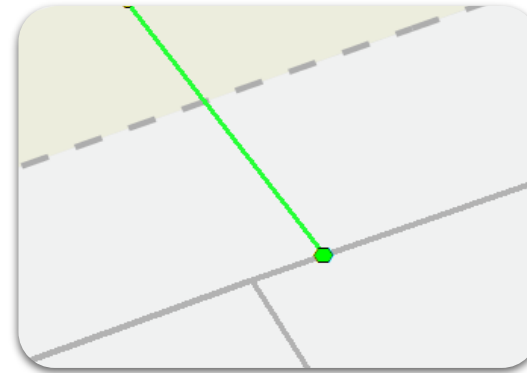| UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.

theme		Attribute value not required in Highways.
point	geometry	
referenceToITN	roadLink	

UPN
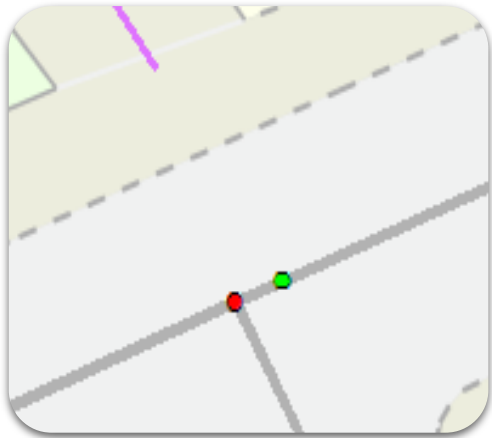
TOID: osgb4000000064522574

referenceToITN: 4000000025335791

OS MasterMap Highways Network

id: osgb4000000064522574

roadLink: osgb4000000025335791

Ferry Network

Between ITN and Highways, the ferry network is structured in a similar way. Both products include FerryLink, Ferry Node and Ferry Terminal feature types but the attribution for these features are quite different which this section will cover. Additional attributes have been added in Highways to give more detailed information about the ferry network. For an overview comparison of the structure of the ferry network in both products please see figure 8.
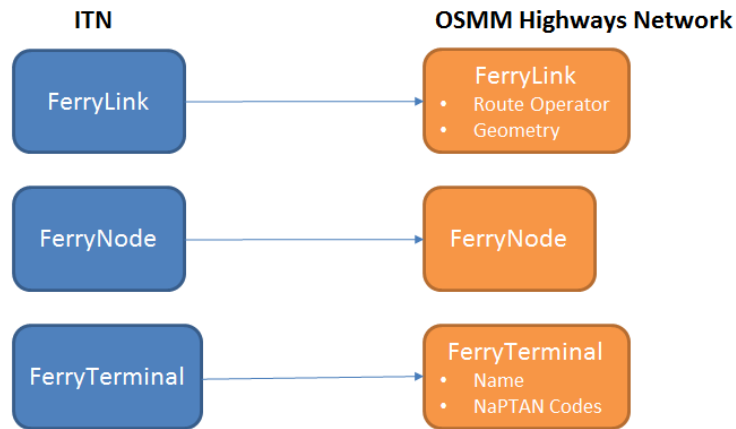
ITN

- FerryLink
- FerryNode
- FerryTerminal

OSMM Highways Network

- FerryLink
  - Route Operator
  - Geometry
- FerryNode
- FerryTerminal
  - Name
  - NaPTAN Codes

Figure 8 Overview comparison of the ferry network in ITN and OS MasterMap Highways Network

Ferry Link

In both products the ferry link is a feature which represents the connectivity of a vehicular ferry route across a body of water. A FerryLink will only be captured where the route is limited to pedestrians only and both terminals are within Great Britain, and there is a timetabled service which is open to the public. The ferry link has geometry captured only in Highways and is sourced from OS large scale content. In ITN the geometry of the ferry link is inferred from its attribution.

