



ORDNANCE SURVEY GB

# OS MASTERMAP HIGHWAYS NETWORK GETTING STARTED GUIDE

## Version History

Version	Date	Description
1.0	02/2018	Initial release
1.1	03/2021	Addition of Scottish Street information

## Purpose of this Document

This is the Getting Started Guide for the OS MasterMap Highways Network product. This Guide provides greater insight into this product and its potential applications. For information on the contents and structure of OS MasterMap Highways Network, please refer to the Product Guide and Technical Specifications.

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## Contact details

<https://www.ordnancesurvey.co.uk/contact-us>

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## I. Overview

Ordnance Survey, GeoPlace® and Improvement Service have collaborated to bring together the Ordnance Survey's detailed road and path information, the National Street Gazetteer (NSG), the Trunk Road Street Gazetteer (TRSG), and the Scottish Street Gazetteer (SSG) to create the authoritative road and path network for Great Britain, OS MasterMap Highways Network.

The Highways Network integrates the Unique Street Reference Number (USRN) from the gazetteers with the most detailed definitive geometry from Ordnance Survey (Figure 1). The OS MasterMap Highways Network was produced in partnership with GeoPlace and the Local Government Association, and as of March 2021, contains data created and maintained by Scottish Local Government.

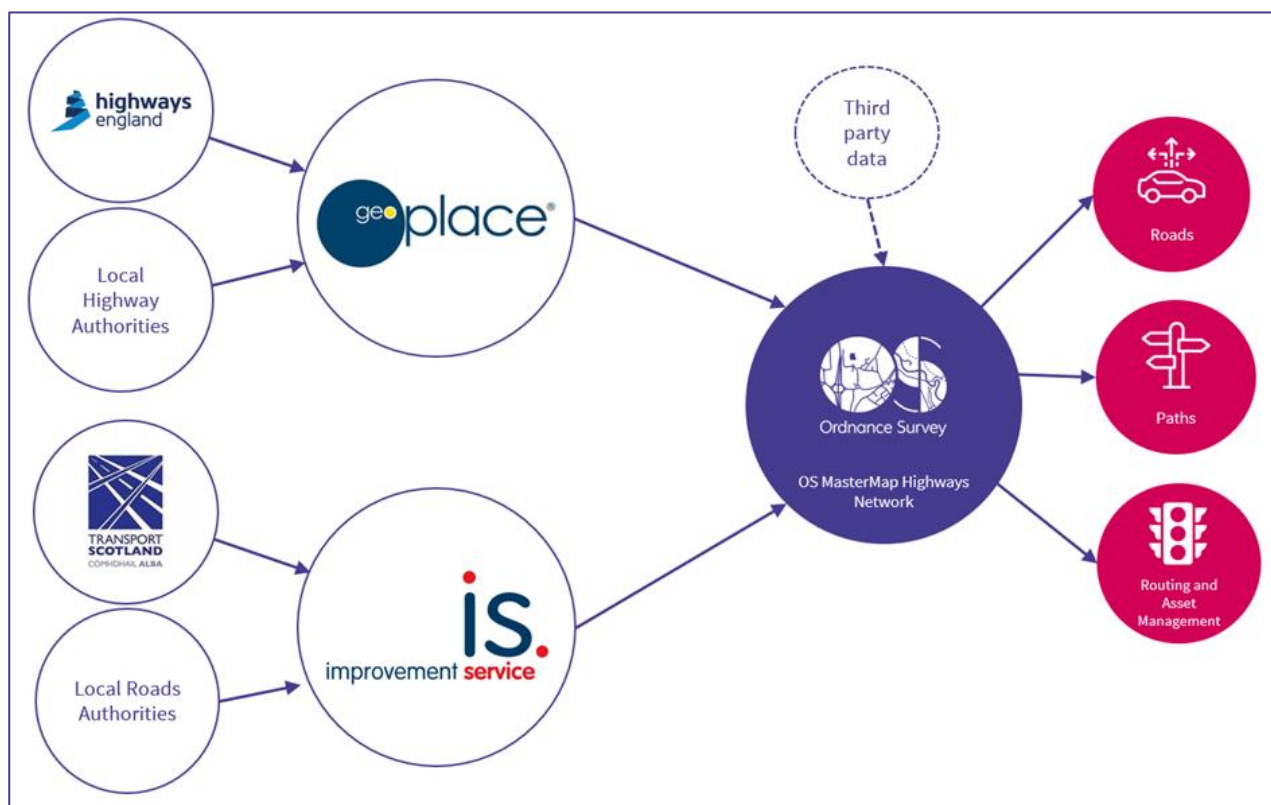


Figure 1: Bringing together data to create OS MasterMap Highways Network

The OS MasterMap Highways Network product family includes three core products:

- OS MasterMap Highways Network – Roads
- OS MasterMap Highways Network – Routing and Asset Management Information
- OS MasterMap Highways Network – Paths

OS MasterMap Highways Network products contain a wide range of features. These include:

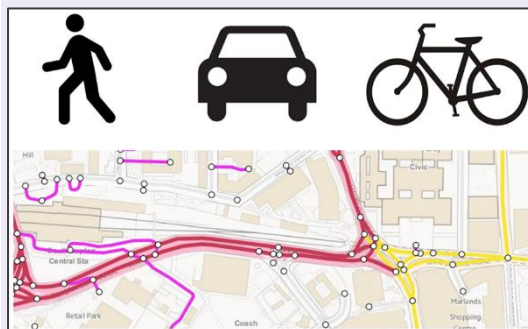
- Unique Street Reference Number (USRN)
- Road names from the naming and numbering authority
- DfT road classifications
- Road maintenance authority
- Motorway Junction to junction information
- Routing information

- Height, weight, width and length restrictions information
- Special designations
- Road reinstatement information
- Connected network across GB including islands through the Ferry Network

## 2. Applications

OS MasterMap Highways Network is designed to be used as a single source of highway asset management by private and public sectors alike. It can be used for the following:

Product name	OS MasterMap Highways Network – Roads	OS MasterMap Highways Network - Roads and Routing and Asset Management	OS MasterMap Highways Network - Paths
<b>Suggested application</b>	<ul style="list-style-type: none"> <li>• Source for legal road identifications</li> <li>• Costings or benefits of road policies</li> <li>• Calculating funding allocations</li> <li>• For evidence-based policy making</li> <li>• Journey and transport planning</li> <li>• Emergency service planning</li> <li>• Enforcement regulation</li> <li>• Traffic statistics</li> <li>• School Allocation</li> <li>• Smart Cities</li> </ul>	<ul style="list-style-type: none"> <li>• Source for legal road identifications</li> <li>• Costings or benefits of road policies</li> <li>• Calculating funding allocations</li> <li>• Policy making</li> <li>• Asset management</li> <li>• Journey planning, routing, and navigation</li> <li>• Emergency service planning</li> <li>• Transport planning</li> <li>• Enforcement regulation</li> <li>• Traffic statistics</li> <li>• Delivery</li> <li>• Waste Management</li> <li>• Planned Works</li> <li>• Projects on the resilience of infrastructure</li> <li>• Lane Rental schemes</li> <li>• Smart Cities</li> </ul>	<ul style="list-style-type: none"> <li>• To estimate costs or benefits of road and paths policies</li> <li>• Calculating funding allocations</li> <li>• Policy making</li> <li>• Asset management</li> <li>• Journey planning, routing, and navigation</li> <li>• Emergency service planning</li> <li>• Transport planning</li> <li>• Delivery</li> <li>• Enforcement regulation</li> <li>• School Allocation</li> <li>• Sustainable Travel</li> <li>• Planned Works</li> <li>• Projects on the resilience of infrastructure</li> <li>• Smart Cities</li> </ul>
<b>Benefits</b>	<p>OS MasterMap Highways Network is a single authoritative view of the road network that underpins decision making across government.</p> <ul style="list-style-type: none"> <li>• reduces duplication of effort on maintaining highways information across multiple departments and datasets; and</li> <li>• facilitates data-sharing.</li> </ul>		



Provides OS detailed geometry and routing information on highways together with the best asset management information from authoritative sources in to one central location.

Enables planning, routing and navigation for a variety of vehicle types.



The Unique Street Reference Number (USRN) as the key identifier for a Street enables systems to share information about the same entities without the need to match multiple datasets. With the USRN you can also link to AddressBase®. This lets you search for or navigate to an address, and find the property access and delivery points.

Provides accurate and precise asset management information on who maintains the road network, special designations and the type of surface reinstatement values.

## 3. What do I need to use this data?

### 3.1 System requirements

OS MasterMap Highways Network is designed for use in a Geographical Information System (GIS). For details of Ordnance Survey's Licensed Partners who can assist you with incorporating the product in their systems, please see the [Software for Mapping](#) page on the Ordnance Survey website:

Ordnance Survey does not recommend either suppliers or software products, as the most appropriate system will depend on many factors, such as the amount of data being taken, resources available within the organisation, the existing and planned information technology infrastructure and last but by no means least, the applications that the data will be used for.

However, as a minimum, the following elements will be required in any system:

- a means of reading the data, either in its native format, or by translating it into a file format or for storage in a database;
- a means of storing and distributing the data, perhaps in a database or through a web-based service; and
- a way of visualising and/or querying the data, typically a GIS.

## 3.2 Backup provision of the product

You are advised to copy the supplied data to a backup medium before following the steps in this Guide.

## 3.3 Typical data volumes

For reading purposes it is recommended that users store the data on a single hard disc. This will speed up the ability of your computer to read the data. Uncompressed Geography Markup Language (GML) file sizes for the full supply of England, Scotland and Wales are as follows:

- OS MasterMap Highways Network – Roads: 29GB;
- OS MasterMap Highways Network - Routing and Asset Management Information: 43GB; and
- OS MasterMap Highways Network – Paths: 11GB.

## 3.4 OS MasterMap Highways Schema files

Schema files are used to interpret the GML and translate it into a suitable data format by your chosen software. However, we are aware that some firewalls will block access to these. In these instances, it is suggested that you download the schemas from our website.

# 4. Structure of the supplied data

## 4.1 Supply Format

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.

## 4.2 Supply Media

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

## 4.3 Coverage

The product's cover Great Britain. The information which has been provided from the National Street Gazetteer will only be provided for England and Wales.



## 4.4 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 provided 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.

## 4.5 Product Packaging

When a customer receives an order, the product will be packaged as follows:

Data folder – contains the GML files which make up the ordered product.

Doc folder - contains a summary.gml file which will contain specific information about the customer order including the order number, extent and order type information ('Full supply' or 'COU').

Resources folder - contains 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 Highways Product Guide.

## 4.6 GML File Naming

The file naming for the OS MasterMap Highways Network GML will be constructed as:

**Highways\_ProductName\_FeatureType\_SupplyType\_NullorDelete\_volumenumber.gml.gz.**

- *Highways* - identifies that the GML is from the OS MasterMap Highways Network product family.
- *ProductName* - is the name of the product that is being supplied, for example Roads.
- *FeatureType* - is the name of the feature type that is being supplied in the GML file, for example RoadLink.
- *SupplyType* - is the type of supply the GML is, for example Full or COU.
- *NullorDelete* – This will not be present in any GML file names if the GML forms part of a full supply. If the GML forms part of a COU supply, then "Delete" will identify if the file contains all the features which need removing from the customer holding as a part of the COU application.
- *volumenumber* - will be the volume number for the file which will be three digits and the first volume will be 001.

Examples of the file names are:

- Highways\_Roads\_RoadLink\_Full\_001.gml.gz

- Highways\_RoadsAndRAM\_AccessRestriction\_Full\_001.gml.gz
- Highways\_Paths\_Maintenance\_Full\_001.gml.gz

## 4.7 How do I unzip the files?

The Highways GML data is supplied in a compressed form (gzip). Some software can access these files directly; others will require it to be uncompressed. To uncompress the zipped data files (.gz extension), use an unzipping utility found on most PCs, for example, WinZip. Open-source zipping/unzipping software can be downloaded from the Internet, for example, 7-Zip.

## 5. How do I load the OS MasterMap Highways Network GML product into a GIS?

GML is an XML dialect, which can be used to model geographic features. It was designed by the Open Geospatial Consortium ((OGC) as a means for people to share information regardless of the particular applications or technology that they use. In the first instance, GML was used to overcome the differences between different GIS applications by providing a neutral file format as an alternative to proprietary formats.

The data can be loaded into several Geographic Information Systems (GIS). This chapter describes how to translate the GML and load it into some commonly used GIS. However, as the data is based on a relational data model not all GIS formats will support this and storing the data in a relational database is recommend. For more information about other GIS that Highways is compatible with, please speak to your Relationship Manager.

The common software covered in this chapter are:

- QGIS
- FME
- ESRI
- MapInfo Professional
- CadCorp Map Modeller
- Loading into a database
  - Go Loader - PostGreSQL

*△ Warning – Some software will successfully read the GML including both geometry and textural information. However, where a data field contains multiplicity these elements will be ignored.*

### 5.1 QGIS

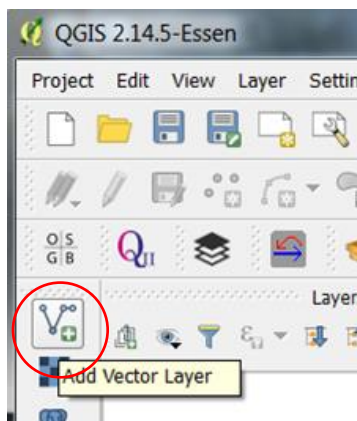
These notes outline how to load OS MasterMap Highways Network into QGIS using the GML file you have received. They have been prepared using version 2.14.5 of QGIS Desktop – an open source GIS in which you can create, edit and visualise and publish geographic information. You can download it from the link below:

<http://www.qgis.org/en/site/forusers/download.html>

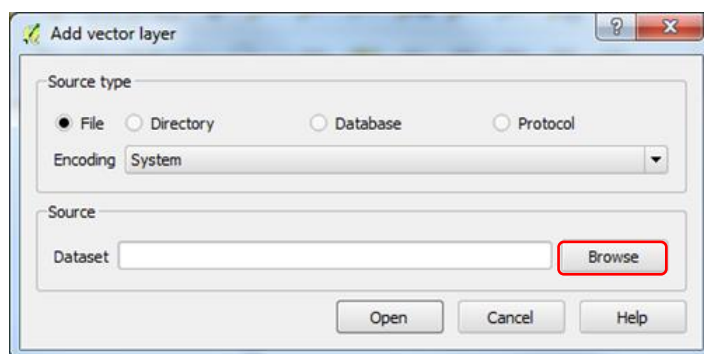
### 5.1.1 Loading OS MasterMap Highways Network GML into QGIS:

#### 1. Open QGIS

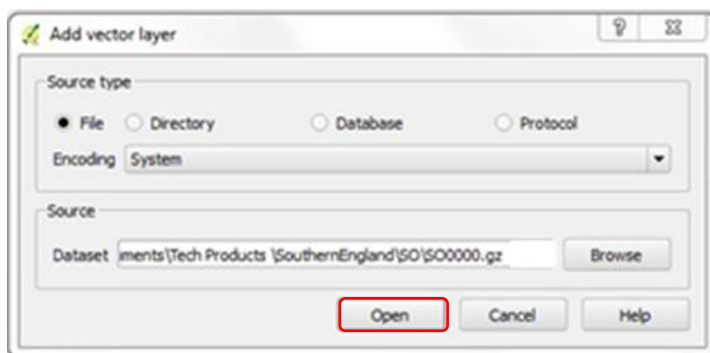
The OS MasterMap Highways Network data can be loaded into QGIS either zipped or unzipped. To load the data, click on 'Add Vector Layer' icon



'Add vector layer' window opens. In 'Source' – 'Dataset' click on Browse button on the right and navigate to the GZ/GML file you wish to import. If the files do not appear in the browser window change the file type in the drop down to Geography Markup Language [GML].

