# Geography – Background Information – Postcodes

## History of Digitising Postcodes in Scotland

National Records of Scotland (NRS) Geography first began plotting postcode boundaries in 1973. The Post Office (as it was at that time) assigned addresses to postcodes and NRS Geography staff manually traced the boundaries around the addresses using Ordnance Survey (OS) 1:10,000 and 1:50,000 maps to reference the boundary lines.

The postcode boundary dataset represents the smallest plotted unit in Scotland. As a result it is possible to assign any Scottish postcode to any entity (area) within a Scottish boundary dataset.

In 1973 the process of assigning postcodes to these 'higher geographies' was entirely manual (for example, using romers to establish National Grid coordinates) and the individual postcodes were assigned to approximately 15 types of area, e.g. council areas, health boards, electoral wards.
The ability to assign postcodes to these 'higher geographies' represented a significant step in being able to create and interpret statistics about particular locations and areas.

In the late 1980s NRS Geography replaced the manual tracing methods with the introduction of the Geographic Information System, 'GenaMap'. In addition to providing the ability to produce digital boundaries, the system also automated the process of assigning postcodes to the 'higher geographies'. The GenaMap system used the OS 1:10,000 raster maps as the background for the digitising of the postcode boundaries.

In 2006 GenaMap was replaced by ESRI's ArcGIS product. Since the introduction of ArcGIS, NRS Geography utilises Ordnance Survey's (very accurate and detailed) MasterMap® as the base map for positioning the postcode boundaries.

## Postcode Structure

Postcodes are alphanumeric references comprising an outward code of two to four characters and an inward code of three characters. For example:

| | |
|---|---|
| EH12 | 7TB |
| Outward Code | Inward Code |

The postcode is structured hierarchically, supporting four levels of geographic unit:

| **Example** | **Geographic Unit** |
|---|---|
| EH | Postcode Area |
| EH12 | Postcode District |
| EH12 7 | Postcode Sector |
| EH12 7TB | Unit Postcode |

# Geography – Background Information – Postcodes

## Postcode Types

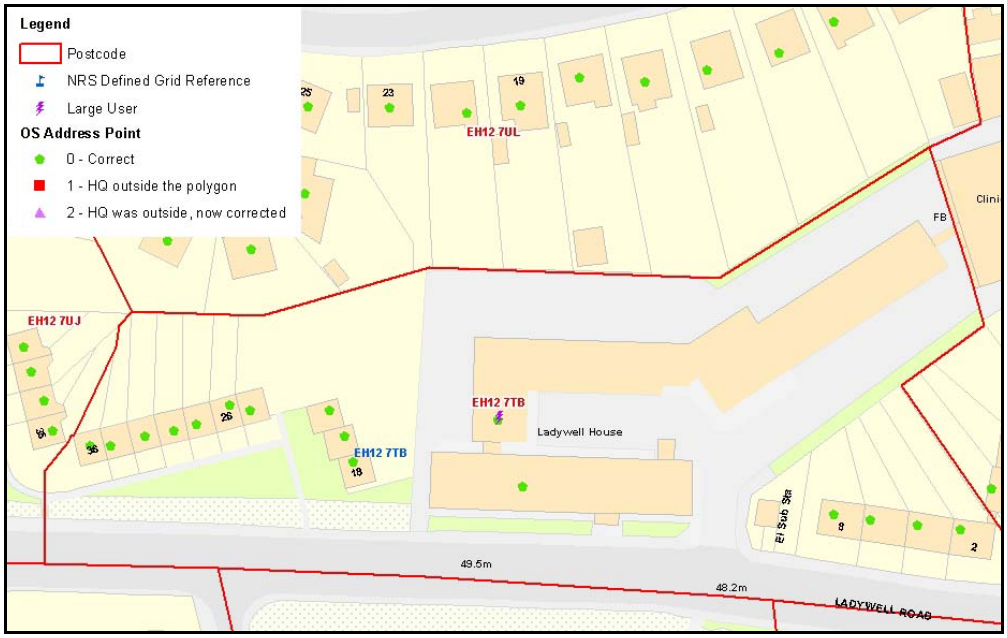
Unit postcodes are the base unit of postal geography and fall into two types:

**Small User Postcodes** identifies either an individual address or a group of delivery points within a thoroughfare of locality. On average there are 15 delivery points per postcode, however this can vary between 1 and 100. NRS creates and maintains a digital boundary for every live small user postcode so that the entire land surface of Scotland is covered by postcode polygons.