The attribution between the two products is different which includes direct mapping of information to new attributes, superfluous attribution has been removed and new attribution has been incorporated through bringing in enhanced data processing. A detailed comparison is shown in the table below.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	

versionDate		beginLifespanVersion	
version			The version number was not carried through into Highways.
changeHistory			Change History has not been carried through into Highways.
descriptiveGroup			Attribute value not required in Highways.
theme			Attribute value not required in Highways.
descriptiveTerm		vehicularFerry	The descriptive term attribute provided information on the classification of the ferry link. In Highways this has been provided in vehicularFerry attribute.
directedNode	xlink:href	startNode endNode	Both ITN and Highways reference the ferry link nodes which are at the start and end of the ferry link. ITN holds this as through the complex attribute, directedNode. The orientation attribute identifies whether the TOID reference is the start node or the end node. In Highways this is explicit through the attribute name.
	orientation		
		centrelineGeometry	New attribute in Highways which provides the geometry of the ferry link.
		fictitious	New Boolean attribute in Highways which indicates whether the geometry of the link is a logical connecting straight line with no intermediate control points (true)– unless the straight line is a real topological representation of the geography in the data(false).
		routeOperator	New attribute in Highways which provides information about the operator of this Ferry route.

UPN
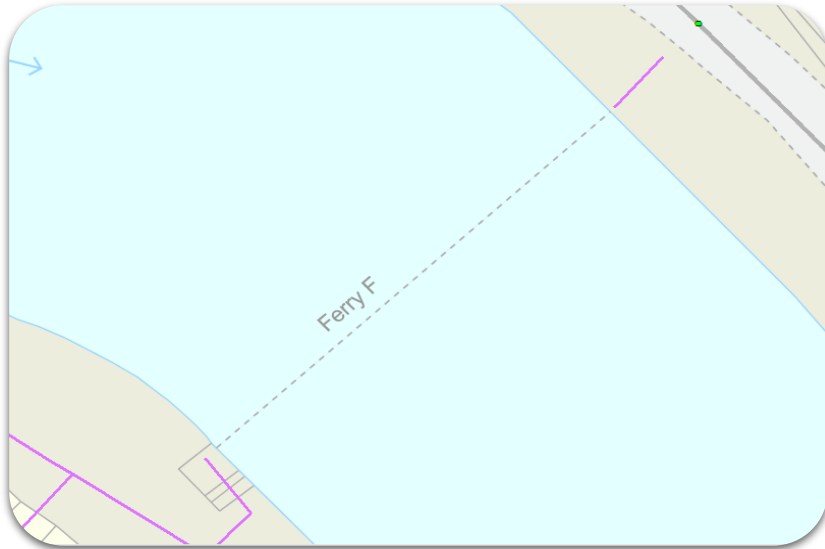
TOID: osgb4000000067841675

descriptiveTerm: Pedestrian

directedNode:

 xlink:href: osgb4000000067841681

orientation: +

directedNode

xlink:href: osgb4000000067841680

 orientation: -

OS MasterMap Highways Network

id: osgb4000000067841675 **vehicularFerry**: false
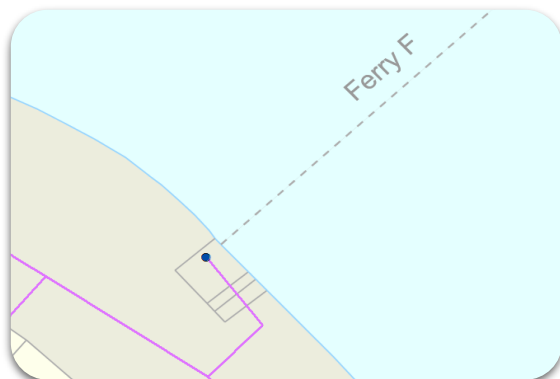
startNode:osgb4000000067841681

endNode: osgb4000000067841680

Ferry Node

In both products the Ferry Node is a point spatial object that provides the connecting breaks within the ferry network. The network splits where a Ferry Link starts or ends. Likewise, in both products the geometry is a GM_Point, with the only difference being that in Highways the z value is also present (3D point).

All attributes are the same in ITN and Highways except for formOfWaterwayNode in Highways which informs you that this is a location where goods are transhipped.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
point	geometry	
	formOfWaterwayNode	New attribute in Highways which describes the function of a waterway node in the water transport network. This has been inherited from INSPIRE model and it is only populated with 'water terminal' value, which informs you that this is a location where goods are transhipped.