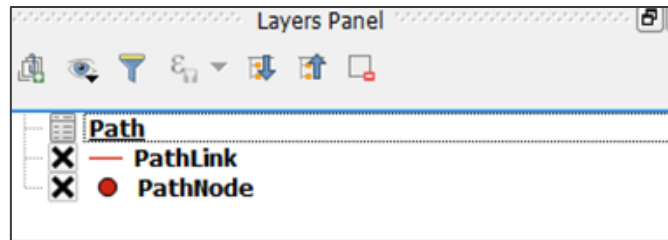


When selected click 'Open'

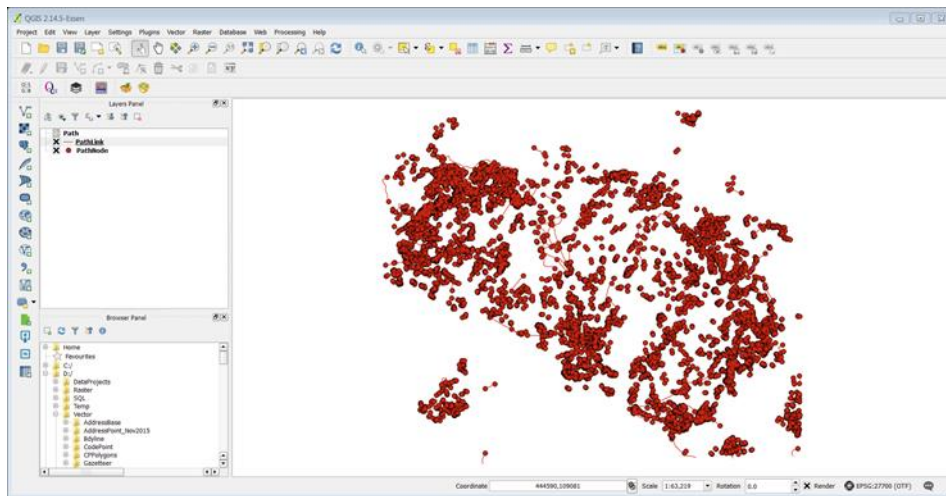


*NOTE: Alternatively, you can load the file by dragging and dropping the GZ or GML file into a blank canvas.*

This will open the GML as both vector layers and tables in QGIS, displayed in the Layers Panel.



And draws the layers in the canvas:

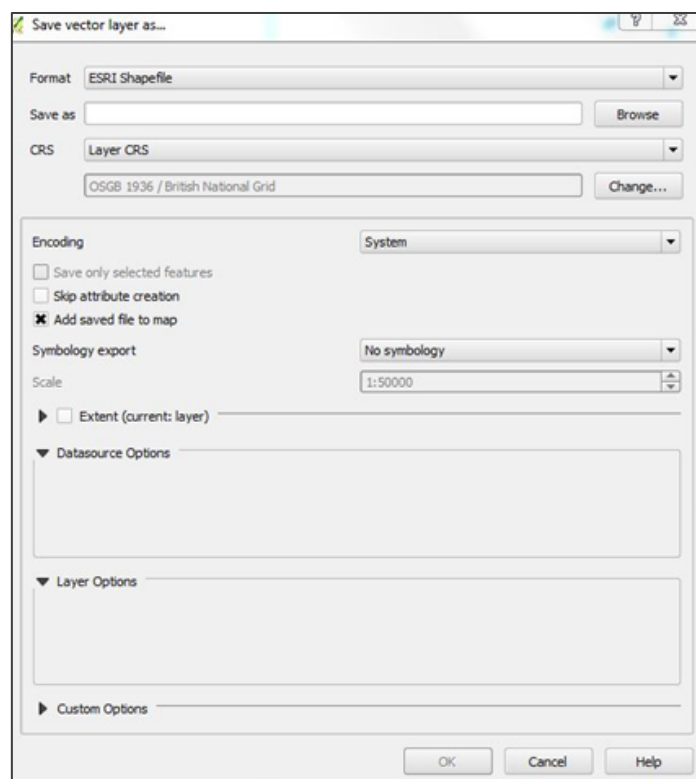


You can add additional layers of OS MasterMap, for example OS MasterMap Topography Layer, to give context to the data.

### 5.1.2 Translating GML using QGIS:

You can also use QGIS to export the OS MasterMap Highways Network data in many different common GIS formats. This will allow you to open the files in many other GIS applications.

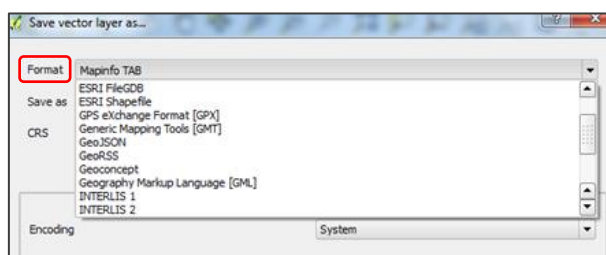
1. Right click on the layer you want to translate and select 'Save as'.



*NOTE: If you are trying to save layers for more tiles or national dataset please bear in mind that you will have to save them separately as there is no option for grouping layers.*

The 'Save vector layer as' window opens.

In 'Format' using the drop-down select your chosen format for further analysis, for example MapInfo TAB or ESRI Shapefile, Tables can also be saved as either a DBF or CSV file.



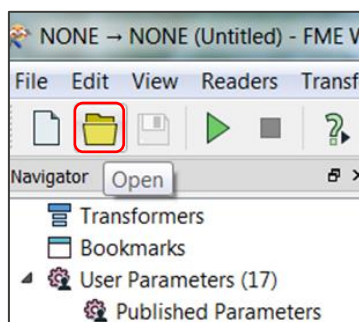
When selected, by clicking on the 'Browse' button, save your file to location of your choice.

Then click 'OK' to save the data in your chosen format.

## 5.2 FME:

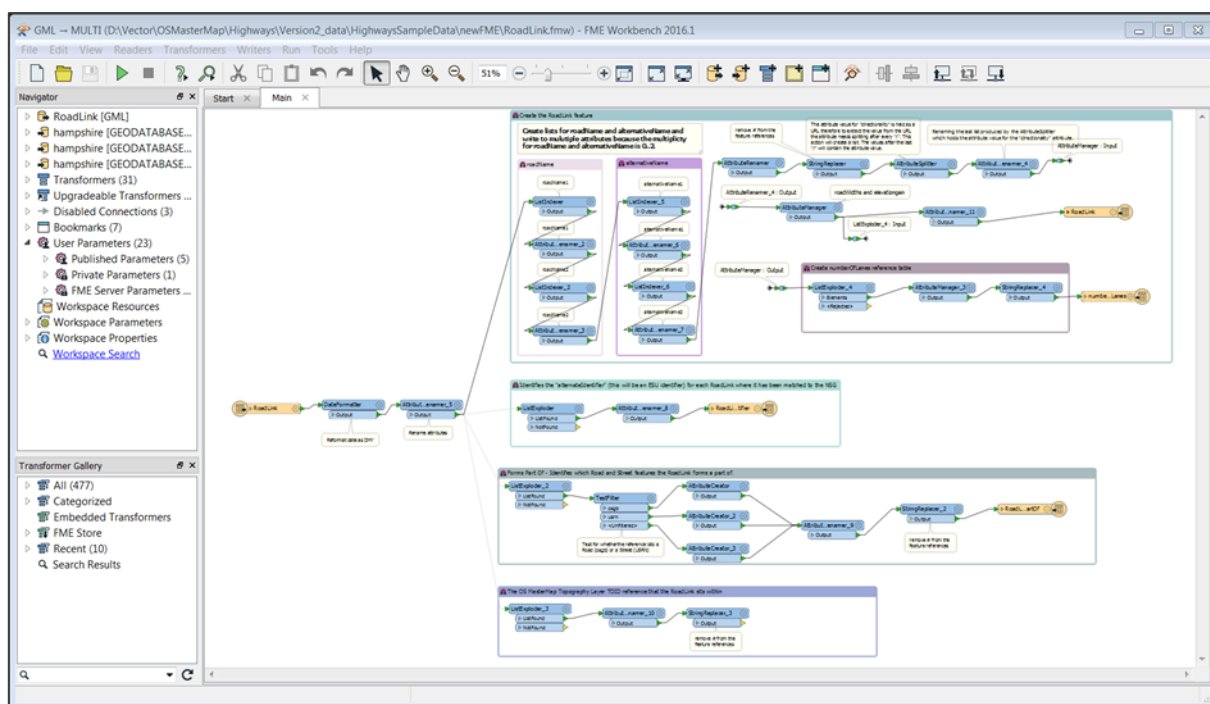
The following section details how to load OS MasterMap Highways Network into FME using the GML file you have received. This will allow you to view the data and translate into the most appropriate format for your software. To help get started we have prepared a number of FME workbench files which convert the GML into an OGC GeoPackage. However, the writer can easily be changed to an output of your choosing. The FME workbenches can also be created to suit the user's specific purpose and requirements. They have been prepared using FME 2016.1.

1. Download the workspaces from Ordnance Survey's GitHub pages - <https://github.com/OrdnanceSurvey/OSMM-Highways-Network-Support>.
2. Open FME Workbench and click on the Main Tab.
3. Select the open icon.



In the open file window, navigate to the folder containing the work bench files.

Select a file and click open, this will load the file into FME Workbench. The workspace has been annotated with comments to help you understand the process and data output.



*Note if FME cannot find the appropriate schema file for use in Translation this can be downloaded from Ordnance Surveys Schema Repository:*

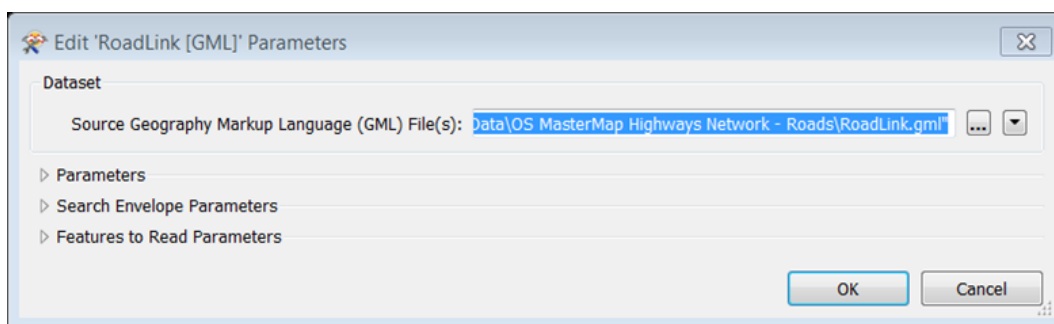
<https://www.ordnancesurvey.co.uk/xml/schema/highwaysnetwork/index.html>

You will need to change the location of the GML files to be read.

Select the reader in the main window and click on EDIT 'xxxx [GML]' Parameters. (xxxx is the name of feature being read, e.g. RoadLink).



In the open dialogue click on the icon with 3 dots to open a file browser



Navigate to the folder containing your GML files, select a file and click Open.

Click OK to close the window.

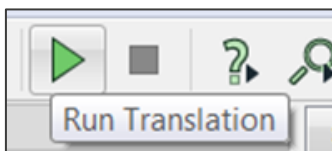
The next step is to change the output file on the writer.

Select the writer in the main window and click on EDIT 'GEODATABASE FILE]' Parameters.

A similar dialogue to before opens, click on the icon with 3 dots and, in the browser, navigate to and select the file the features will be written to.

You will need to repeat this for each writer in the workspace.

Once completed you are ready to run the workspace by clicking the green arrow – Run Translation.

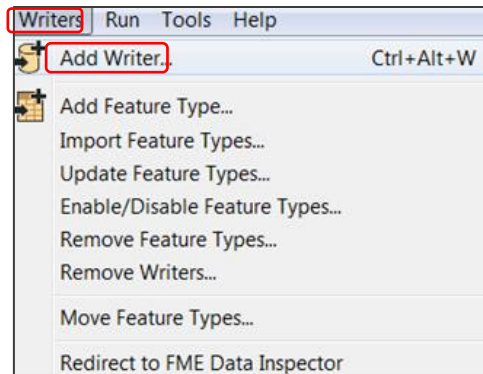


### Changing the FME writer

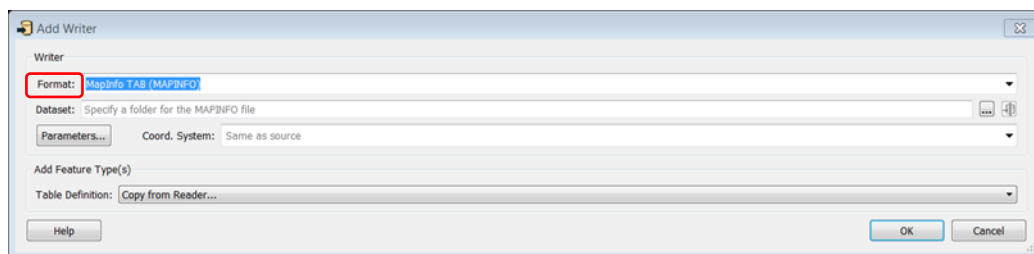
The FME writer can be chosen to an output that is more suitable for the software you are using.

Tip: Do not remove the unwanted write until you have set up the new writer as this can be used to help replicate the writer.

1. From the menu bar select Writers and Add Writer...



In the open dialogue set the format you want to add. A drop-down list of previously used formats will be available, if not, click on more formats.

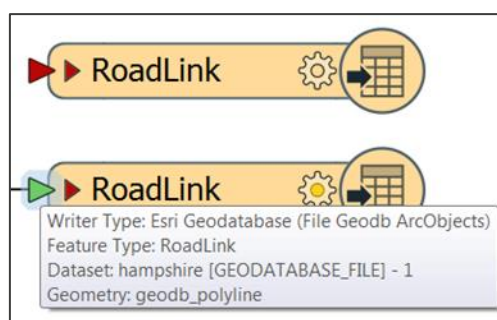


Set the output data set in by clicking on the icon with 3 dots and navigate to the file or folder.

Once set, click OK to add the writer.

You will now need to replace the existing writer in the workspace.

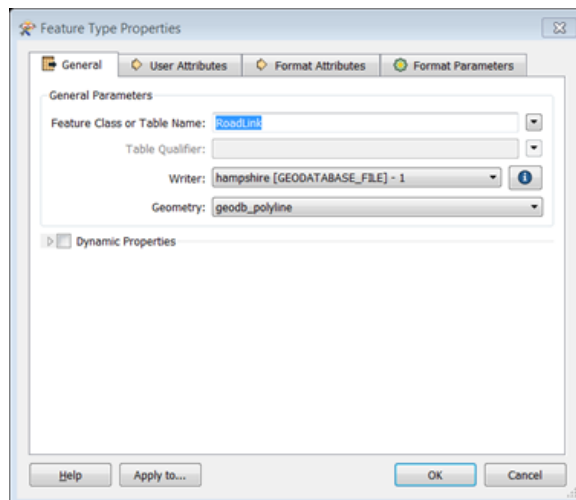
Either click on the green arrow and drag this to the new writer (to the red arrow).



However, a much simpler way is to change this in the writer properties.



Double click the writer to open the Feature Properties dialogue

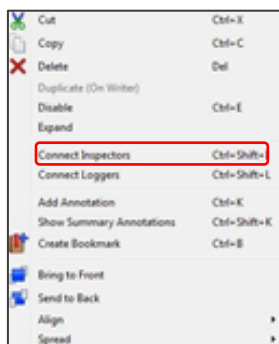


Click on the drop down next to *Writer* and change to the new writer from the list. Do this for each feature type in the workspace. Check that all the attributes are still being written, you may need to rename some of these to match the existing depending on the restrictions on the output.