**Large User Postcodes** are allocated to single addresses receiving at least 1,000 mail items per day (e.g. business addresses). NRS do not create boundaries for large user postcodes. We try to find where each large user is located on the map and link it to the nearest small user postcode. NRS do not attempt to link PO Box addresses to Small User Postcodes. PO boxes are defined as non-geographic addresses.

Address content for

- EH12 7TB (Small User Postcode) is
  Scottish Government Social Work Inspection Agency, Ladywell House and 2-10, 18-36 Ladywell Road.
- EH12 7TF (Large User Postcode) is
  National Records of Scotland, Ladywell House, Ladywell Road.



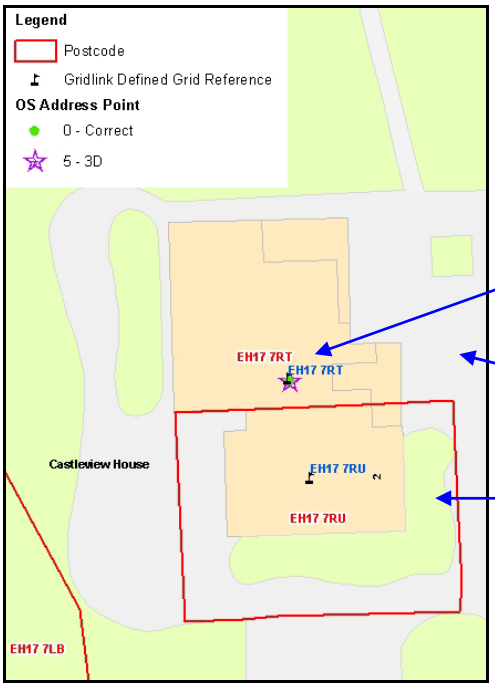
# Geography – Background Information – Postcodes

## Notes regarding Small User Postcodes

Postcode boundaries are subject to continuous change due to new addresses, single addresses acquiring large user postcodes as mail volume increases, and the need to restrict the number of addresses per unit to less than 100.

## Multiple Postcodes on one property

It is possible for large buildings with many separate delivery points (for example, a tower block) to have more than one unit postcode within the building.

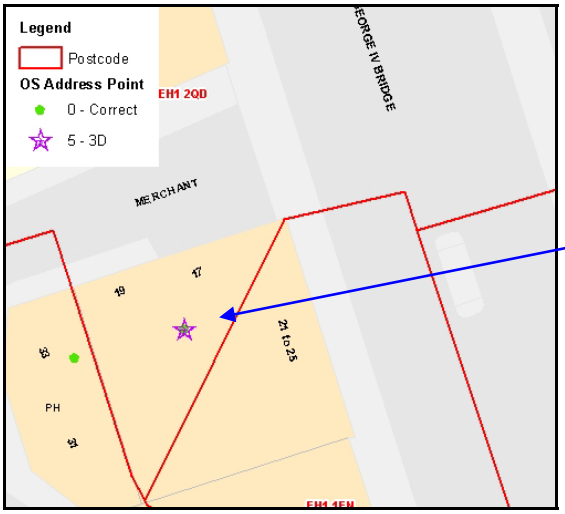



NRS digitise multi storey postcodes by drawing a smaller polygon over half of the building. This is so we can place the grid reference on the property.

The purple stars '☆5- 3D' highlight to us that Address points belonging to a neighbouring postcode are shown in this postcodes boundary.

The larger (outside) polygon contains the lower addresses. (G/1 to 8/6, 2 Craigour Place)

The smaller (inside) polygon contains the higher addresses. (9/1 to 15/6, 2 Craigour Place)




There are many properties that share postcodes, street corners for example.

