ORDNANCE SURVEY GB

OS MASTERMAP HIGHWAYS NETWORK – SPEED DATA – TECHNICAL SPECIFICATION

Version history

Version	Date	Description
1.0	07/2018	Initial release
1.1	12/2021	Product release months updated. Formatting updates to the document.

Purpose of this document

This document provides information about and insight into the OS MasterMap Highways Network – Speed Data product and its potential applications. For information on the contents and structure of OS MasterMap Highways Network – Speed Data, please refer to the OS MasterMap Highways Network Product Guide and Getting Started Guide.

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Contact details

OS website 'Contact us' page (https://www.ordnancesurvey.co.uk/contact-us).

Contents

1. Introduction to the OS MasterMap Highways Network speed products

The OS MasterMap Highways Network family has been enhanced with the addition of three new products:

• OS Master Highways Network with Routing and Asset Management Information and Average Speed

• OS Master Highways Network with Routing and Asset Management Information and Speed Limits

• OS Master Highways Network with Routing and Asset Management Information and Average Speed and Speed Limits

These three new products are supplied with an additional data file which will be either Average Speed, Speed Limits or a combination of both. This Technical Specification will cover the elements which make up the Average Speed and Speed Limits data files. For information relating to OS MasterMap Highways Network – Routing and Asset Management Information (RAMI), please see the relevant product technical specification which is available on the [Product Support page of the OS website](https://www.ordnancesurvey.co.uk/business-government/tools-support/mastermap-highways-support) (https://www.ordnancesurvey.co.uk/business-government/tools-support/mastermap-highways-support)

OS MasterMap Highways Network with Average Speed contains detailed historical speed information which provides the average speed travelled for all roads in Great Britain. This dataset is based on a year's worth of information collected by in-vehicle telematics devices that capture data for all roads.

OS MasterMap Highways Network with Speed Limits identifies the speed limit for a stretch of road based on road traffic signs. This dataset is sourced from local authorities, police forces and many other reliable sources to ensure a high level of accuracy. The data is continuously updated through a system of user feedback.

Both Average Speed and Speed Limits data are linked to the corresponding OS MasterMap Highways Network Road Link feature to which it belongs, identified by the Road Link TOID.

These speed datasets will be made available along with the OS MasterMap Highways Network – Routing and Asset Management Information (RAMI) product licence.

Available formats

OS MasterMap Highways Network with Average Speed dataset will be supplied as a Comma-Separated Value (.CSV) file.

OS MasterMap Highways Network with Speed Limits dataset will be supplied as a shapefile (.shp), for which the source projection is OSGB 1936 / ESPG 27700, British National Grid.

2. OS MasterMap Highways Network with Average Speed

The OS MasterMap Highways Network with Average Speed product identifies the average speed travelled across all roads in Great Britain at different times of day. The average speed is calculated based on detailed historical speed information, which is collected annually by in-vehicle telematics devices and mapped to each unique OS MasterMap RoadLink TOID. The average speed value is provided in both directions. The average speed is provided in km/h and for each road link.

The average speed product provides a detailed breakdown of the speed travelled at different times of day. The times of day available are as follows:

- 07:00 – 09:00 Monday – Friday (Peak AM)

- 10:00 – 16:00 Monday – Friday (Off Peak)

- 16:00 – 19:00 Monday – Friday (Peak PM)

- 19:00 – 23:00 every day (Evening)

- 00:00 – 04:00 every day (Night-time)

- Weekend

The context diagram (Figure 1) shows the feature attribution of Average Speed data and the relationship to the OS MasterMap Highways Network RoadLink feature. This is a one-to-one relationship and is realised through the "RoadLinkId" attribute in the Average Speed file.

2.1 Data creation and provenance

The OS MasterMap Highways Network with Average Speed product contains detailed average speed information which is calculated using over 135 000 vehicles with inbuilt trackers and GPS loggers and mixed-use vehicle fleet telematic data. The main type of vehicle is cars, but LGVs and HGVs are also used to calculate the average speed. The data is polled every 1 to 10 seconds and then attached to the Ordnance Survey road network.