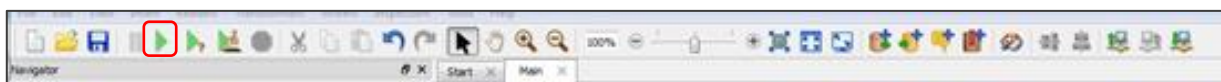
## 5.2.1 Viewing the data using Data Inspector before translation

1. Before translating the data, FME allows users to view the data. This process is faster than translation and allows a quick interrogation before translation is started.

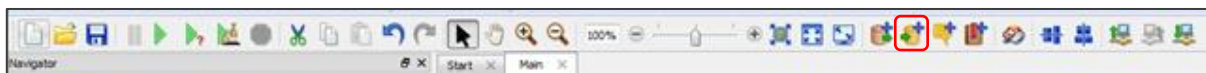
Highlight all of the feature types you wish to view by either selecting them individually or drawing a box around them. Right click on one of the features and select *Connect Inspectors*.



Run the workspace with the Inspectors connected in order to view the data in FME Data Inspector.



When finished, an 'FME Data Inspector' window will open visualising the Highways data.



## 5.3 ESRI:

These notes outline how to load OS MasterMap Highways Network into ArcMap. They have been prepared using Version 10.2.

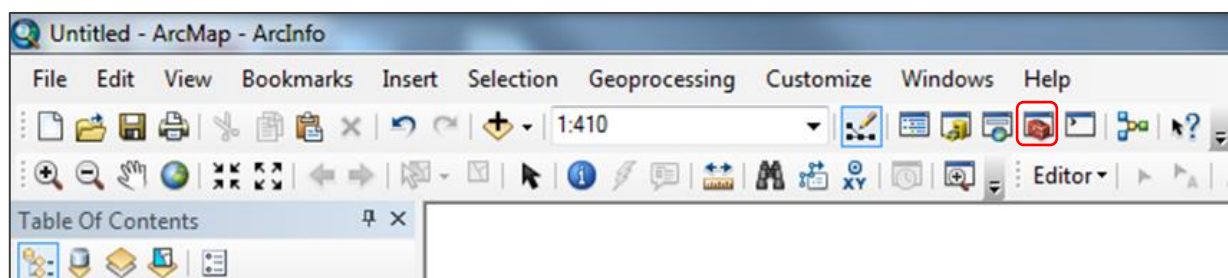
GML data can be now imported as zipped GML (GZ) directly into ArcMap using Data Interoperability tool called 'Quick Import'. The Interoperability extension is now available at no cost as a part of ArcMap from version 10.2. You require internet access when using 'Quick Import' tool so the data can access the schema attached to the file.

NOTE: If your version of ArcMap is older than 10.2 and you do not have a licence for Data Interoperability, you will have to use translation tools available in FME or QGIS (explained in the earlier chapters) to first translate the GML data into ESRI shapefiles, before you can load them in ArcMap.

You can find more information about Quick Import on:

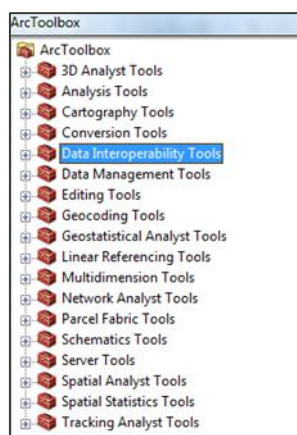
<http://www.esri.com/software/arcgis/extensions/datainteroperability>

1. Open ArcMap.
2. Click on *ArcToolbox* window' icon.

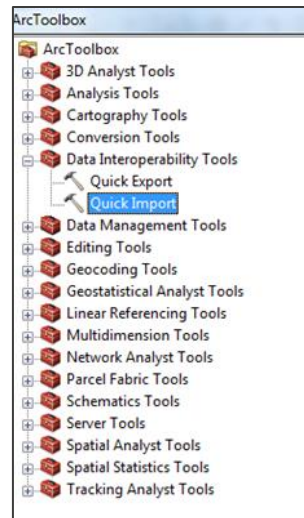


*ArcToolbox* opens.

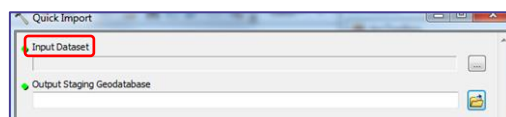
Click on the plus sign next to *Data Interoperability Tool* and double click on *Quick Import*.



*Quick Import* window opens.

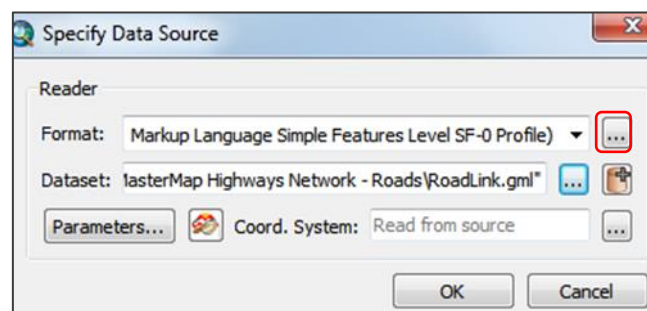


In *Input Dataset* click on the button on the right.



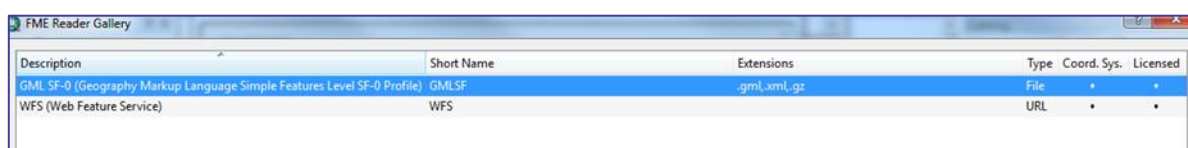
*Specify Data Source* window opens.

In *Format* click on button on the right.

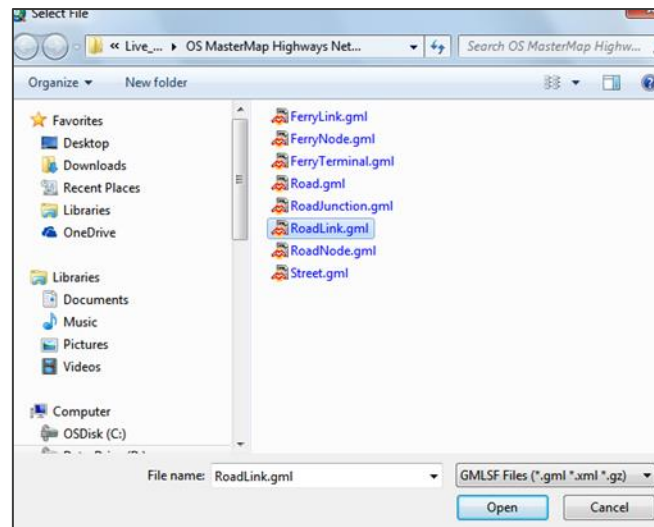


'FME Reader Gallery' window opens.

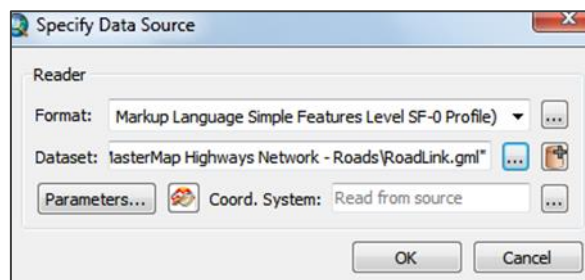
Select 'GML SF-0 (Geography Markup Language Simple Features Level SF-0 Profile)' and click OK.



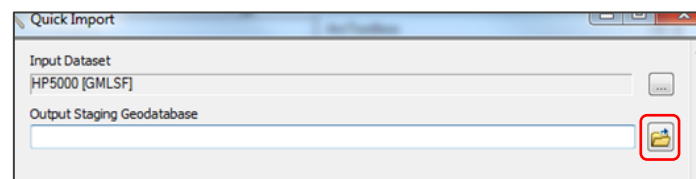
In *Dataset* navigate to the folder where you saved your GML/GZ file, select it and click 'Open'. Make sure that extensions available to load are \*.gz or \*.gml.



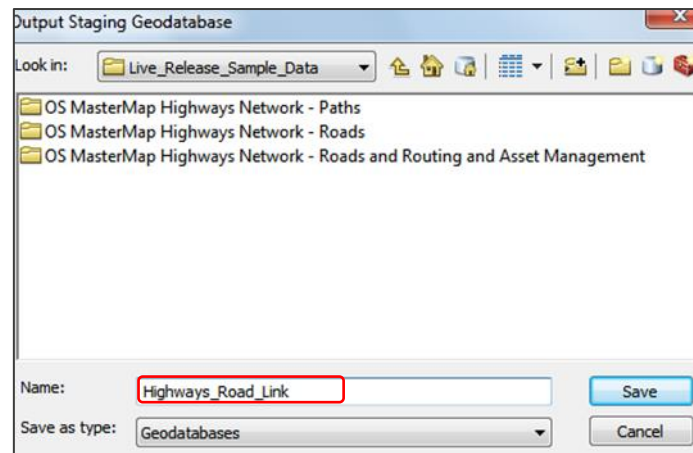
Please leave the rest of the settings as default and click *OK* in *Specify Data Source* window.



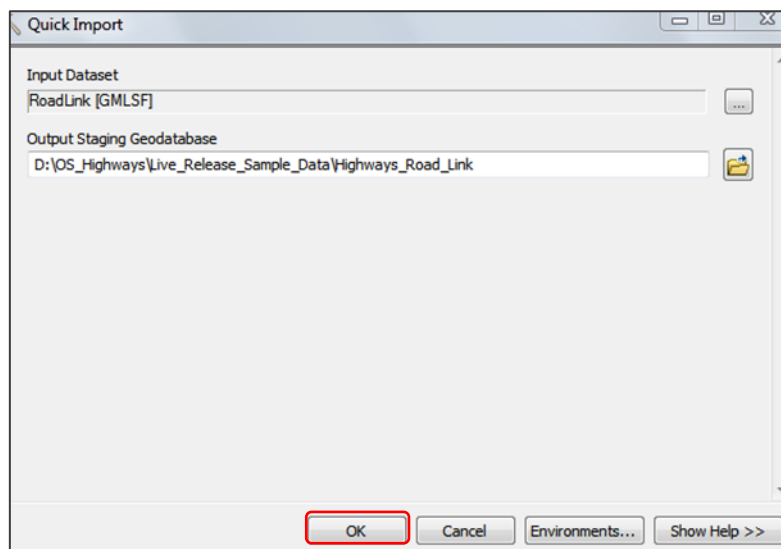
In *Quick Import* window click on the folder icon on the right of *Output Staging Geodatabase*.



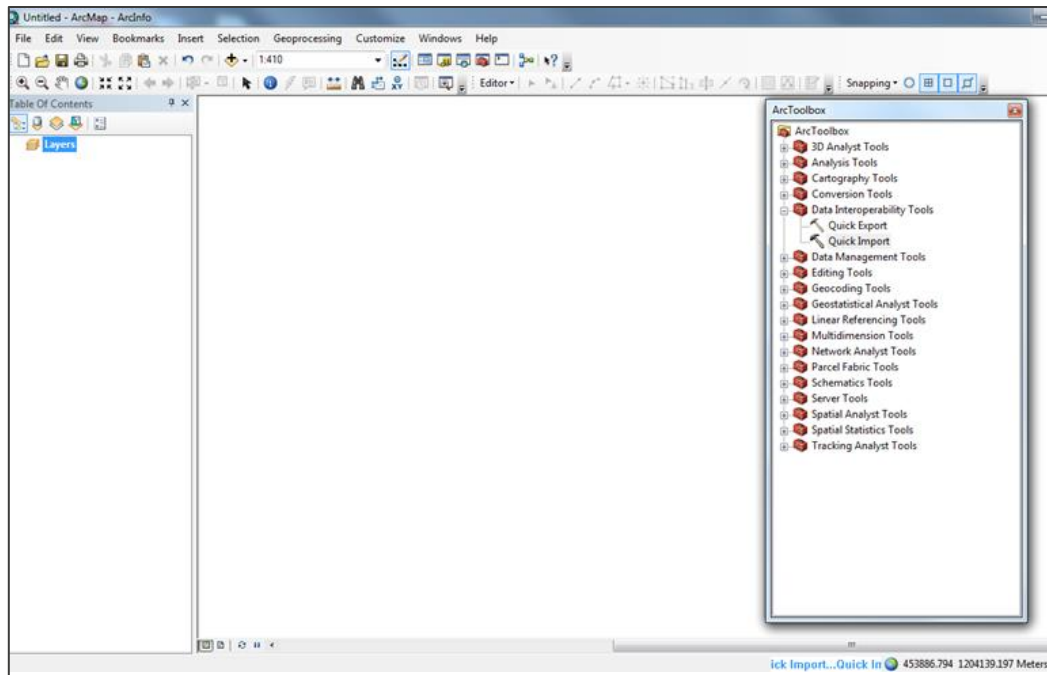
Navigate to the folder and select the output *Personal Geodatabase* for the feature classes to be stored in.  
Make sure you're saving it as Geodatabases. Click *Save*.



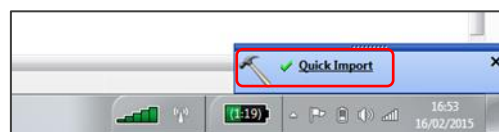
Next click *OK* in *Quick Import* window.



The process started. You will see the process running notification on the bottom of the screen.

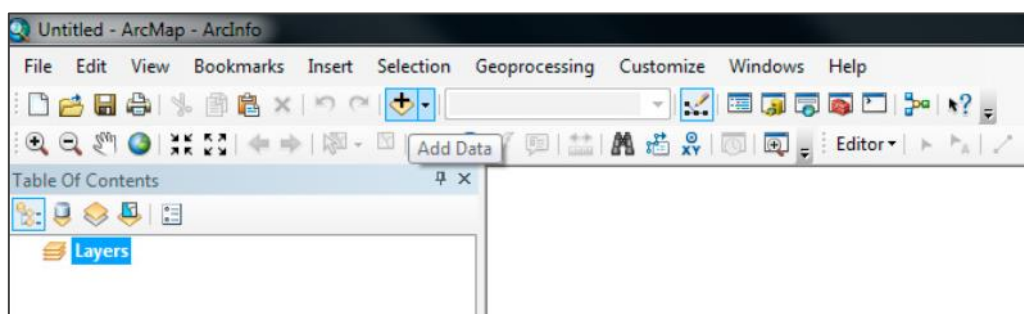


When successfully completed you will notice a popup window in the bottom right corner of the screen.



The Arc Toolbox window can now be closed.

To add data into ArcMap, click on the *Add data* button on the main toolbar.

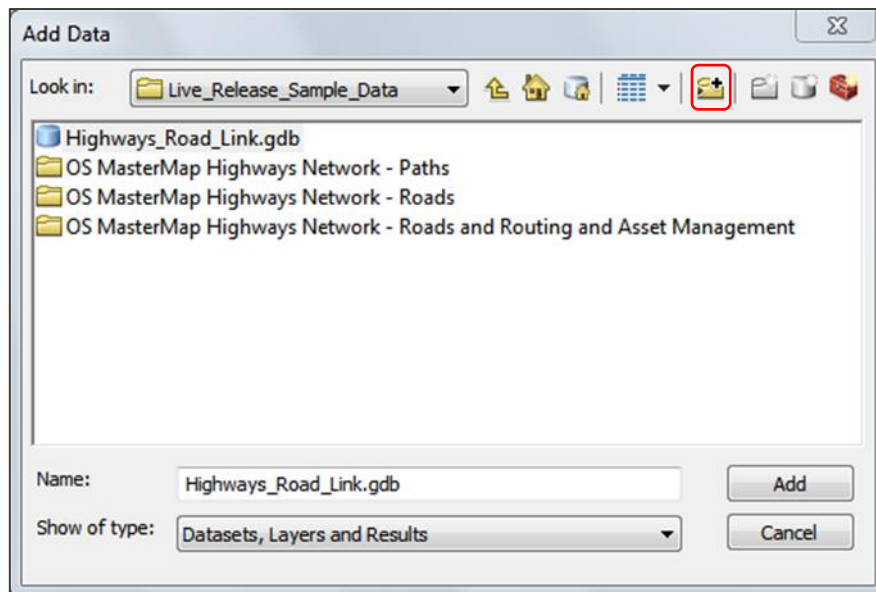


*Add Data* window opens.