UPN

TOID: osgb4000000067841681

OS MasterMap Highways Network

id: osgb4000000067841681

**formOfWaterwayNode:** waterTerminal

Ferry Terminal

In both products the ferry terminal represents a connection between the ferry and road network. Likewise, in both products the Ferry Terminal is a logical connection between the two networks and therefore there is no geometry supplied with these features. A reference to the OS Mastermap Sites feature will be provided in its attribution in both products.

UPN	OS MasterMap Highways Network	Additional Information
TOID	id	Persistent identifier from one product to another.
reasonForChange	reasonForChange	
versionDate	beginLifespanVersion	
version		The version number was not carried through into Highways.
changeHistory		Change History has not been carried through into Highways.
descriptiveGroup		Attribute value not required in Highways.
theme		Attribute value not required in Highways.
referenceToNetwork	element	Both ITN and Highways use network referencing to relate this feature back to the Road Node or PathNode and the Ferry Node. In Highways this is explicitly defined in two attributes: element which shows the type of node the element is referencing and xlink:title which gives you the id of the node.
	xlink:title	
	type	New attribute in Highways which provides a categorisation of the network connection. This has been inherited from INSPIRE model and it is only populated with 'intermodal' value. This value shows that this feature is a connection between two network elements. The connection represents a possibility for the transported media (people, goods, etc) to change from one transport mode to another (land to water).
	ferryTerminalCode	New attribute in Highways which will provide the recognised code of the Ferry Terminal. At the moment this attribute is not populated as there was no source data available.

	ferryTerminalName	New attribute in Highways which will provide the name of the Ferry Terminal. At the moment this attribute is not populated as there was no source data available.
	refToFunctionalSite	New attribute in Highways which provides reference to the Site representation of the Ferry Terminal in OS MasterMap Sites Layer.

UPN
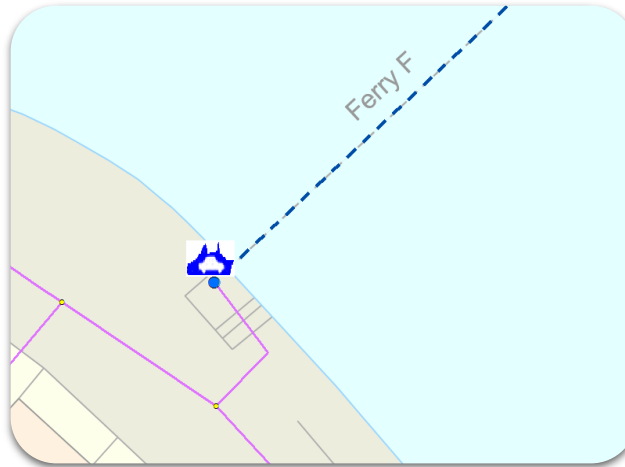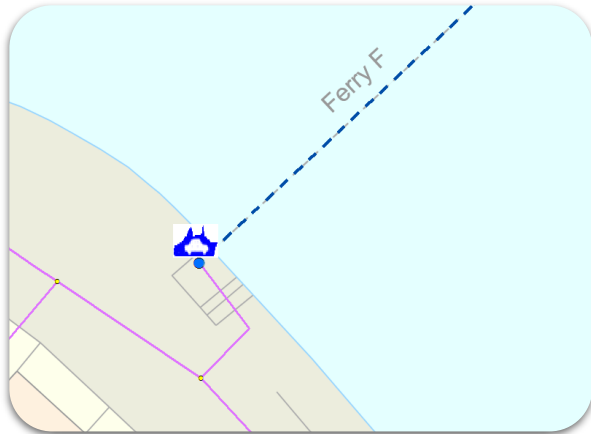
TOID: osgb4000000025335806

referenceToNetwork:

osgb4000000023581896

osgb4000000023671913

OS MasterMap Highways Network

id: osgb4000000067841682

element:

xlink:href: osgb4000000067841680
xlink:role: FerryNode

xlink:href: osgb4000000067841662
xlink:role: PathNode

Chapter 4   Routing Comparison

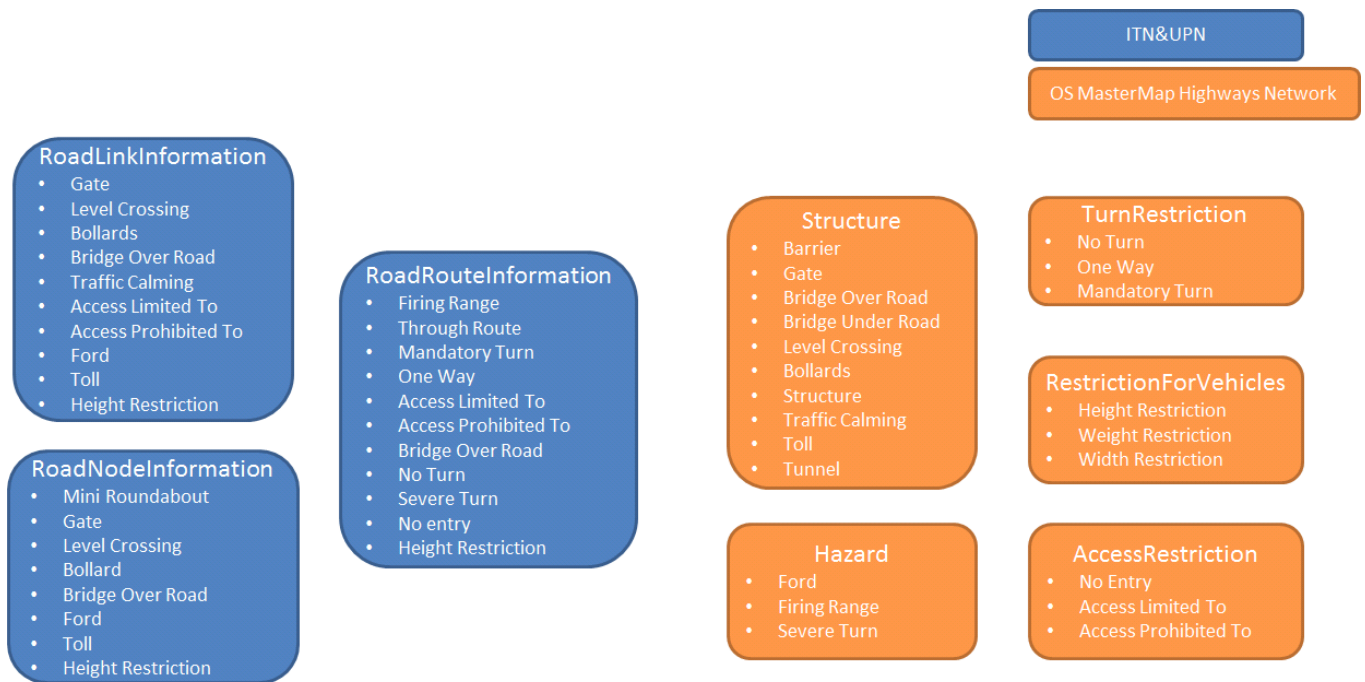**This chapter will have more information added soon.**

ITN&UPN

OS MasterMap Highways Network

RoadLinkInformation
- Gate
- Level Crossing
- Bollards
- Bridge Over Road
- Traffic Calming
- Access Limited To
- Access Prohibited To
- Ford
- Toll
- Height Restriction

RoadRouteInformation
- Firing Range
- Through Route
- Mandatory Turn
- One Way
- Access Limited To
- Access Prohibited To
- Bridge Over Road
- No Turn
- Severe Turn
- No entry
- Height Restriction

RoadNodeInformation
- Mini Roundabout
- Gate
- Level Crossing
- Bollard
- Bridge Over Road
- Ford
- Toll
- Height Restriction

Structure
- Barrier
- Gate
- Bridge Over Road
- Bridge Under Road
- Level Crossing
- Bollards
- Structure
- Traffic Calming
- Toll
- Tunnel