The data is then analysed and checked against current and previous polls to ensure the data is captured against the correct OS MasterMap Road Link feature. The average speed data is provided with bi-directionality, meaning two speed values are provided on single carriageway roads. These speeds are named in the product data as an "A" speed and a "B" speed in km/h. The speed will be given on the road link for the direction of travel. The A side represents the direction from node A to B and is in direction of digitisation of the road link while the B side is from node B to A and is against direction of digitisation. When a link is one-way the speed will always be provided only in the A column attributes.

Within any given month of data collection, there will be 99% coverage of average speed information for Motorways, A Roads and B roads and over 50% coverage of C class roads. For road links or time periods where there is no speed data available over the 12 months, these road links are infilled using neighbouring link information to ensure 100% coverage of data. This data is released annually and built against one version of the Ordnance Survey network; therefore, the complete link matching is for this version only.
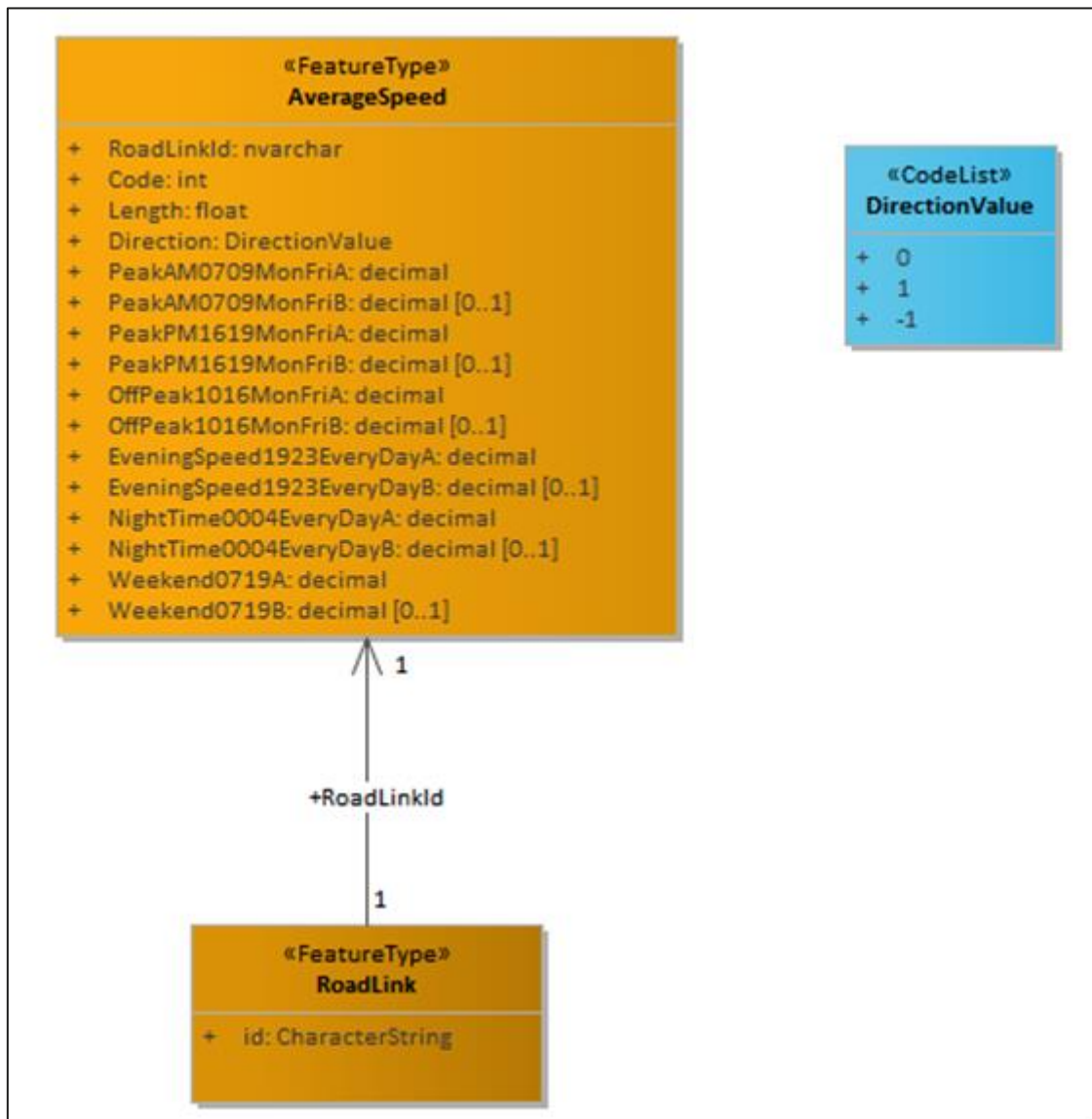
Figure 1: Context diagram for Average Speed and the relationship to the OS MasterMap Highways Road Link feature.