Connect to the folder where you have saved the Geodatabase.

To do this, click on the *Connect to Folder* button.

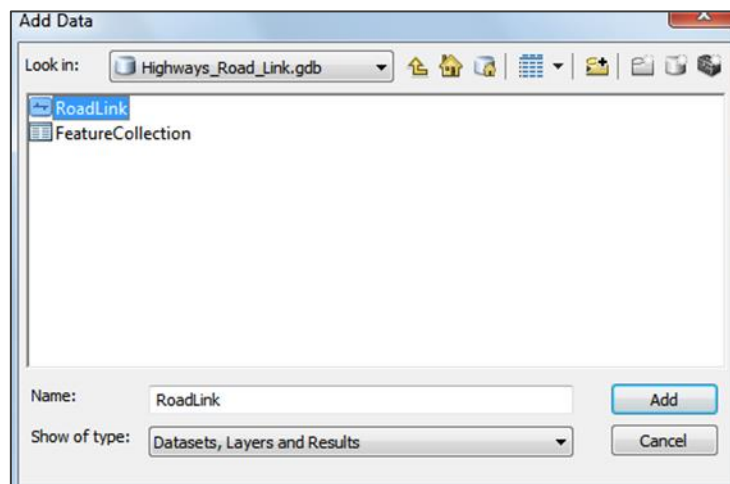
If you have stored the file geodatabase in a folder to which you have already connected, you will not need to connect to the folder.



The *Connect to Folder* window will open. Navigate to the folder and click *OK*.

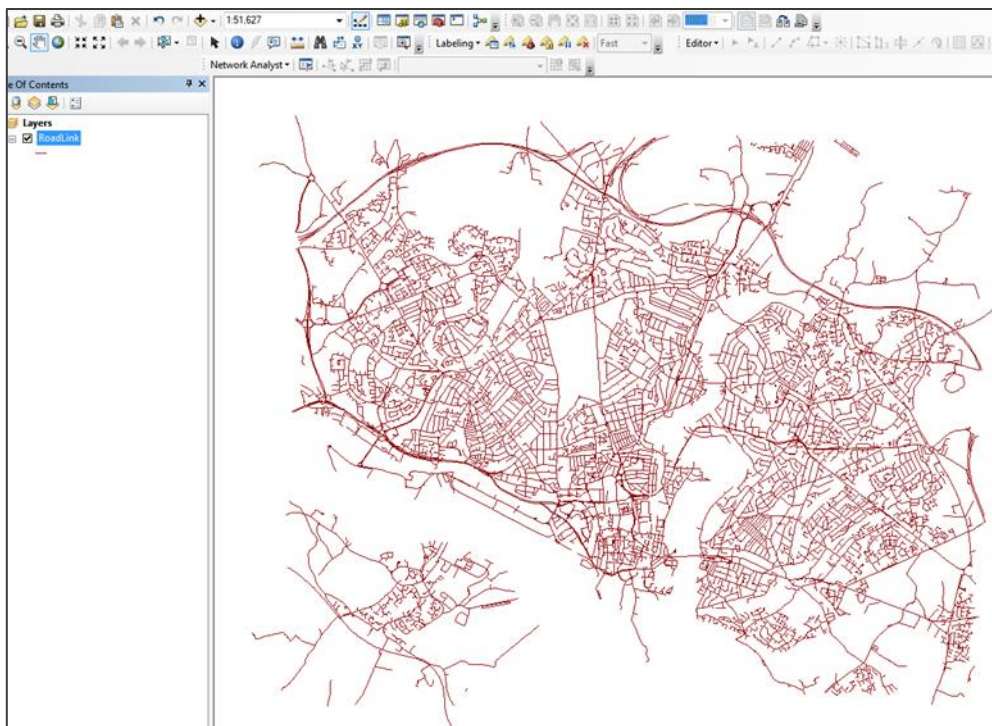
Select the Highways geodatabase that you have created and click *Add*. The component feature classes within the file geodatabase appear. In this example, we only have the road link feature class.

Select the OS MasterMap Highways Road Link feature class within the file geodatabase and click *Add*.





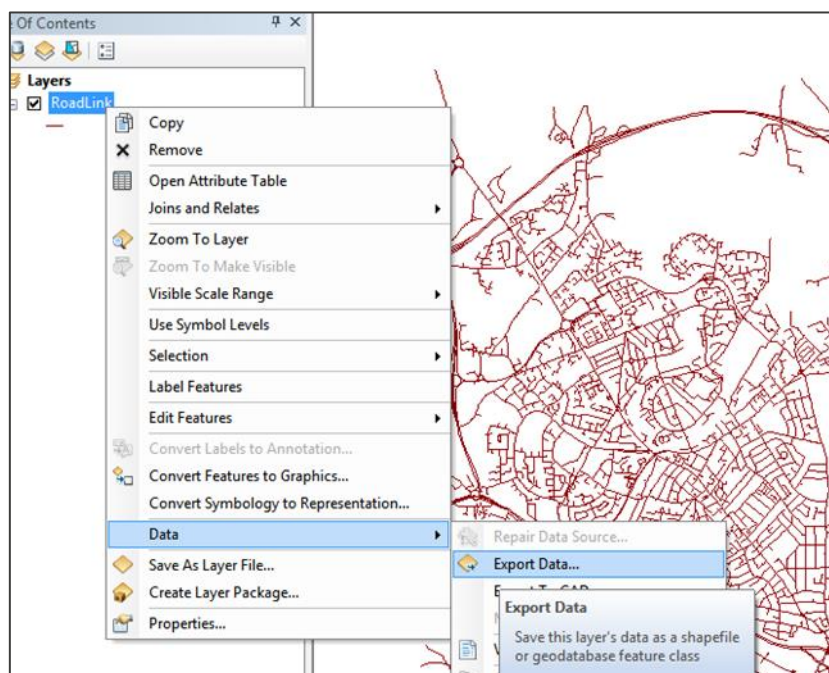
The data appears in the map window in ArcMap and will appear un-styled as shown in the example below.



You can view and analyse the features, as they are, directly from the Geodatabase. You can also save the OS MasterMap Highways Network data as ESRI shapefiles or GeoDatabase feature classes.

To do this, right click on the feature on the *Table of Contents*, select *Data* then *Export Data*.

The *Export Data* window will open. Click on the folder icon.

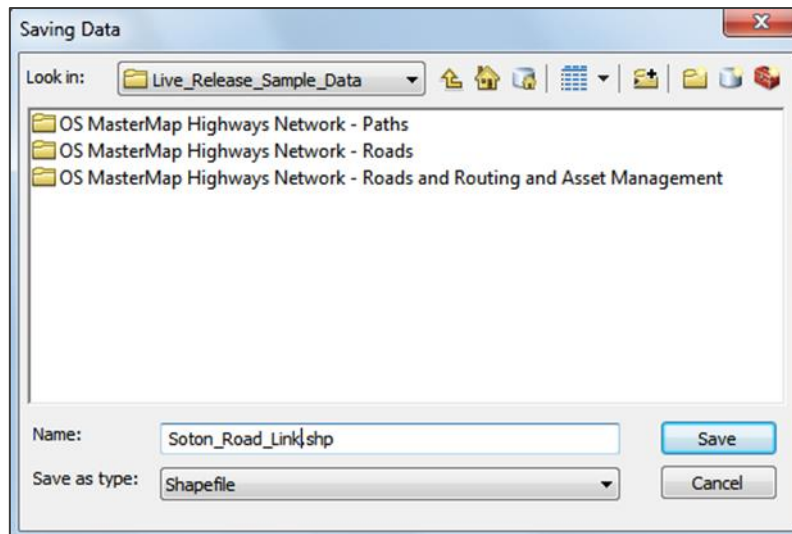


Navigate to the folder where you wish to save your data.

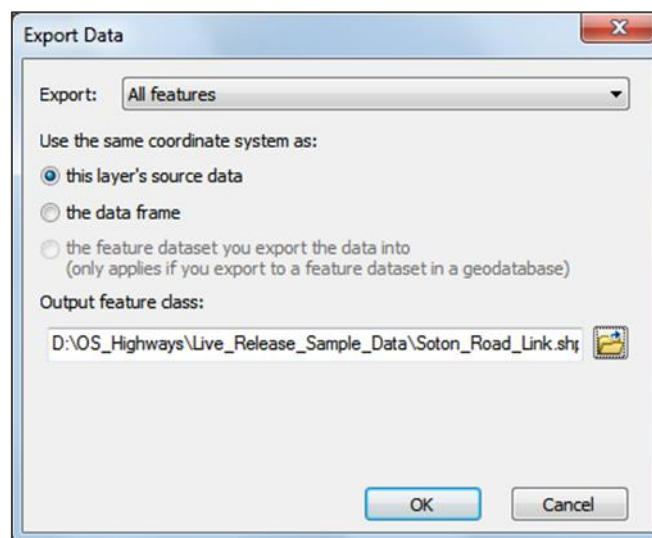


In *Name*, rename your data accordingly, for example Soton\_Road\_Link.shp.

Click **Save**.

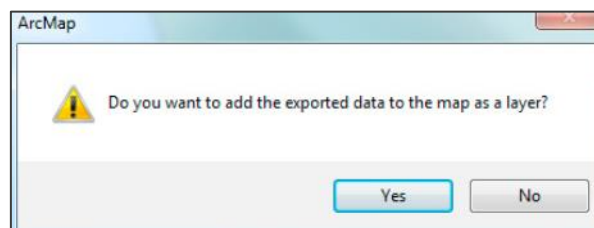


Leave the rest of the settings in the *Export Data* window and click **OK**.



An ArcMap window will appear asking if you want to add the exported data to the map as a layer.

There is no need to do that so click **No**.

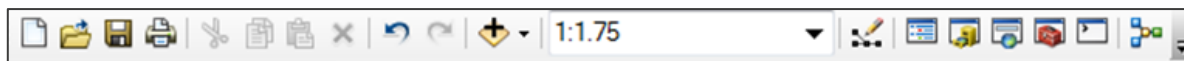


### 5.3.1 Loading untranslated GML into ESRI

If you are using a more recent version of ArcMap (10 onwards) you can open GML files directly and view the geometry.

1. Open ArcMap.

Click on the *Add Data*  in the standard toolbar.



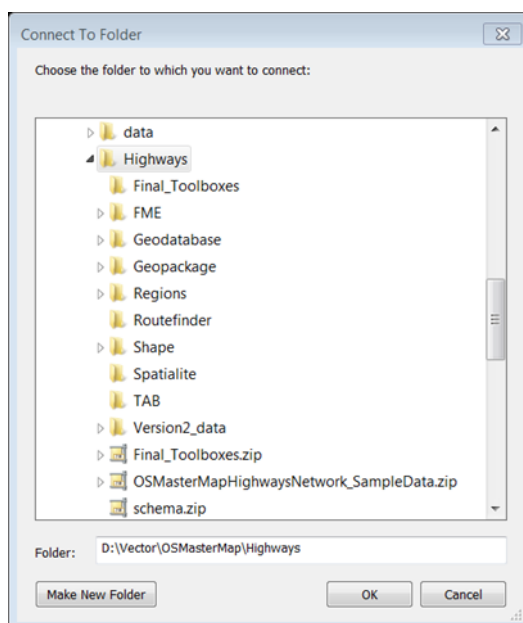
This will open *Add Data* window.

Connect to the folder where you saved your translated OS MasterMap Highways Network data.

To do this, click the *Connect to Folder* button.

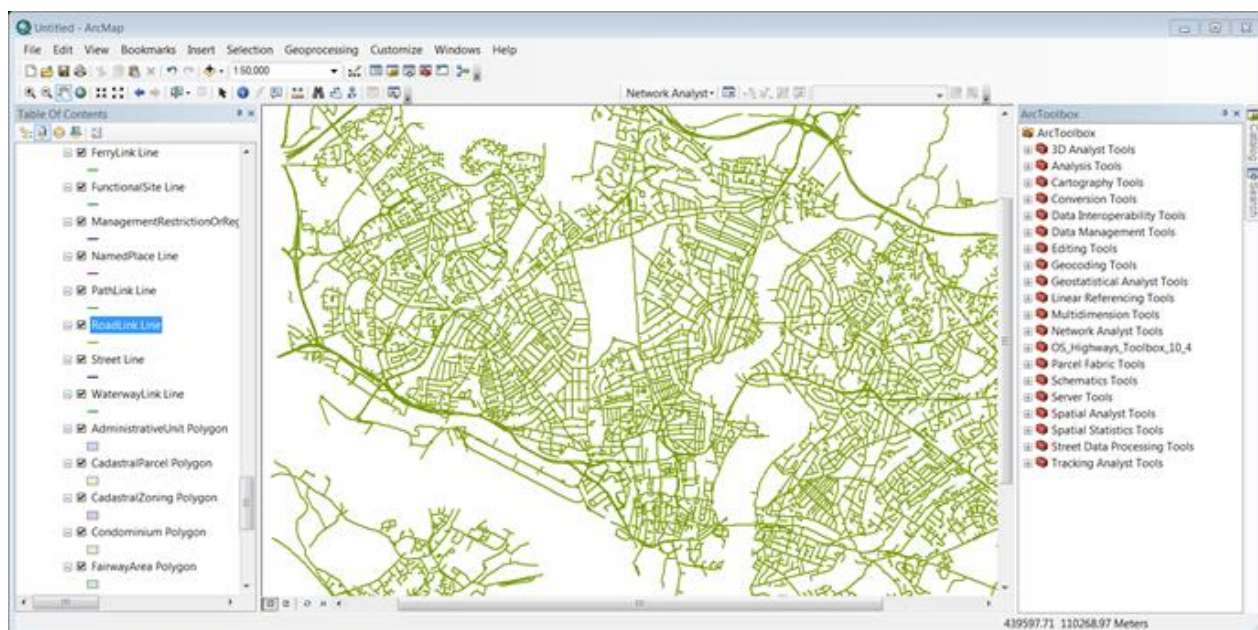


The *Connect to Folder* window will open. Navigate to your folder and click *OK*.



The *Add Data* window will remain open, so you can navigate to your GML files and select a file to open and click *Add*.

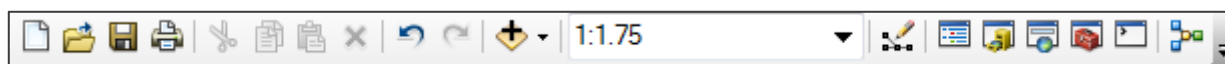
This will load you the geometry into ArcMap for you to inspect or exporting to either a shapefile of geodatabase by right clicking on the layer and selecting Data and Data Export.