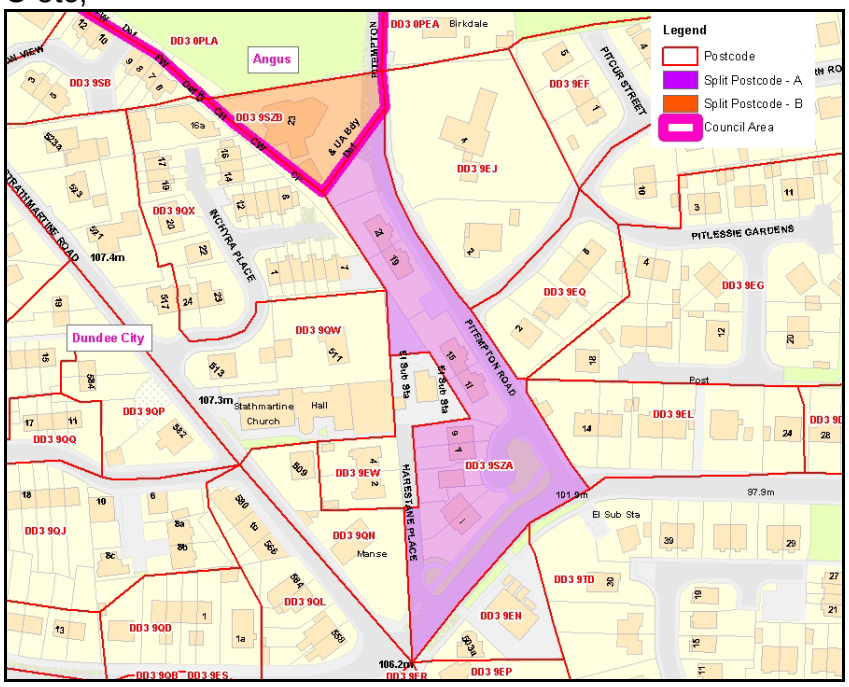
In these cases NRS digitise a postcode by cutting through the property.

The purple stars '☆5- 3D' highlight to us that Address points belonging to a neighbouring postcode are shown in this postcodes boundary.

## Split Postcodes

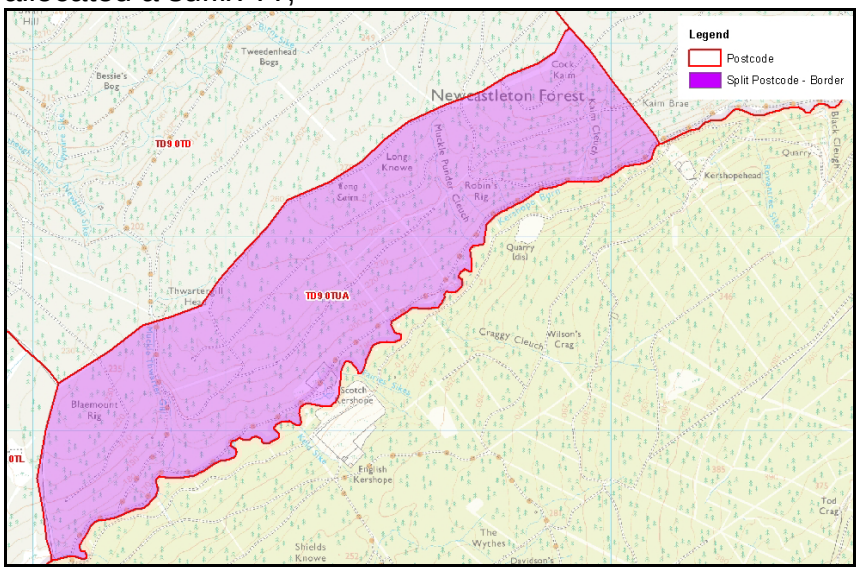
NRS split postcodes for statistical reasons; they are not a feature of Royal Mail® . Split postcodes are those with an ‘A’, ‘B’ or ‘C’ suffix and occur when:

- a postcode straddles two or more Council area boundaries. The most populous past of the postcode is identified by suffix A and the smaller parts by suffixes B, C etc;