2.2 Attribution

«FeatureType» Average Speed

Definition: Historical Average Speed on a highway.

Attribute: RoadLinkId

Definition: Unique identifier, for OS MasterMap Road Link feature, this is a TOID.

Type: nvarchar	Size: 50	Multiplicity: [1]

Attribute: Code

Definition: The Road Feature code (e.g. 3000 Motorway).

Type: Integer		Multiplicity: [1]

Attribute: Length

Definition: The OS RoadLink length in metres.

Type: Float		Multiplicity: [1]

Attribute: Direction

Definition: The direction to which the average speed applies to.

Note: If this is populated with 0 the average speed applies to both directions (A and B) of a road link and if it is 1 (A>B direction, in direction of digitisation) or -1 (B>A Direction, against direction of digitisation) the average speed applies to one-way road links.

When the road link is one-way the speed will always be provided in the A column attributes and the Direction value 1 or -1 will show if the average speed applies in or against direction of digitisation of the road link.

Type: DirectionValue		Multiplicity: [1]

Attribute: PeakAM0709MonFriA

Definition: This is the average speed for Monday – Friday for 07:00 until 09:00 and is in direction of digitisation of the road link.

Type: Decimal	Size: (10, 2)	Multiplicity: [1]

Attribute: PeakAM0709MonFriB

Definition: This is the average speed for Monday – Friday for 07:00 until 09:00 and is against direction of digitisation of the road link.

Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]

Attribute: PeakPM1619MonFriA

Definition: This is the average speed for Monday – Friday for 16:00 until 19:00 and is in direction of digitisation of the road link.

Type: Decimal	Size: (10, 2)	Multiplicity: [1]

Attribute: PeakPM1619MonFriB

«FeatureType» Average Speed		
Definition: This is the average speed for Monday – Friday for 16:00 until 19:00 and is against direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]
Attribute: OffPeak1016MonFriA		
Definition: This is the average speed for Monday – Friday for 10:00 until 16:00 and is in direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [1]
Attribute: OffPeak1016MonFriB		
Definition: This is the average speed for Monday – Friday for 10:00 until 16:00 and is against direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]
Attribute: EveningSpeed1923EveryDayA		
Definition: This is the average speed for Monday – Sunday for 19:00 until 23:00 and is in direction of digitisation of the road link.		
Type: Decimal	Size: 120	Multiplicity: [1]
Attribute: EveningSpeed1923EveryDayB		
Definition: This is the average speed for Monday – Sunday for 19:00 until 23:00 and is against direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]
Attribute: NightTime0004EveryDayA		
Definition: This is the average speed for Monday – Sunday for 00:00 until 04:00 and is in direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [1]
Attribute: NightTime0004EveryDayB		
Definition: This is the average speed for Monday – Sunday for 00:00 until 04:00 and is against direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]
Attribute: Weekend0719A		
Definition: This is the average speed for Saturday – Sunday for 07:00 until 19:00 and is in direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [1]
Attribute: Weekend0719B		
Definition: This is the average speed for Monday – Sunday for 07:00 until 19:00 and is against direction of digitisation of the road link.		
Type: Decimal	Size: (10, 2)	Multiplicity: [0..1]