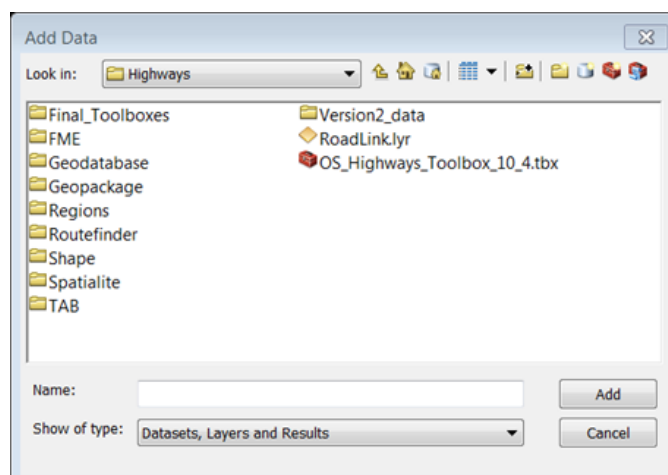
### 5.3.2 Loading translated GML into ESRI

If your version of ArcMap is older than 10 or if you do not have access to the Quick Import (Data interoperability) extension, you can use other translation tools such as FME or QGIS (explained in the earlier chapters). This will enable you to first translate the GML for OS MasterMap Highways Network data into either a File Geodatabase or ESRI shapefiles, before you can load them into ArcMap. However, it is recommended to use a File Geodatabase as a shapefile can only store geometry and not the related tables.

1. Open ArcMap.
2. To load a Geodatabase or shapefile into ArcMap, click on the *Add Data* button in the standard tool bar.



The *Add Data* window will open.

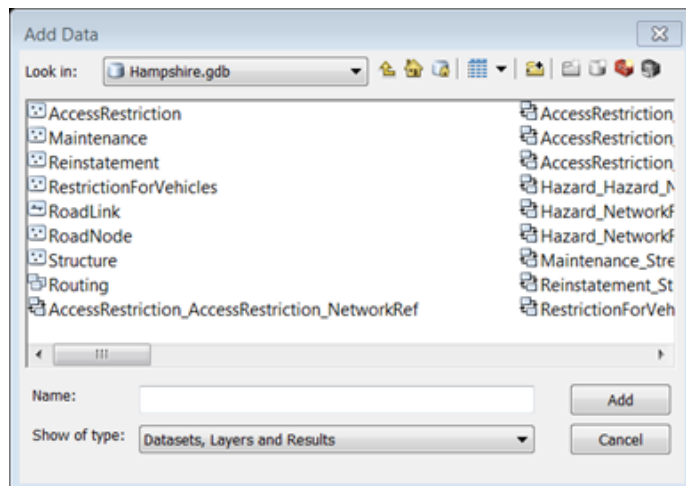


Connect to the folder where you saved your translated OS MasterMap Highways Network data.

To do this, click the *Connect to Folder* button.

The *Connect to Folder* window will open. Navigate to your folder and click *OK*.

The *Add Data* window will remain open, navigate to the folder containing your data.



Select the elements of the data you wish to open in the window and click *Add*.

The OS MasterMap Highways Network features will be added to the ArcMap.

### 5.3.3 Creating relationships in an ESRI FileGeodatabase

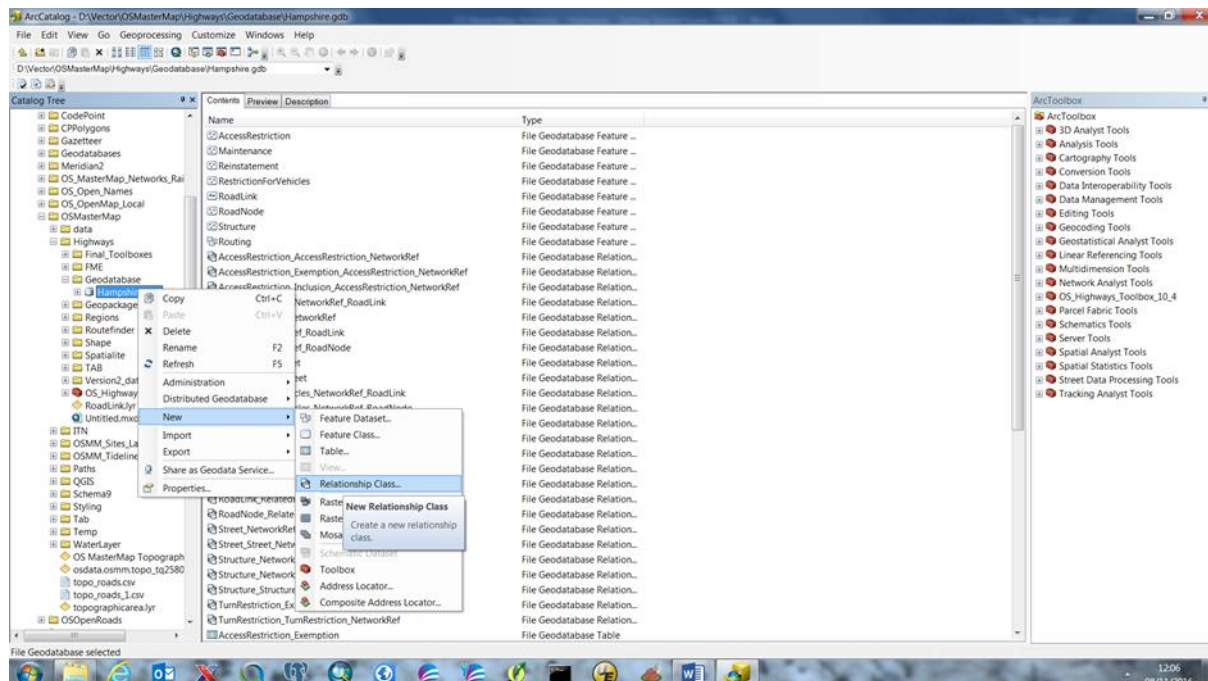
The OS MasterMap Highways data set has been created using a relational data model. If you are using a File Geodatabase you can create relationship classes within the Geodatabase.

1. Open *ArcCatalog*.

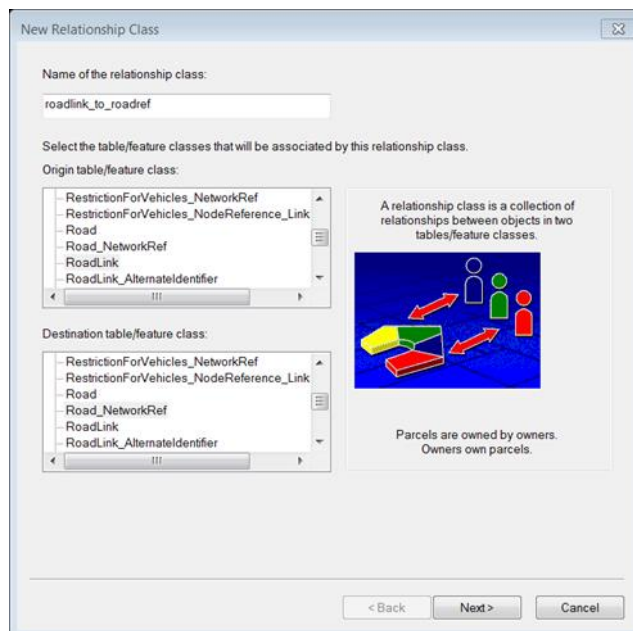
If you don't have a connection to the folder containing data add one now by clicking on *Connect to Folder* on the standard toolbar.

In the Catalog Tree navigate to the folder containing your geodatabase.

Right click on the geodatabase and select **New – Relationship Class**.



Give the new relationship class a meaningful name and click on the tables the relate is between. In this example we are creating a relationship between the roadlink and road network reference which is reflecting in relate name.



Click **Next**.

Leave the default as Simple (Peer to Peer) Relationship and click **Next>**.

Leave the default names and select None (no messages propagated) and click **Next>**.

As there are more than one reference to the roadlink you will need to create a one to many relationship by selecting 1-M (one to many) and click *Next>*.

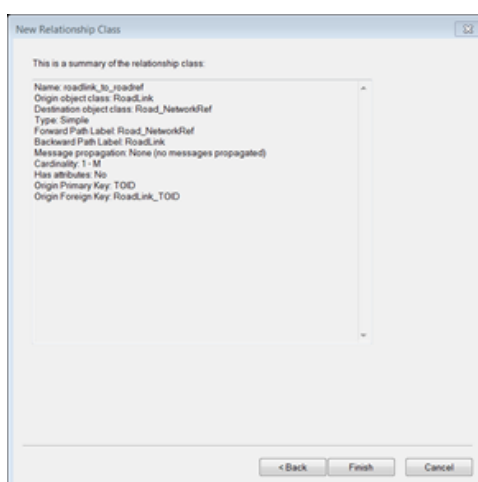
You do not need to add attributes so select *No* and click *Next>*.

The next step is important as it defines the fields that will be used to link the data together. These relationships are described in appendix A.

For the example, we are using the Primary field in the Roadlink table is TOID, select this from the drop-down list.

The foreign key in the Road Network Reference table will be RoadLink TOID, select this from the dropdown list and click *Next*.

This is now complete click *Finish* to create the relationship class. When you open the data in ArcMap and use the identify tool it will now return all data that forms part of the created relationship.



## 5.4 MapInfo Professional

These notes outline how to load OS MasterMap Highways Network into MapInfo Professional using the GML you have received. They have been prepared using version 15.2.2 of MapInfo. This version of MapInfo allows you to convert GML data using Tool called Universal Translator, older versions may not have this functionality.

However, using this tool will only convert the files that contain geometry. If you wish to use the full data set, it is recommended that you store the data in either a relational database or a Spatialite or Geopackage data structure, supported from version 12.5 of MapInfo Pro.

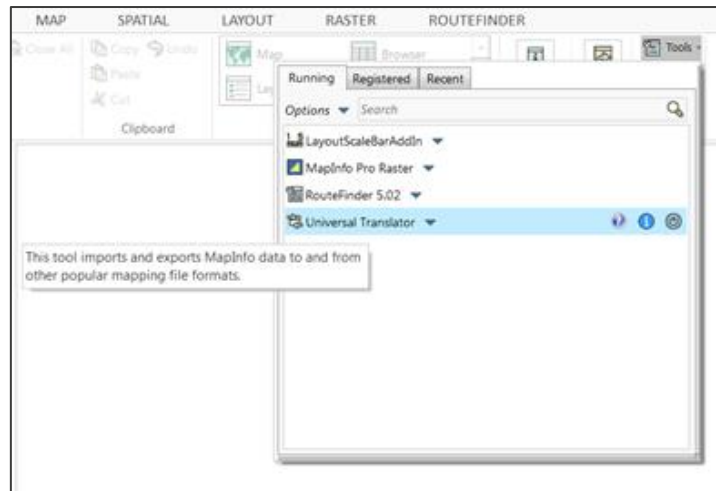
Note these instructions refer to the 64Bit version, the Universal Translator window is the same in the 32Bit version, however the MapInfo menus are slightly different.

If your version of MapInfo is 12.0.2 or older, you will have to use translation tools available in FME or QGIS (explained in the earlier chapters) to first translate the OS MasterMap Highways Network GML data into MapInfo TAB, before you can load them in MapInfo. If you are bringing in already translated TAB files, please start following the instructions from section 5.4.1.

1. Open MapInfo Professional.



2. On the main Tools tab select Universal Translator. If this is not under the list of 'Running' tools go to the 'Registered' tab and scroll down the list of available tools until you find it.

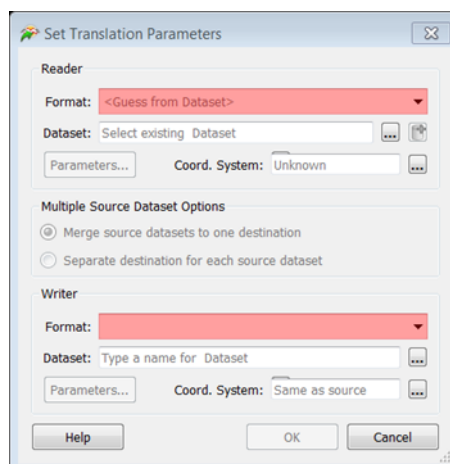


*FME Quick Translator* window opens.



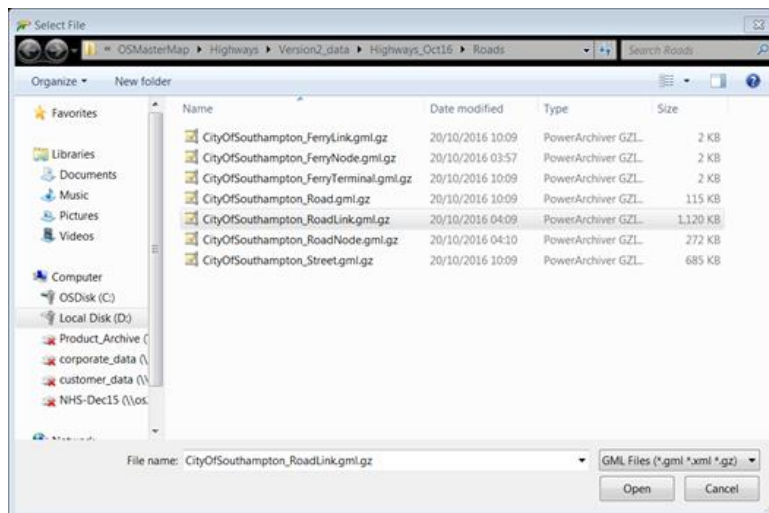
Go to File>Translate or click on the *Translate Data* icon circled above.

*Set Translation Parameters* window opens



In *Reader* section Select GML (Geography Markup Language) from the drop down menu next to Format.

In *Reader Dataset* navigate to the folder where you saved your GML files.



In *Writer* select **MapInfo TAB** from the drop-down menu.

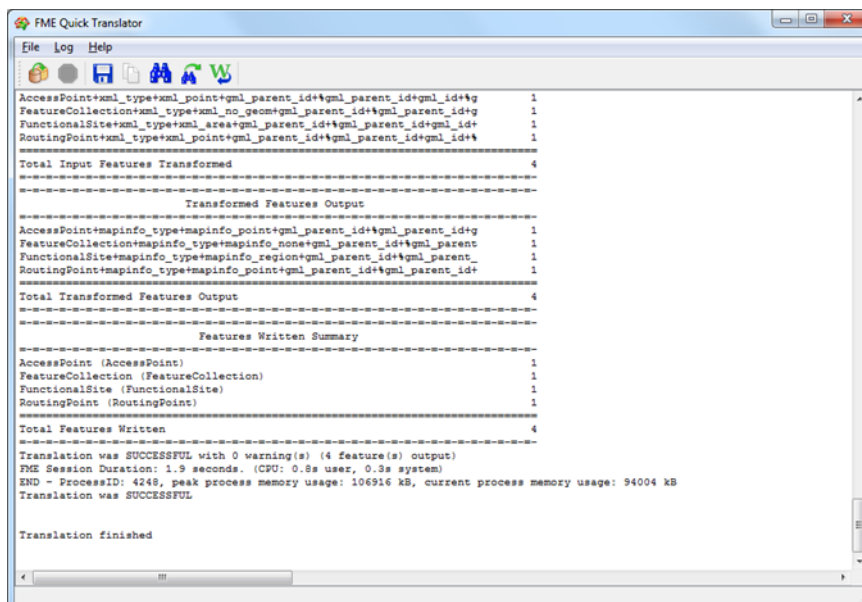
In *Writer Dataset* navigate to the folder where you want your TAB file to be saved.

You can leave the rest of the settings as default.

Click **OK**.

The translation started. You will notice comments appearing in *FME Quick Translator* window.

When completed you will see the information that the Translation was successful. Close the window.