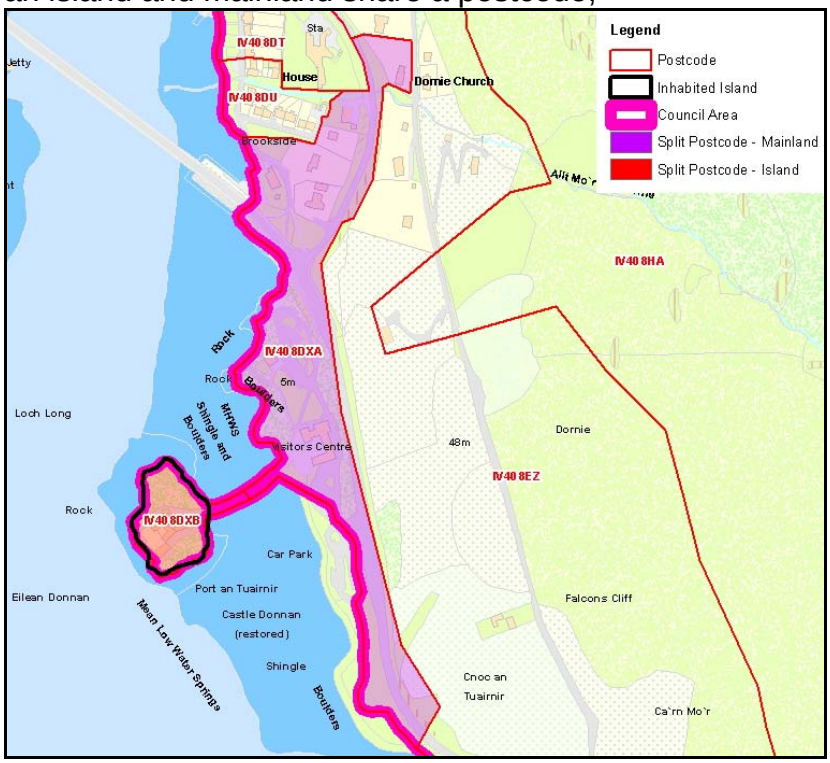





- a postcode straddles the Scottish/English border and the Scottish postcode is allocated a suffix ‘A’;

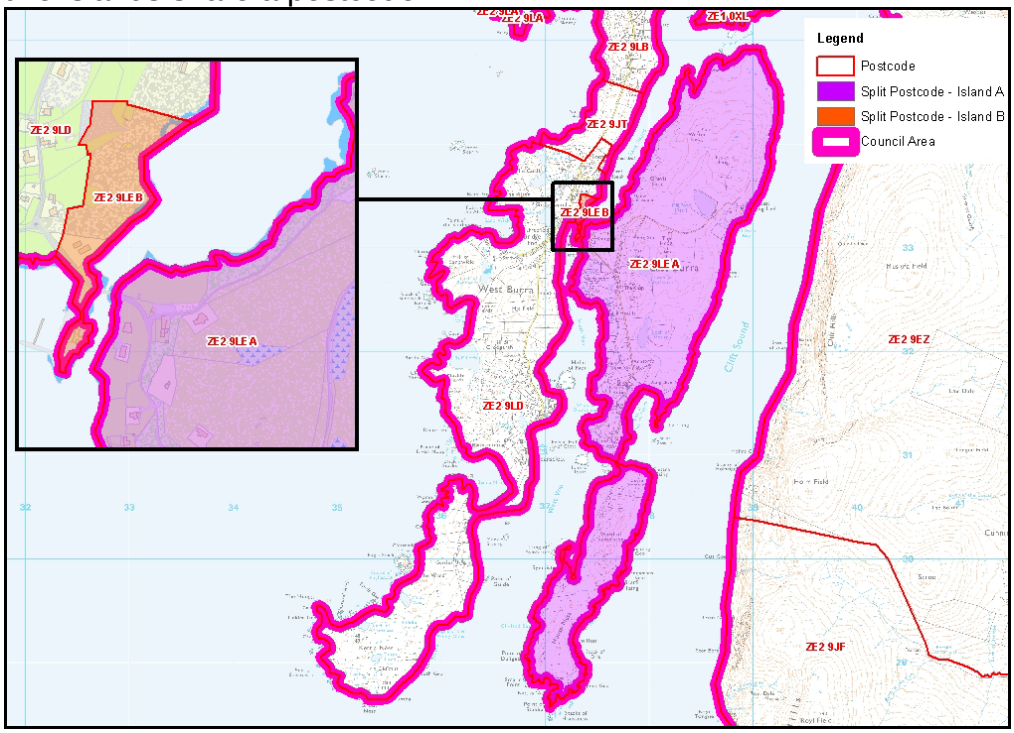


- an island and mainland share a postcode;