2.3   Code list

2.3.1   DirectionValue

The average speed information is provided in both directions of a road link, named A and B in the attributes. The Direction attribute informs you if the speed information applies to both directions of a road link or if it applies to one-way road links. When the speed is provided only within an "A" attribute means the speed applies to one-way road links and the direction values indicates if the speed applies in the direction or against the direction of digitisation. The table below describes the codes which will be used to populate this field and the description for each code.

Code List: ChangeValue https://www.ordnancesurvey.co.uk/xml/codelists/ChangeTypeValue.xml	
Code	**Description**
0	The speed information applies to both directions of the road link.
1	The speed information applies to a one-way road link and is in direction of digitisation of the road link (A>B direction).
-1	The speed information applies to a one-way road link and is against direction of digitisation of the road link (B>A direction).

2.4   Example record

Average Speed data is supplied as a Comma-Separated Values (CSV) file with headers included and will appear in the following format:

Attribute (Header)	Attribute value
RoadLink TOID	osgb5000005114587813
Code	3006
Length	326.0541211
Direction	0
PeakAM0709MonFriA	34.77
PeakAM0709MonFriB	34.77
PeakPM1619MonFriA	31.49
PeakPM1619MonFriB	31.49
OffPeak1016MonFriA	18.24
OffPeak1016MonFriB	18.24
EveningSpeed1923EveryDayA	17
EveningSpeed1923EveryDayB	17

Attribute (Header)	Attribute value
NightTime0004EveryDayA	17.03
NightTime0004EveryDayB	17.03
Weekend0719A	24.4
Weekend0719A	24.4

3.   OS MasterMap Highways Network with Speed Limits

The OS MasterMap Highways Network with Speed Limits product provides information on the signed speed limit of a road. Speed Limits are collected from various sources such as local authorities, telematics, accident reports, police forces and trusted users. The product provides a single speed limit value for each OS MasterMap RoadLink feature.

The speed limit is provided in miles per hour (mph). Road Link features within the OS MasterMap Highways Network do not break for a change in speed limit. Therefore, the speed limit provided is the speed which predominantly covers the road link. Speed Limits has full national coverage and accuracy is aimed to be at 98% by road length at the time of publishing.

The context diagram shows the feature attribution of Speed Limits data and the relationship to the OS MasterMap Highways Road Link feature. This is a one-to-one relationship and is realised through the "Os_link_id" attribute in the SpeedLimits feature.

3.1   Data creation and provenance

The OS MasterMap Highways Network with Speed Limits product contains detailed speed limit information based upon traffic signage. Many other speed datasets are built by sending vehicles around the UK; however, this product captures speed limit information and validates it more frequently through the following sources:

- Accident information
- Telematics data
- FOI requests
- Road layout logic
- Local Authorities
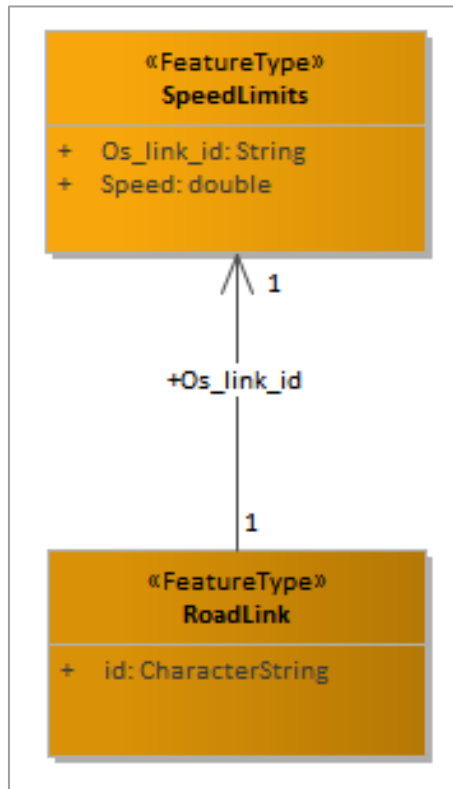- An online visual tool that is used to manage the updates which is accessed by numerous trusted users