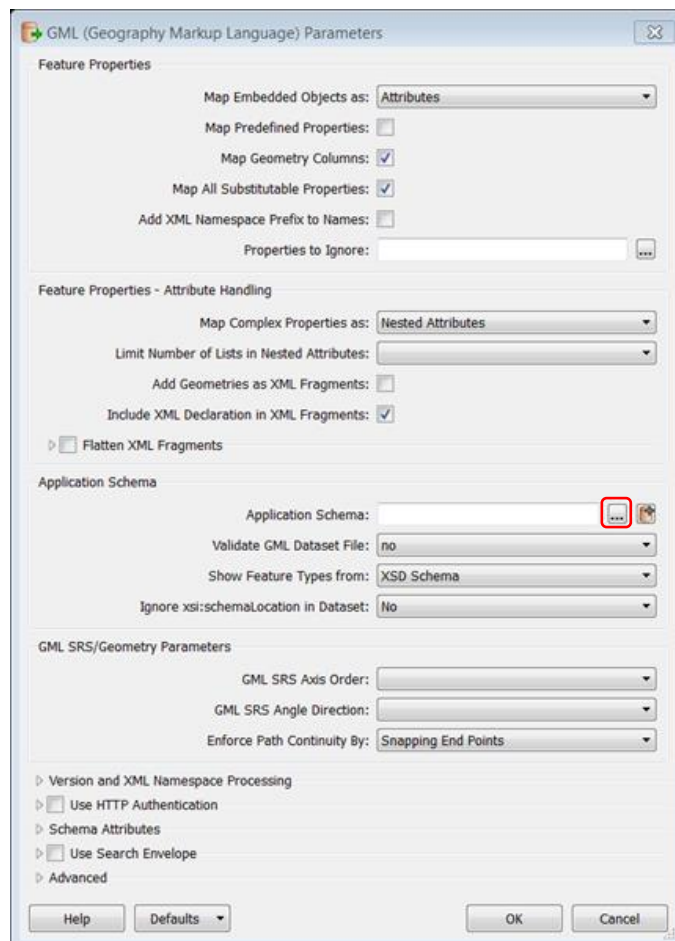
## 5.4.1 Setting the application schema

One common reason for the translate to fail is that it cannot find the schema file used to interpret the GML. If this is the case it can be added manually.

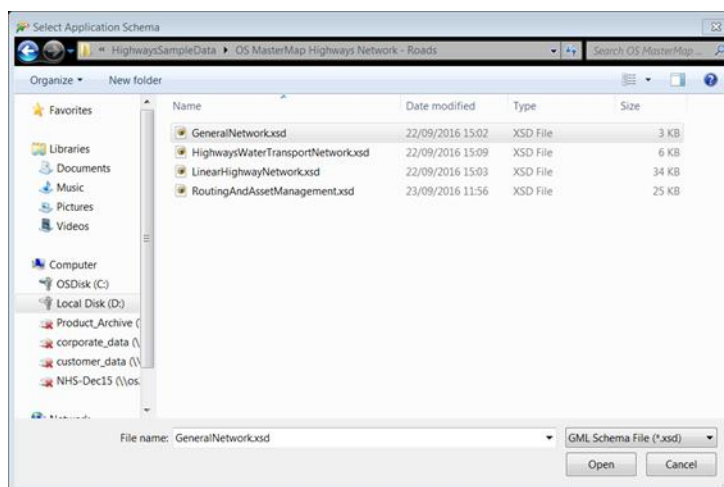


1. On the *Reader* panel of the tool select the *Parameters* button.

Halfway down the window in the *Application Schema*, click the button with 3 dots and navigate to the schema location and select *GeneralNetwork.xsd*. (These can be downloaded from the Ordnance Survey website).

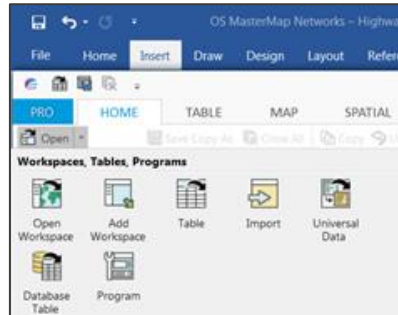


Click *Open* and then *OK* and re-run the translation.



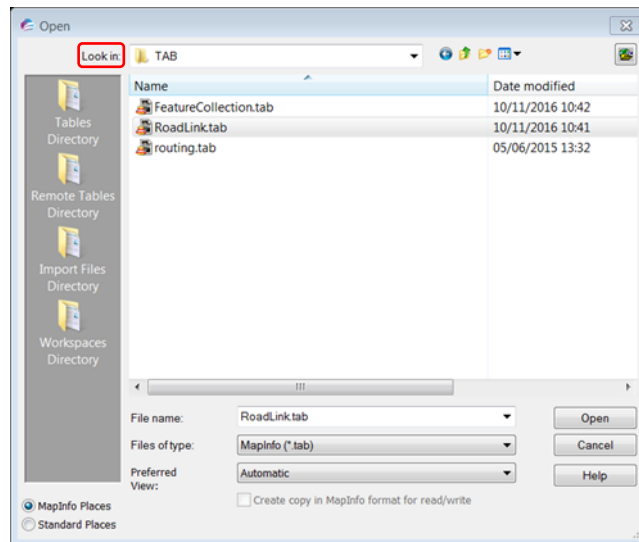
## 5.4.2 Opening the translated files in MapInfo Pro

1. On the Home tab select Open and the Table option



Open window opens.

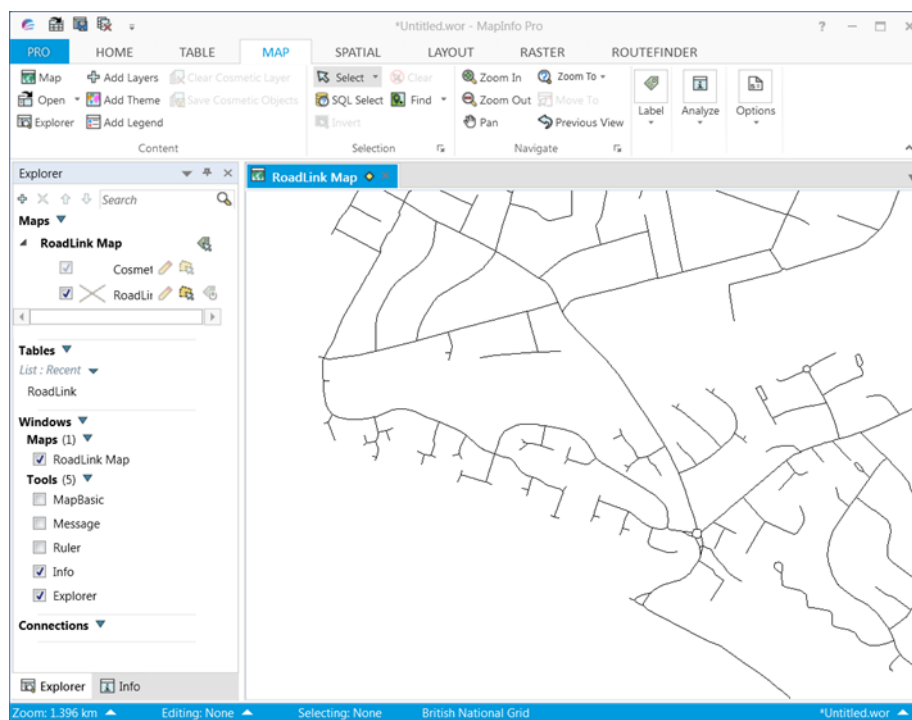
Next to *Look in* navigate to the folder where you saved your TAB files.



If you don't see your files, in the *Files of type* drop-down menu select MapInfo (\*.tab).

Select your translated TAB file and click *Open*.

The data will now load into MapInfo Pro without styling.



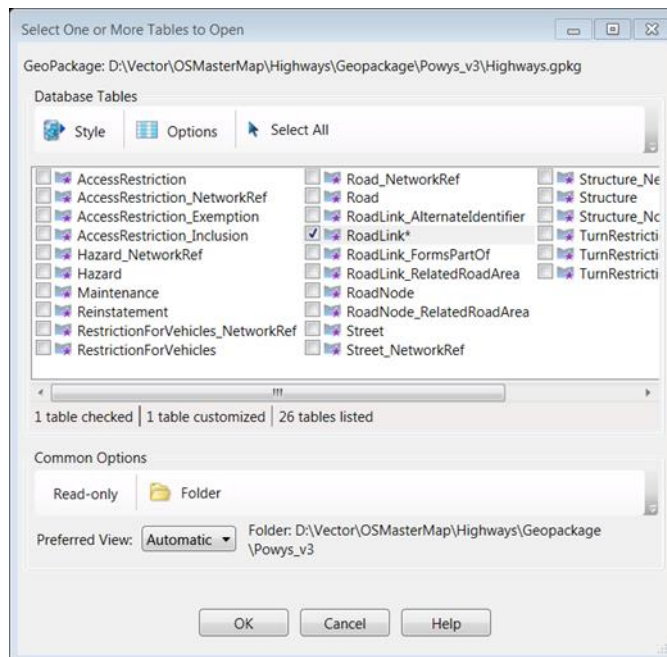
### 5.4.3 Creating and using OGC GeoPackage in MapInfo Pro

From version 11.5.2 of MapInfo Pro, the SQLite data format was supported. This is a 'lite weight' portable data type which allows users to store both geometry and tabular data within the same structure. OGC GeoPackage is an extension of this and is supported from MapInfo Pro xx.

Both formats can be created using FME using the workbenches discussed in the FME section of this guide. These notes outline how to open a GeoPackage for use in MapInfo Pro.

1. On the Home tab select *Open* and *Table*.
2. In the *Open* window change *Files of Type* to GeoPackage (.gpkg) – N.B. you will also see an option for SQLite which can be opened in a similar way.
3. Navigate to the location of your GeoPackage file and click *Open*.

4. A list of available tables will appear.



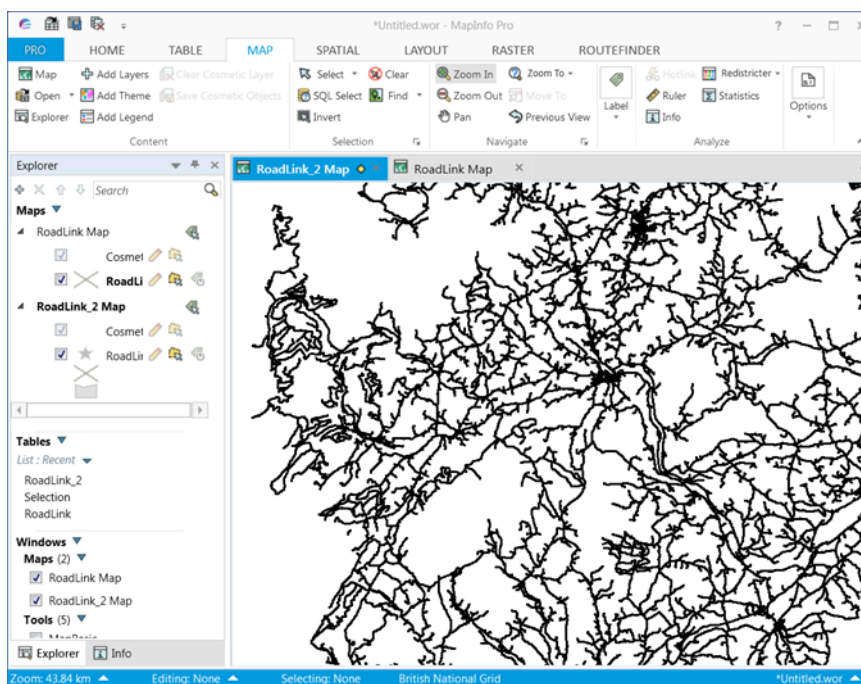
Check the tables you wish to open.

If you table contains geometry you can set the default style by click on the style tab.

Chose the geometry type – Point, Line or Area and select a style.

Click OK to open the tables in MapInfo.

MapInfo will create a TAB file for the data you have selected which will open within MapInfo and is ready for you to work with.



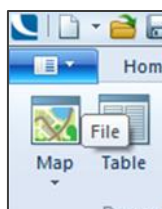
## 5.5 CadCorp Map Modeller

It is important to ensure that the current version of CadCorp Map Modeller is used to convert and display the OS Highways data. The current version is 8.0.2148.64 with a build date of post October 2017 which is required to be able to load the Highways data using the October 2017 schema (final version).

There are several ways to load Highways data into CadCorp Map Modeller. The recommended way of doing this, which will also allow the creation of a routable network in CadCorp, is to use the Ordnance Survey Network Manager extension.

### 5.5.1 Loading using the CadCorp Map Modeller Network Extension

1. Open Map Modeller and select *File*. It is the shaded box in the top-left hand corner of the *Map Modeller* window.



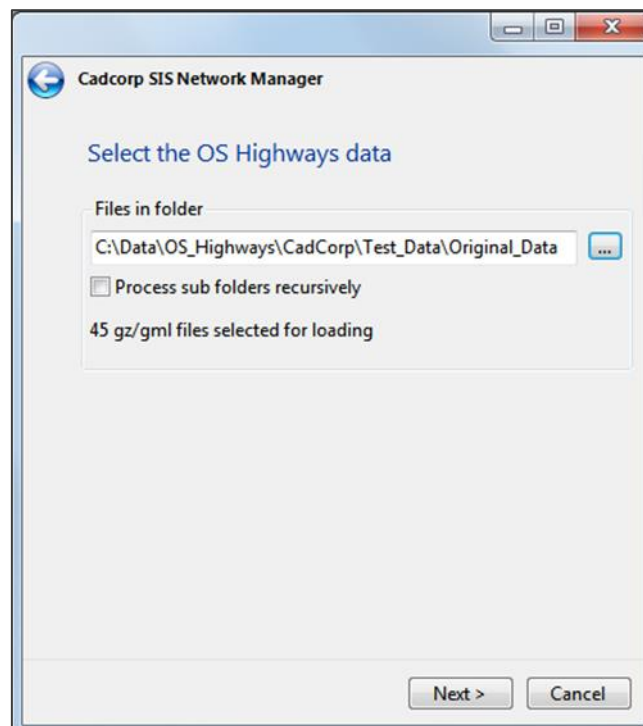
The drop-down window pictured above will open. The user will need to select *Utilities* followed by the *OS Network Manager* which is right at the bottom of the list. Please note that the user needs to be licenced to use these extensions – if they are greyed out, the user will need to contact CadCorp for assistance.

The following window will appear after the licence has been checked.

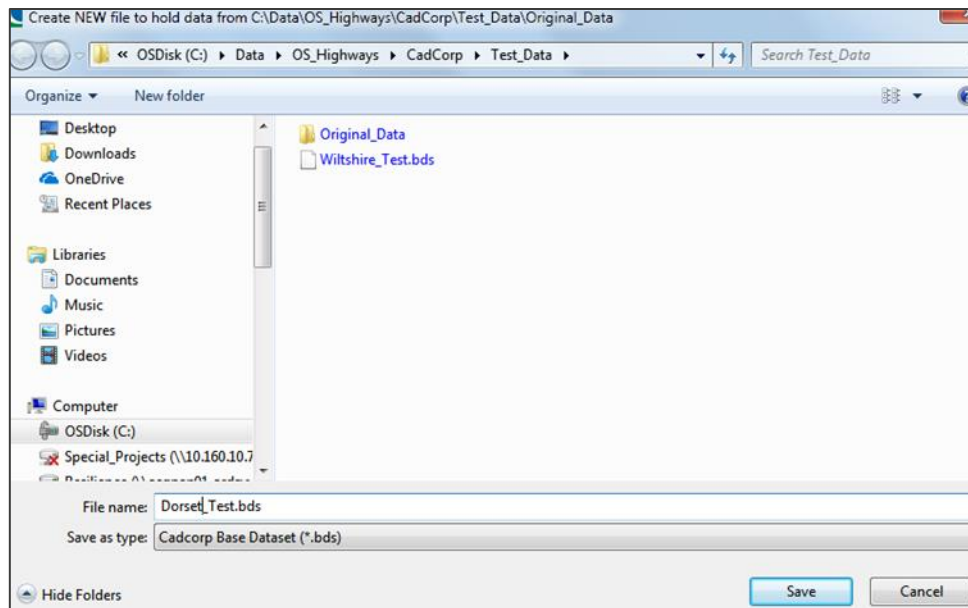


The option to process OS Highways data is at the top. Select this option.

The user will need to browse to where the Highways data is located, either on a local hard drive or on a network drive.