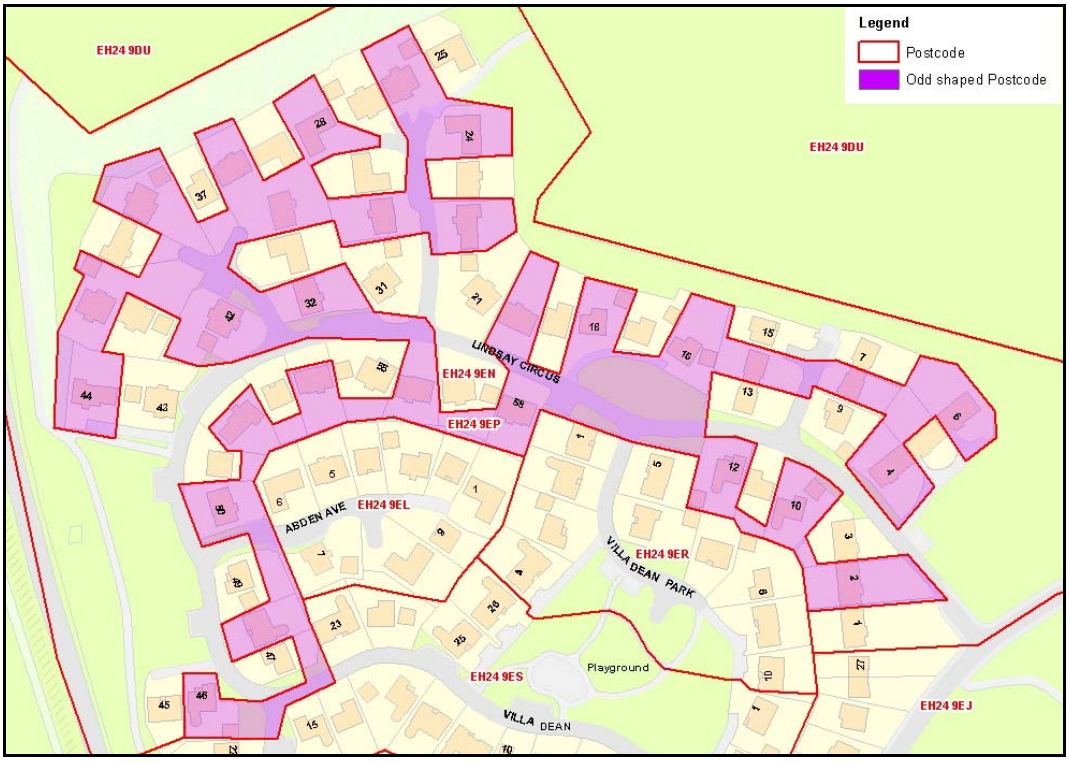



- two islands share a postcode.



## Odd Shaped Postcodes

NRS attempt to keep all postcode content within a single polygon, this is not always possible (more information can be found at Non-contiguous Postcodes). Some of our postcode boundaries are oddly shaped as a result of this.

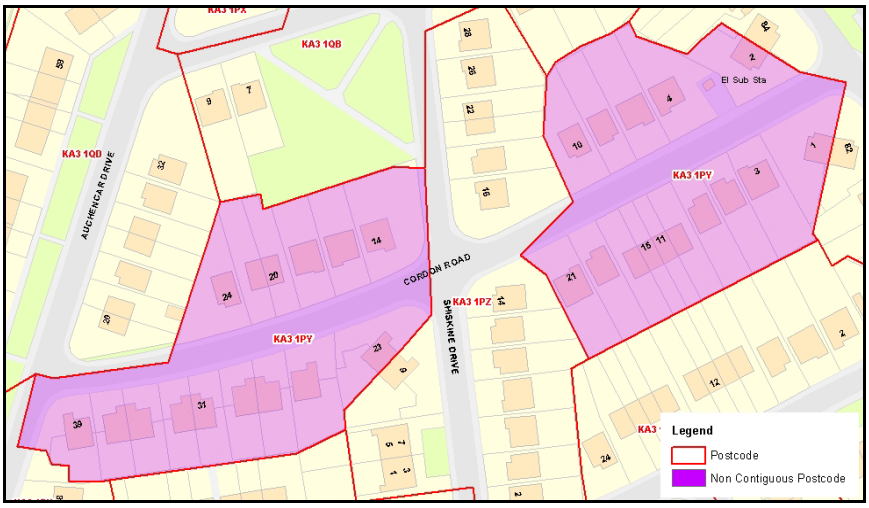


## Non-contiguous Postcodes

NRS uses the term ‘Non-contiguous postcodes’ to describe postcodes where addresses with the same postcode cannot be digitised as a single polygon because:

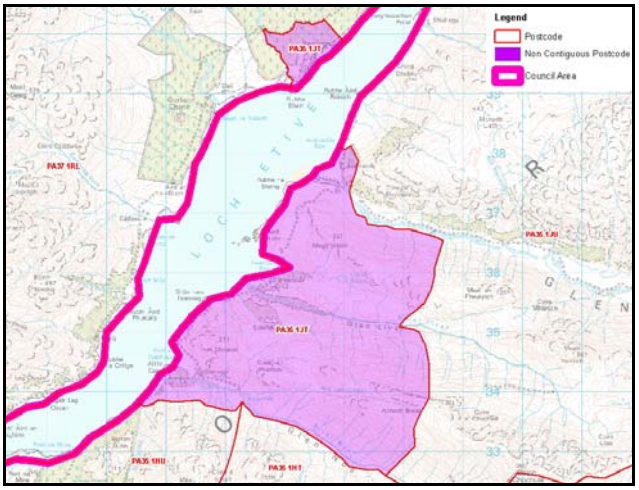
1. Some of the addresses are separated by another postcode’s polygon: or
2. Some of the addresses are separated by water.

In situation 1, the layout of the addresses with different postcodes makes no difference to the delivery of mail by the postmen. However, when the postcode addresses are defined as areas, in some cases the layout makes it impossible to create single postcode areas for all the postcodes.






In situation 2, a postcode may have some addresses on the mainland that are either side of inland water (i.e. Loch Etive). Again, the postcode’s addresses cannot be contained within one polygon - they have to be digitised as two polygons.



# Geography – Background Information – Postcodes

## Constant Improvement of Postcode boundaries

NRS Postcode boundaries are based on the Postal Address File (PAF®) received from Royal Mail® . This data is provided to us on a quarterly basis.
The files provide details of new and deleted postcodes. This information is augmented by information from local authorities.

- new postcodes are assigned to groups of new addresses. For example, houses in a new building development will be assigned a completely new postcode.

- deleted postcodes where there are no longer any addresses. For example, there may be a programme of housing demolition which will result in there being no addresses remaining for that particular postcode.

Using all available data, the Geography Branch digitisers plot the changes to the postcode dataset.

Also, every quarter OS provides us with details of its product ADDRESS-POINT®. We use this product to check the postcode boundaries, amending any as required.

## New Postcodes

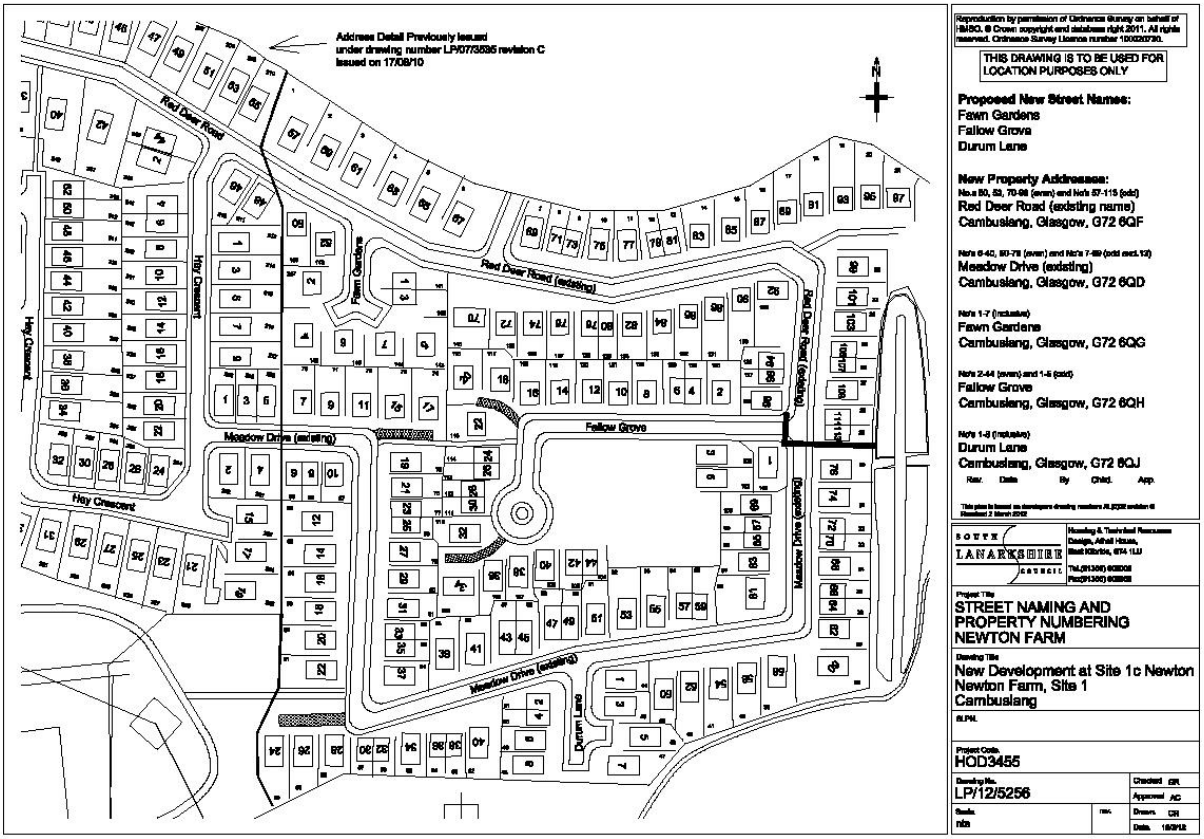
Most Councils supply us with advance information of new properties in their area by way of a paper plan or map. An example of a development plan can be found on the following page.