TurnRestriction
- No Turn
- One Way
- Mandatory Turn

RestrictionForVehicles
- Height Restriction
- Weight Restriction
- Width Restriction

Hazard
- Ford
- Firing Range
- Severe Turn

AccessRestriction
- No Entry
- Access Limited To
- Access Prohibited To

Figure 9 Structure of routing features in both products

Network Referencing

Rights & Restrictions

Advisory Information

Chapter 5   Additional Features in OS MasterMap Highways Network

OS MasterMap Highways Network contains additional street information and asset management information at local highway authority level for England and Wales. As opposed to ITN which is only sourced from OS large scale content data, OS MasterMap Highways Network provides OS detailed geometry and routing information on highways together with street and asset management information from the National Street Gazetteer in to one central location. The National Street Gazetteer is created through the compiling of 174 Local Street Gazetteers (LSGs) and the Trunk Road Street Gazetteer (TRSG). The TRSG provides the authoritative information about the road and path network.

OS MasterMap Highways Network sources the following features from the National Street Gazetteer:
- Street
- Highway Dedication (within Rights and Restrictions category)
- Maintenance (within Asset management information category)
- Reinstatement (within Asset management information category)
- Special Designation (within Asset management information category)

Street

The Street is an additional feature type contained within all three products of OS MasterMap Highways Network portfolio and is present in both the road and the path network. A Street feature extends and specialises the Road feature in the road network, respectively the Path feature in the path network. In both the road and the path network, the Street will split when it crosses the boundary of an Administrative Area where the local maintenance responsibility changes. A Street could also split at a town or locality boundary to allow properties to be located uniquely upon a street via a geographic identifier (i.e. USRN).

The Street data is sourced from the National Street Gazetteer and will exist regardless of whether an Elementary Street Unit geometry has been matched to at least one RoadLink or PathLink. Within the Road Network will only reference Streets made up of RoadLinks and within the Path Network will only reference Streets made up of PathLinks. RoadLinks as well as PathLinks can be referenced by multiple Streets. Geometry is aggregated from the matched links that make up the Street.

The Street feature contains attribution about the street classification in the NSG, a list referencing all the RoadLink or PathLink features making up the Street feature, the authority responsible for naming and numbering the highway, official street name given by the designated Street Naming Authority, the name of the administrative area the street is located within or the operational state.

Highway Dedication

Highway Dedication feature provides an indication of the type of Highway user who has access to that particular section of the Highway and is included in the Rights and Restrictions category within the OS MasterMap Highways Network – Roads and Routing and Asset Management and OS MasterMap Highways Network – Paths products.

The Highway dedication value is only an inference of where a Public Right of Way exists and therefore not the definitive record of Public Rights of Way, that is the definitive map held by the relevant authority.

A Highway Dedication feature will reference back to the Road Network through Network Reference and will reference a RoadLink or Street Feature. Similarly, a Highway Dedication feature will reference back to the Path Network through Network Reference and will reference a Path Link or Street Feature.

Asset Management Information features

The asset management information features are sourced from authoritative data in the NSG and will be contained in both the OS MasterMap Highways Network – Roads and Routing and Asset Management product and OS MasterMap Highways Network – Paths product. The asset management information features are Maintenance, Reinstatement and Special Designation.

Maintenance

The Maintenance feature provides information about whether a road or a path is maintained at public expense by a national or local highway authority, a road authority or is maintained by another responsible organisation (i.e. not maintained at public expense). If a road or path is prospectively maintainable at public expense, then this is not currently maintained by a road or highway authority, but the responsible organisation has started the process to become responsible for the maintenance of the street at public expense. Maintenance responsibility does not provide an indication of ownership.

A Maintenance feature will reference back to the Roads product or Paths product through Network Reference and will reference a Street Feature. There are also Maintenance features which are a partial reference and for those a Network Reference Location will be provided.

Reinstatement

The Reinstatement feature provides information about the standard to which the path must be restored to following opening due to works in the highway, as defined in the New Roads and Street Works Act Specification for the Reinstatement of Openings in Highways in England and Wales and the New Roads and Street Works Act 1991 Specification for the Reinstatement of Openings in Roads in Scotland.