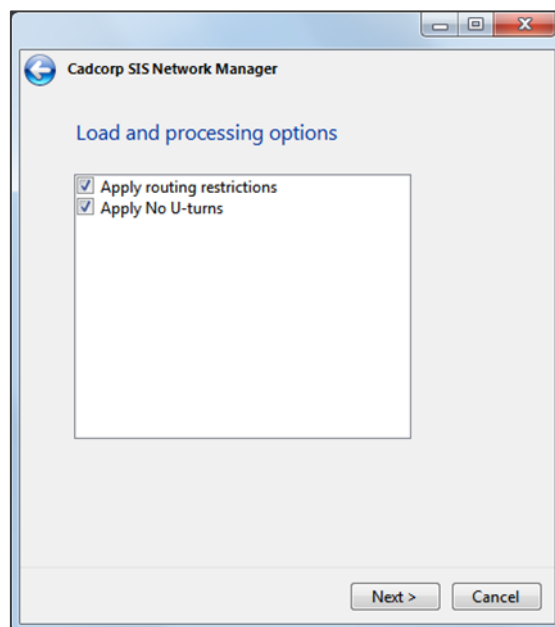


Once the data folder has been selected, click *Next*.



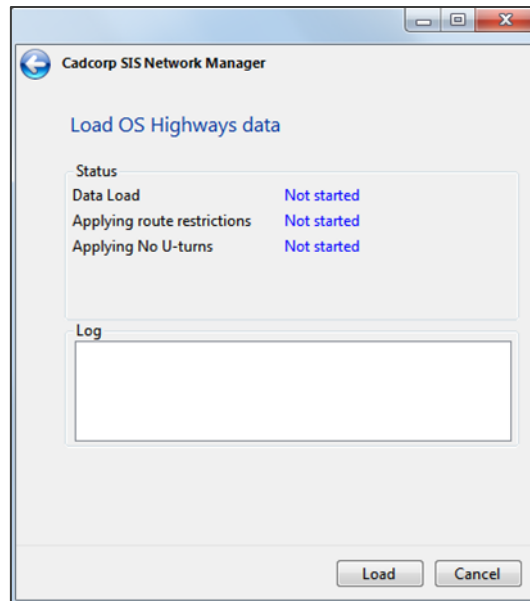
The user will now need to give the file to be created containing the Highways data a name and a location where the data will be saved. In this example we are going to call the file 'Dorset\_Test'. Click *Save* once this has been done. The window below will now appear to commence the conversion process. The user does have the option here of applying the routing restrictions to the data and also adding U turns.

Click *Next* when ready.

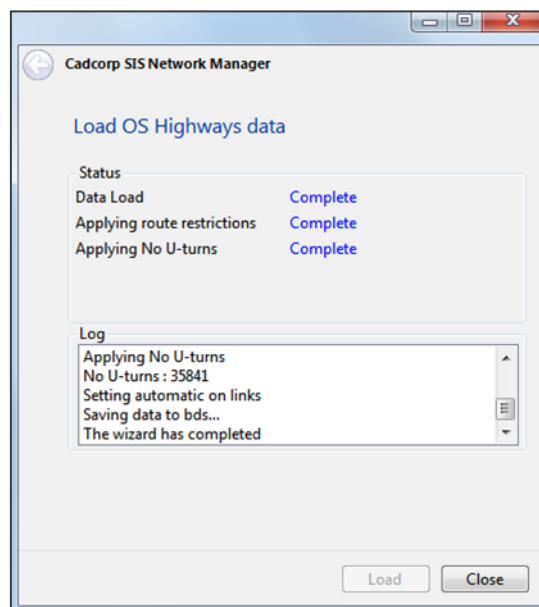




Click *Load*. The wizard will now start creating a routable network dataset. Please wait until the process is completed. The user may see a 'not responding' message on top of the window. It is safe to ignore this.

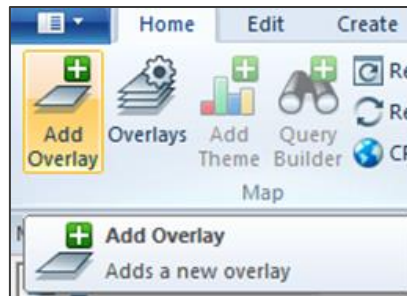


The window below will appear when the process is complete. Depending upon how much data is being processed this could take several hours. Click *Close* to close the wizard. The user is now ready to load the data into Map Modeller.

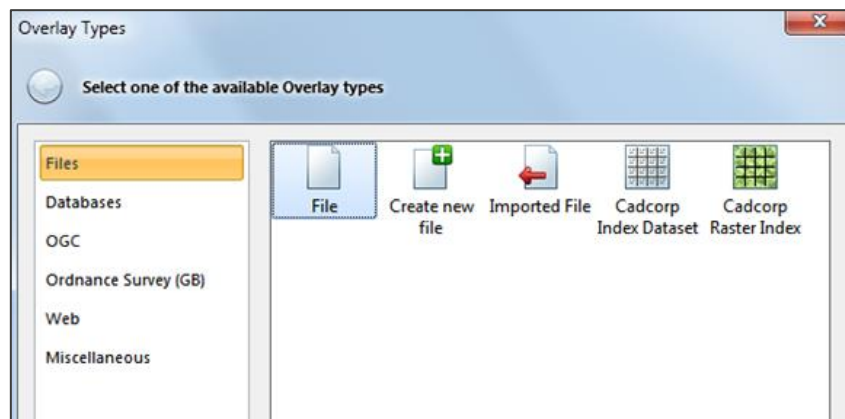




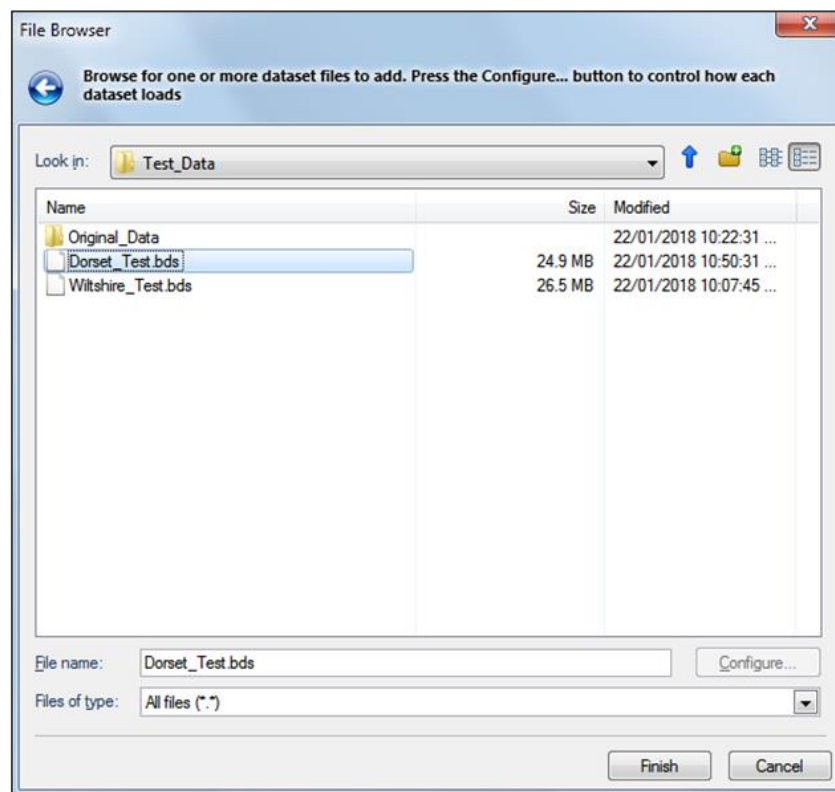
Click *Add Overlay*.



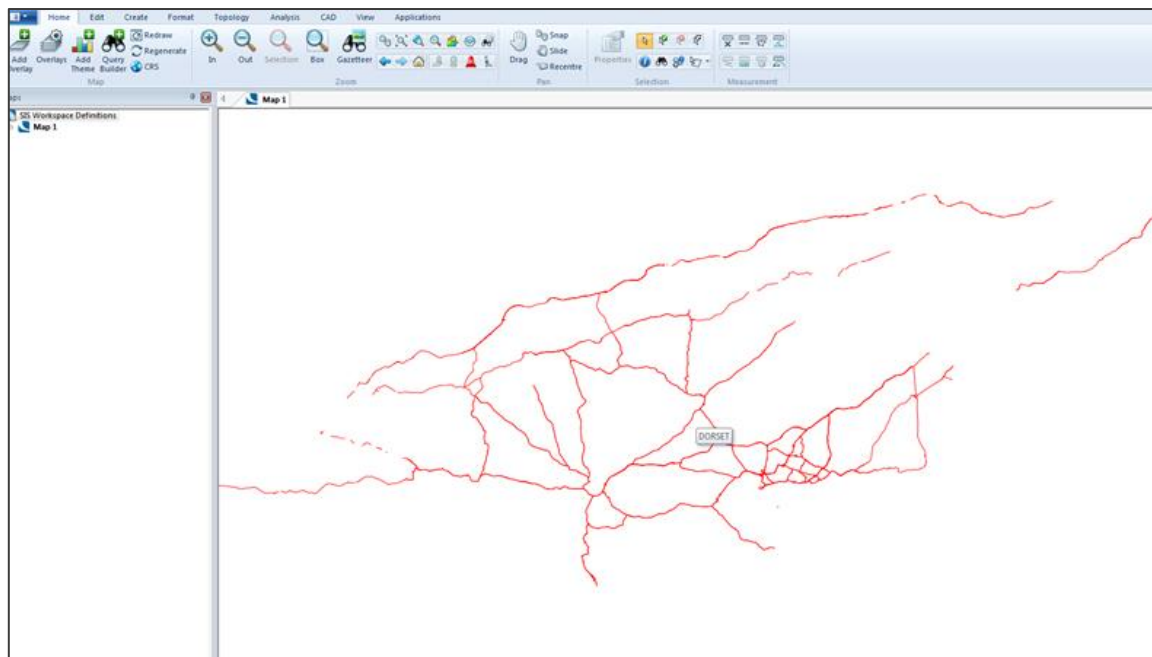
Click on the *Files* tab. We are going to load the file which has just been created. Click *Next*.



Browse to the location of the file and select it.

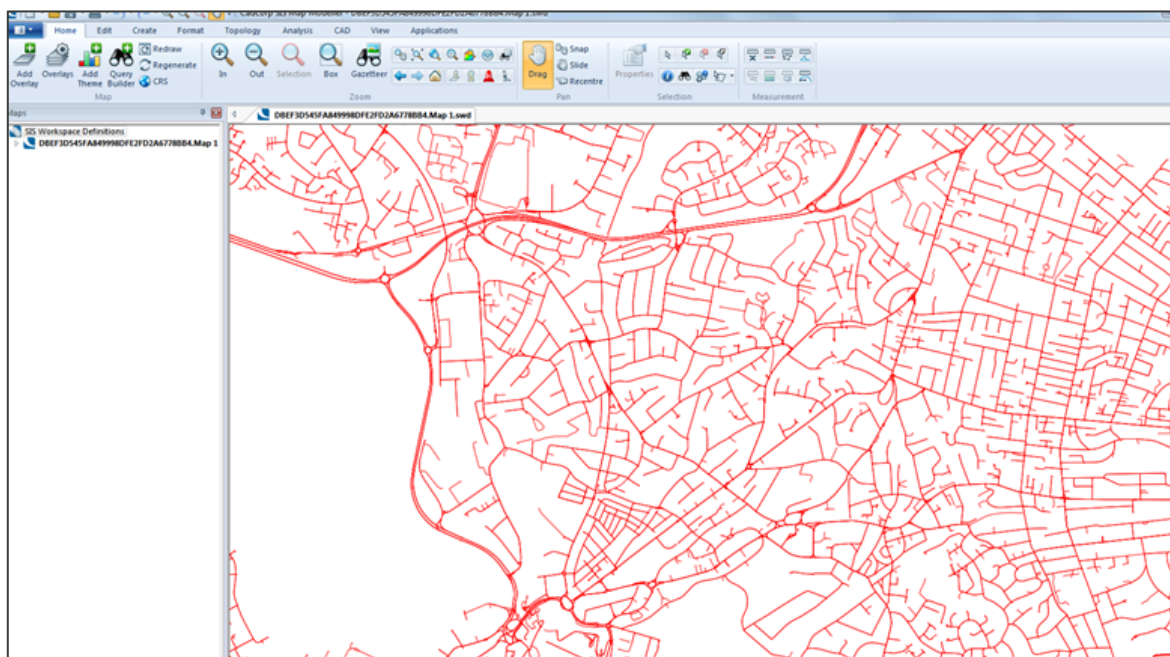


Click *Finish* when the file has been selected. The data will now load into Map Modeller.



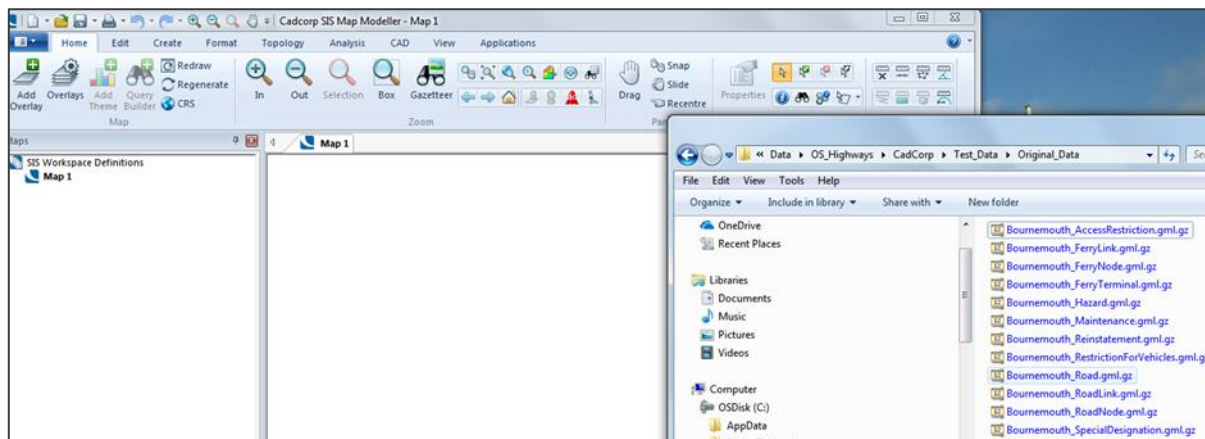
The data will be styled using a CadCorp default style and the data will appear more complex as one zooms into an area.

The user will need to style the data based upon whatever classification is required. CadCorp will also be developing Named Object Library (.NOL) file for the styling of Highways data shortly. Users should keep a watch on the CadCorp web site for information.



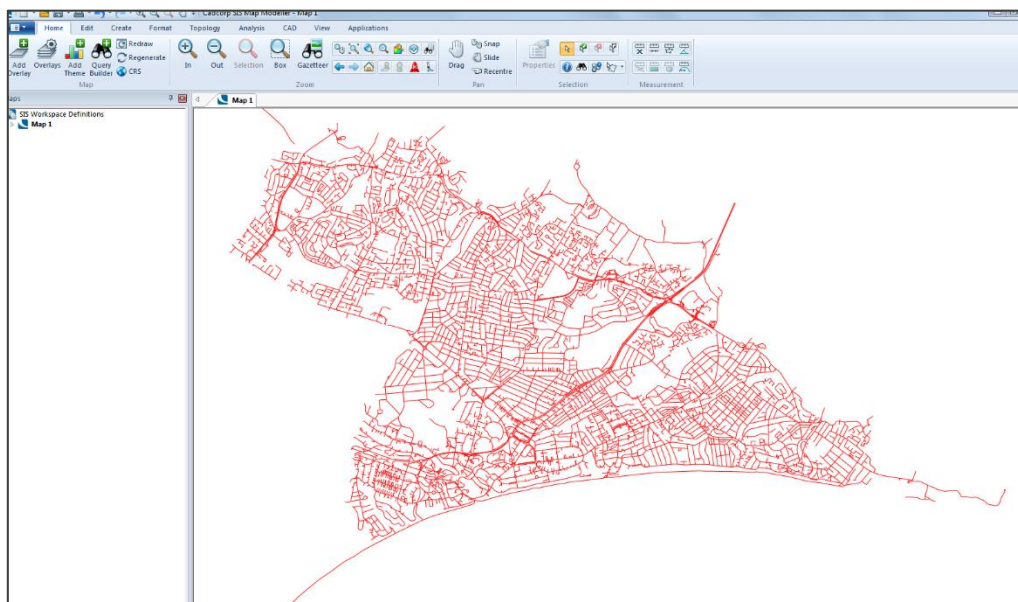
## 5.5.2 Loading the data using the 'drag and drop method'

Users can also load OS Highways data into CadCorp Map Modeller by simply dragging a Highways .gz file as supplied by Ordnance Survey into the Map Modeller window.