We do on occasion have to contact the local delivery offices, especially in more rural areas, when the Council are unable to supply us with sufficient information to allow us to draw the new code.

We also utilise the One Scotland Gazetteer website. This is an address database made up of all 32 individual local authority gazetteers. The data is available to any organisation that is a member of the One Scotland Mapping Agreement.

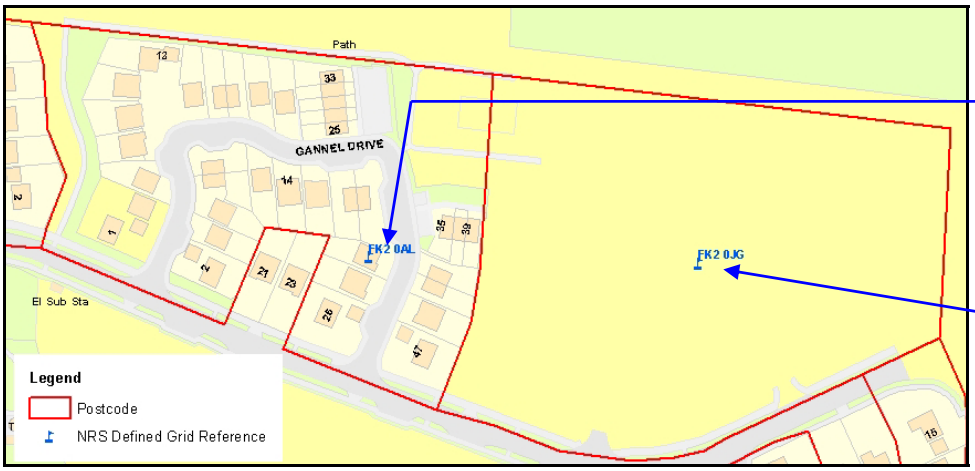
# Geography – Background Information – Postcodes

Example of a plan for New Development, reproduction by permission of South Lanarkshire Council.




Reproduction by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2011. All rights reserved. Ordnance Survey Licence number 100020730.

Once Royal Mail® allocate a postcode the a new development we draw the new boundary. We then give the new code a grid reference point, on the most populated part of the postcode.




Where there is development we place the grid reference on a property.

Where there is no background data available we place the grid reference in the centre of the postcode boundary.

Reproduced by permission of Ordnance Survey on behalf of HMSO.
© Crown copyright and database right 2013. All rights reserved National Records of Scotland.
Ordnance Survey Licence number 100020542.

From this point, all the other higher area codes such as Council Area, Civil Parish, and Parliamentary Constituency etc. are assigned.