*Figure 2: Context diagram for SpeedLimits and the relationship
to the OS MasterMap Highways Road Link feature*

3.2   Attribution

«FeatureType» SpeedLimits	
Definition: The Speed Limit on a highway.	
Attribute: Os_link_id	
Definition: Unique identifier, for OS MasterMap Road Link feature, this is a TOID	
Type: CharacterString	Multiplicity: [1]
Attribute: Speed	
Definition: This is the speed limit value per road link	
Type: Double	Multiplicity: [1]
Attribute: Geometry	
Definition: The geometry that represents the centreline of the road link.	
Type: Polyline ZM	Multiplicity: [1]

3.3   Example record

Speed limits are supplied in Esri shapefile (.shp) and an example record (instance) will appear in the following format:

ESRI shapefile attribute	Example record value
Os_link_id	osgb5000005196984950
Speed	30
Shape	Polyline ZM

4. Product supply

This section describes how the speed data elements of the OS MasterMap Highways Network portfolio are supplied.

The additional OS MasterMap Highways Network speed products are being made available to Partners only and will be available to download from the OS Data Hub (https://osdatahub.os.uk/). However, due to different release schedules between the OS MasterMap Highways Network Routing and Asset Management Information product and the speed products, they will be available in OS Data Hub as separate data sets.

The speed products will be available as national coverage only. Partners can make areas of interest (AOIs) available to their customers.

Public Sector customers can commercially license speed products through OS's Partner channel.

4.1 Supply format

OS MasterMap Highways Network with Average Speed is available in CSV file format only. The CSV file will be supplied with headers and the information contained is detailed in the attributes described in Section 2. The data is provided zipped as single file(.zip). Data is provided as full supply only and is refreshed annually (in May).

OS MasterMap Highways Network with Speed Limits is available in shapefile format only. The data is provided zipped as single file(.zip). Data is provided as full supply only and is refreshed quarterly (in April, July, October and January).

4.2 Supply media

OS MasterMap Highways Network with Average Speed data and OS MasterMap Highways Network with Speed Limits data is supplied as download only.

Both speed products are available for partners only and can be ordered from the OS Data Hub (https://osdatahub.os.uk/). You can also download OS MasterMap Highways Network Routing and Asset Management Information from the OS Data Hub.

4.3 Coverage and file sizes

OS MasterMap Highways Network with Average Speed is supplied as a zipped file comprising a national set. The zipped file will contain one CSV file which will contain all records. The CSV file contains headers.

- File size will be approximately 180MB zipped.
- The data is not encrypted.

OS MasterMap Highways Network with Speed Limits is supplied as a zipped file comprising a national set. The zipped file will contain one shapefile which will contain all records.

• File size will be approximately 370MB zipped.
• The data is not encrypted.

4.4   File naming

OS MasterMap Highways Network with Average Speed is supplied within a zip file with the following name: hnavsp_csv_gb.zip.

Within the zip file, you will find the CSV file containing all records, which will have the following name: Highways_AverageSpeed_GB.csv.

OS MasterMap Highways Network with Speed Limits is supplied within a zip file with the following name: hnavsp_csv_gb.zip.

Within the zip file, you will find the shapefile containing all records, which will have the following named file extensions:

• Highways_SpeedLimits_GB.shp
• Highways_SpeedLimits_GB.prj
• Highways_SpeedLimits_GB.qpj
• Highways_SpeedLimits_GB.dbf
• Highways_SpeedLimits_GB.shx