The window below shows what is displayed when the road link file for Bournemouth is simply dropped into the Map Modeller window.

**PLEASE NOTE\*** This method will not create a routable network in CadCorp Map Modeller and will not apply any of the routing information or U turn restrictions. It is a method to simply display the data in Map Modeller. To obtain a routable network the user will need to use the method described in the previous section.



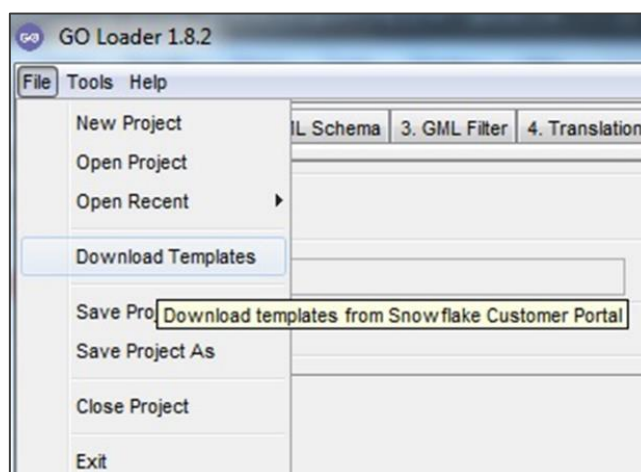
## 6. Using Snowflake to load the data into a database

Snowflake Software provide standard project templates for various OS products, so that users can load the data to a standard data model with the very minimum of effort, to a data model that meets the needs of most end users.

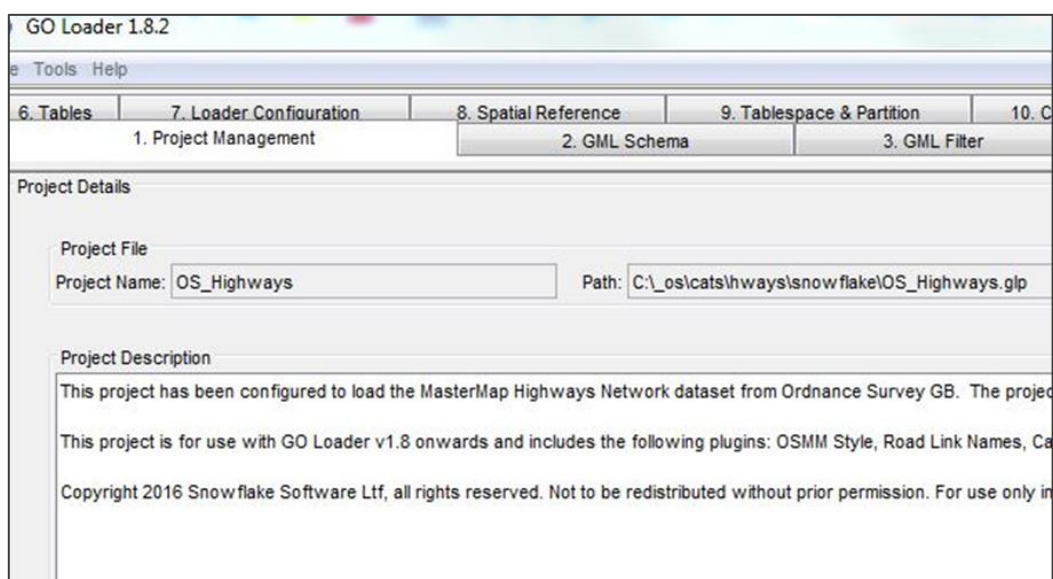
Snowflake have created a new standard project to support the new Highways dataset. This can be downloaded from the Snowflake support portal.

The Project also includes columns to help support styling/MapInfo styling if needed.

1. Open GO Loader, File/Download Templates, and download the new standard GO Loader project for Highways, from the Customer portal. (Products/GO Loader/Resources/Project Templates, or go straight to <https://snowflakesupport.force.com/portal/sfc/#workspaceView?selectedWorkspaceId=058D0000000Ga9f>) Save it to your drive, and unzip it.



In GO Loader, open the new extracted OS\_Highways.glp GO Loader Standard project (or drag it into the Project File area of the screen).



You can go straight to the configuration Tab – set your target database details.

6. Tables    7. Loader Configuration    8. Spatial Reference    9. Tablespace

Connection

Load & Validation

Oracle Settings

Tablespace Naming Policy

CSV Values

Application Data

Archiving

Type: PostgreSQL

Hostname/IP Address: localhost

Port: 5432

Database Name: highways

Username: postgres

Password: ●●●●●●●●

Also set a directory location on your hard drive for 'load lists' (choose any valid local location).

6. Tables    7. Loader Configuration    8. Spatial Reference    9. Tablespace & Partition    10. Checkpoint

Connection

Load & Validation

Oracle Settings

Tablespace Naming Policy

CSV Values

Application Data

Archiving

Load List Directory: C:\\_os\cats\hways\snowflake\loadlist    Browse

Database Table Integrity Check: ☒

Load Tolerance Settings:

Create all the tables defined in the GO Loader Highways project (ideally choose a new database or schema without other existing tables).

10. Checkpoint    11. Create Tables

ACCESSRESTRICTION

CONNECTINGNODE

CYCLEFACILITYTYPE

DESIGNATEDNAMETYPE

ELEVATIONGAINTYPE

FERRYLINK

FERRYNODE

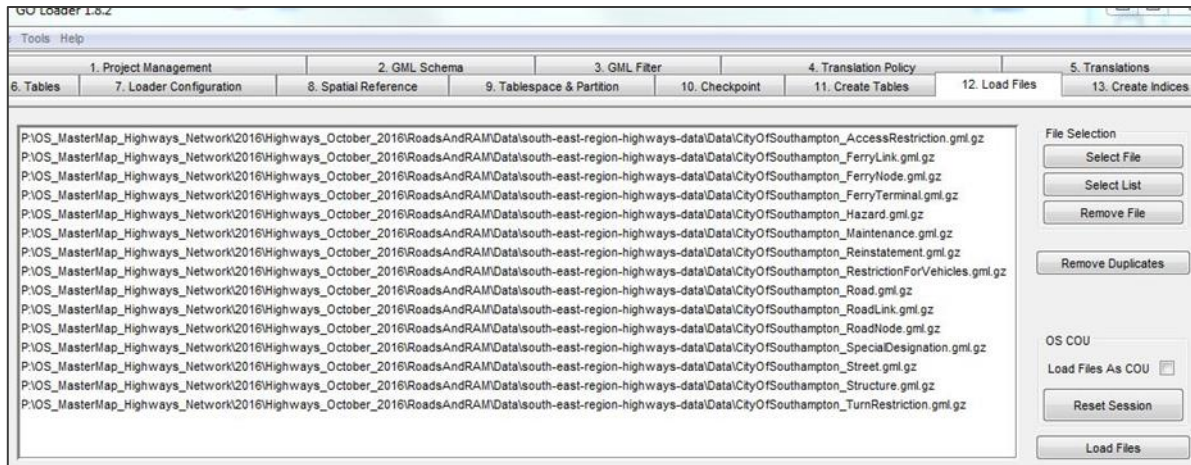
FERRYTERMINAL

Create Select...    Drop Selecte...    Res

Create All Ta...    Drop All Tables    Re



Load all your Highways data files.



Create the Spatial Indexes and other indexes.



## Appendix A

TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
RoadLink	Linear Network	RoadLink	Y	TOID		
RoadLinkAlternativeIdentifier	Linear Network	RoadLink	N	TOID (id in GML/technical spec)	RoadLink	TOID
RoadLinkFormsPartOf	Linear Network	RoadLink	N	TOID	Road or Street	formsPartOf - Will be either Road TOID or Street USRN
RoadLink_TopoTOIDRef	Linear Network	RoadLink	N	TOID	Topo Area	RelatedRoadAreaTOID - Will be the TOID of the Topo area(s) that represent the RoadLink.
AccessRestriction_NetworkRef	Routing and Asset Management Information	AccessRestriction	N	TOID	RoadLink	RoadLink_TOID - The TOID in the RoadLink table
AccessRestriction	Routing and Asset Management Information	AccessRestriction	N	TOID	AccessRestriction_NetworkRef, AccessRestriction_Inclusion, AccessRestriction_Exemption	TOID
AccessRestriction_Inclusion	Routing and Asset Management Information	AccessRestriction	N	TOID	AccessRestriction	TOID



TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
AccessRestriction_Exemption	Routing and Asset Management Information	AccessRestriction	N	TOID	AccessRestriction	TOID
Hazard_NetworkRef	Routing and Asset Management Information	Hazard	Y	TOID	RoadLink and RoadNode	RoadLink_TOID and RoadNode_TOID - The TOID in the respective tables
Hazard	Routing and Asset Management Information	Hazard	Y	TOID	Hazard_NetworkRef	TOID
Hazard_NodeReference_LinkReference	Routing and Asset Management Information	Hazard	N	TOID	RoadLink	RoadLink_TOID
RestrictionForVehicles_NetworkRef	Routing and Asset Management Information	VehicleRestriction, RestrictionForVehicles	N	TOID	RoadLink and RoadNode	RoadLink_TOID and RoadNode_TOID - The TOID in the respective tables
RestrictionForVehicles	Routing and Asset Management Information	VehicleRestriction, RestrictionForVehicles	Y	TOID	RestrictionForVehicles_NetworkRef	TOID
RestrictionForVehicles_NodeReference_LinkReference	Routing and Asset Management Information	VehicleRestriction, RestrictionForVehicles	N	TOID	RoadLink	RoadLinkTOID
Road	Linear Network	Road	N	TOID	Road_NetworkRef	TOID
Road_NetworkRef	Linear Network	Road	N	TOID	RoadLink	RoadLink_TOID - Is the TOID of the RoadLink table.
RoadNode	Linear Network	RoadNode	Y	TOID		

TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
RoadNode_RelatedRoadArea	Linear Network	RoadNode	N	TOID	Topo Area	RelatedRoadAreaTOID - Will be the TOID of the Topo area(s) that represent the RoadNode.
Street_NetworkRef	Linear Network	Street	N	USRN	RoadLink	RoadLink_TOID - Will be the TOID of the RoadLink table.
Street	Linear Network	Street	N	USRN	Street_NetworkRef	USRN
Structure_NetworkRef	Routing and Asset Management Information	Structure	N	TOID	RoadLink and RoadNode	RoadLink_TOID and RoadNode_TOID - The TOID in the respective tables
Structure	Routing and Asset Management Information	Structure	Y	TOID	Structure_NetworkRef	TOID
Structure_NodeReference_LinkReference	Routing and Asset Management Information	Structure	N	TOID	RoadLink	RoadLink_TOID
TurnRestriction_NetworkRef	Routing and Asset Management Information	TurnRestriction	N	TOID	RoadLink	RoadLink_TOID - The TOID in the RoadLink table
TurnRestriction	Routing and Asset Management Information	TurnRestriction	N	TOID	TurnRestriction_NetworkRef, TurnRestriction_Exemption, TurnRestriction_Inclusion	TOID
TurnRestriction_Exemption	Routing and Asset Management Information	TurnRestriction	N	TOID	TurnRestriction	TOID

TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
TurnRestriction_Inclusion	Routing and Asset Management Information	TurnRestriction	N	TOID	TurnRestriction	TOID
Maintenance Point	Routing and Asset Management Information	Maintenance	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Maintenance Line	Routing and Asset Management Information	Maintenance	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Maintenance Area	Routing and Asset Management Information	Maintenance	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Maintenance No Geometry	Routing and Asset Management Information	Maintenance	N	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Reinstatement Point	Routing and Asset Management Information	Reinstatement	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Reinstatement Line	Routing and Asset Management Information	Reinstatement	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Reinstatement Area	Routing and Asset Management Information	Reinstatement	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Reinstatement No Geometry	Routing and Asset Management Information	Reinstatement	Y	ID	Street	Reference_To_StreetUSRN - The USRN in the Street table
Junction	Linear Network	RoadJunction	N	TOID	RoadNode	TOID, RoadNode_TOIDs (the junction can reference back to multiple road nodes)

TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
Highways Dedication	Routing and Asset Management Information	Dedication	Y	ID	Road, Street or Path	NetworkRef - TOID in RoadLink and PathLink table and USRN in the Street table
Special Designation Point	Routing and Asset Management Information	SpecialDesignation	Y	networkRef	Street	NetworkRef - USRN in the Street table
Special Designation Line	Routing and Asset Management Information	SpecialDesignation	Y	networkRef	Street	NetworkRef - USRN in the Street table
Special Designation Area	Routing and Asset Management Information	SpecialDesignation	Y	networkRef	Street	NetworkRef - USRN in the Street table
Special Designation No Geometry	Routing and Asset Management Information	SpecialDesignation	N	networkRef	Street	NetworkRef - USRN in the Street table
Ferrylink	Linear Network	FerryLink	Y	TOID		
Ferrylink	Linear Network	FerryLink	N	TOID	FerryNode	FerryNode_TOID (one for startNode and one for endNode)
FerryNode	Linear Network	FerryNode	Y	TOID		
FerryTerminal	Linear Network	FerryTerminal	N	refToFunctionalSite, roadNodeRef, pathNodeRef	Road Node, Path Node and Functional Site	TOID
PathLink	Paths	PathLink	Y	TOID		

TABLE	Specification	GML File	Contains Geometry	COLUMN ID PRIMARY	RELATES TO	COLUMN ID FOREIGN
PathLinkAlternativeIdentifier	Paths	PathLink	N	TOID	PathLink	TOID
PathLinkFormsPartOf	Paths	PathLink	N	TOID	Paht or Street	formsPartOf - Will be either Path TOID or Street USRN
PathLink_TopoTOIDRef	Paths	PathLink	N	TOID	Topo Area	RelatedPathAreaTOID - Will be the TOID of the Topo area(s) that represent the PathLink.
PathLink	Paths	PathLink	N	TOID	PathNode	PathNode_TOID (one for startNode and one for endNode)
Path	Paths	Path	N	TOID	Path_NetworkRef	TOID
Path_Ref_PathLink	Paths	Path	N	TOID	PathLink	PathLink_TOID - Is the TOID of the PathLink table.
PathNode	Paths	PathNode	Y	TOID		
PathNode_RelatedRoadArea	Paths	PathNode	N	TOID	Topo Area	RelatedPathAreaTOID - Will be the TOID of the Topo area(s) that represent the PathNode.
ConnectingLink	Paths	ConnectingLink	Y	TOID	PathNode and ConnectingNode	TOID
ConnectingNode	Paths	ConnectingNode	Y	TOID	RoadLink	TOID

## Further information

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>

### **Product Guide:**

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

### **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>

### **Guide to Routing for the Public Sector:**

<https://www.ordnancesurvey.co.uk/documents/os-mastermap-highways-network-guide-to-routing.pdf>