A Reinstatement feature will reference back to the Road Network through a Network Reference and will reference a Street Feature. Features which are a partial reference will provide a Network Reference Location.

Special Designation

The Special Designation feature advises of additional statutory information relating to the carrying out of street or road works on a Highway. This could be information about what is underneath, above or close to the highway or information about an event taking place or the highway having a relevant special significance. A Special Designation feature will reference back to the Roads product or Paths product through Network Reference and will reference a Street Feature. Features which are a partial reference will provide a Network Reference Location. The Special Designation feature contains attribution about the type of special designation, contact authority, a free-text for additional information about designation (e.g. event information) or the time the designation applies to.

Chapter 6   Product Supply

This chapter is looking at comparing the product supply of the two products.

Supply Format

Highways is supplied in GML 3.2.1. zipped as a single file using gzip. Each feature type will be outputted in its own GML file and no other feature types will be supplied in that GML.

ITN is supplied in GML 2.1.2 and zipped in .gz format (geographically or non‑geographically chunked). ITN GML files contain a structured definition of each geographic feature and route information element.

Supply Media

Both ITN and OS MasterMap Highways Network products are available to PSMA, OSMA, commercial customers and partners through the online ordering system. The products are available as both full supply and change only update (COU). For Highways portfolio, customers can also order an Area of Interest (AOI) or a Managed GB Set. Highways portfolio is available as download for all customers, and DVD for customers ordering a Managed GB Set.

Coverage

Both products cover Great Britain. In Highways, the new additional information on routing and asset management which has been provided from the National Street Gazetteer will only be available for England and Wales.

Data Chunks

ITN data is supplied in manageable units referred to as chunks. Each chunk of data is provided as a compressed GML (.gz) file. Typically, each ITN data order consists of a number of .gz files, covering the area of interest specified in the order.

ITN data is supplied in both geographical and non-geographic chunks.

OS MasterMap Highways Network products will only be supplied as non-geographic chunks. Non-geographic chunking is a way of dividing up data into chunks that are supplied in separate volumes that have a feature count, as opposed to a given geographic National Grid area. For this reason, it is possible for features from various geographic locations to appear in one volume and for adjacent features to appear in different volumes. Non-geographic chunk volumes are designed to be loaded into spatial databases but can be used in a file format as long as all chunks are translated or imported into the system at the same time. For information on the volume feature counts for each feature type in OS MasterMap Highways Network please see Annex A in Highways Product Guide.

Product Packaging

Both products are supplied on DVD or downloaded using the online ordering service, for which you receive a similar structure of folders and files (e.g. data folder, doc folder). For both products the data folder will contain the actual data files which make up the ordered product, whereas the doc folder will contain more detailed information about the customer order. Highways also has an additional resources folder which contains information about the product's Feature Validation Data Set (FVDS), a look up table to the OS Open Roads product and a look up table to the Ten-T network. For further information on these resources please refer to the product guide for each product.

Further information

Further information about the ITN to Highways migration can be found on the dedicated web page on the Ordnance Survey website:

www.os.uk/itnmigration www.os.uk/itnmigration

Further information about the OS MasterMap Highways Network can be found on the Ordnance Survey website:

https://www.ordnancesurvey.co.uk/business-and-government/products/os-mastermap-highways-network.html

OS MasterMap Highways Network Help and Support page:

https://www.ordnancesurvey.co.uk/business-and-government/help-and-support/products/os-mastermap-highways-network.html

Technical Specification:

- Highways Roads: https://www.ordnancesurvey.co.uk/docs/technical-specifications/os-mastermap-highways-network-roads-technical-specification.pdf

- Highways Routing and Asset Management: https://www.ordnancesurvey.co.uk/docs/technical-specifications/os-mastermap-highways-network-routing-and-asset-management-technical-specification.pdf

- Highways Paths: https://www.ordnancesurvey.co.uk/docs/technical-specifications/os-mastermap-highways-network-paths-technical-specification.pdf

Product Guide:

https://www.ordnancesurvey.co.uk/docs/product-guides/os-mastermap-highways-network-product-guide.pdf