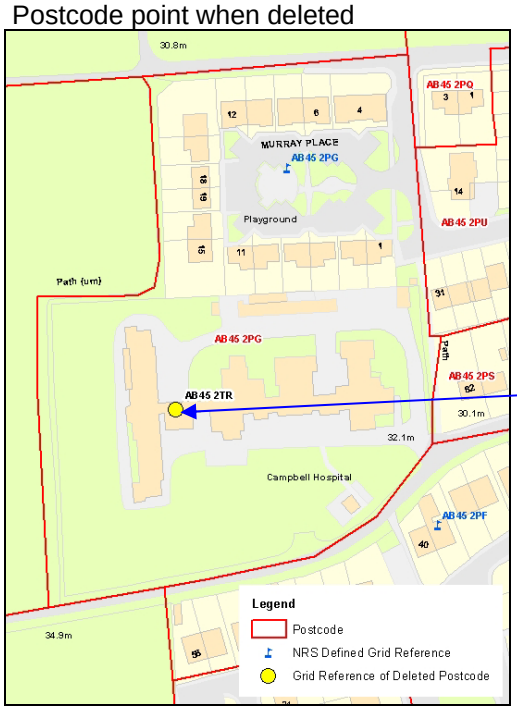
## Deleted Postcodes

In addition to the new postcodes, there are also situations where Royal Mail® found it necessary to delete existing postcodes. For example, 50 addresses in a block of flats may have been assigned a single postcode; subsequently, the block of flats is demolished and as a result the postcode is redundant. In situations like this Royal Mail® deletes the postcode from its address file and informs users.

NRS Geography delete the postcode from the postcode dataset. This deleted postcode is then transferred to the Deleted Postcode Dataset. In this Deleted Postcode Dataset, the postcodes are represented by points and not polygons – the representative point is in fact the Grid Reference of the postcode when it was 'live'.

Postcode polygon boundary when live


Postcode point when deleted




When a postcode boundary is deleted the land is absorbed into a neighbouring postcode.

The grid reference for the deleted postcode is stored in a separate dataset. Shown as a large yellow circle '●' in this example.

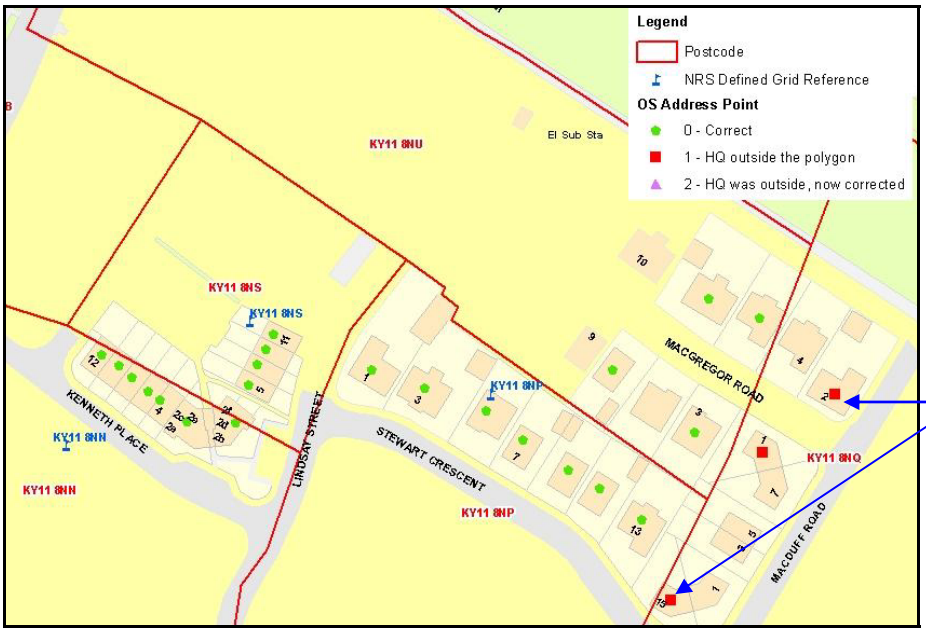


Royal Mail® can re-introduce a deleted postcode after a period of time, (Royal Mail® deems this necessary because in some areas of the country there is a 'shortage' of postcode identifiers.) When a postcode is re-introduced it will not necessarily contain the same addresses or cover the same area as the original postcode. It is also possible that the re-introduced postcode could subsequently be deleted. In these situations there will be multiple points in the dataset with the same identifier.

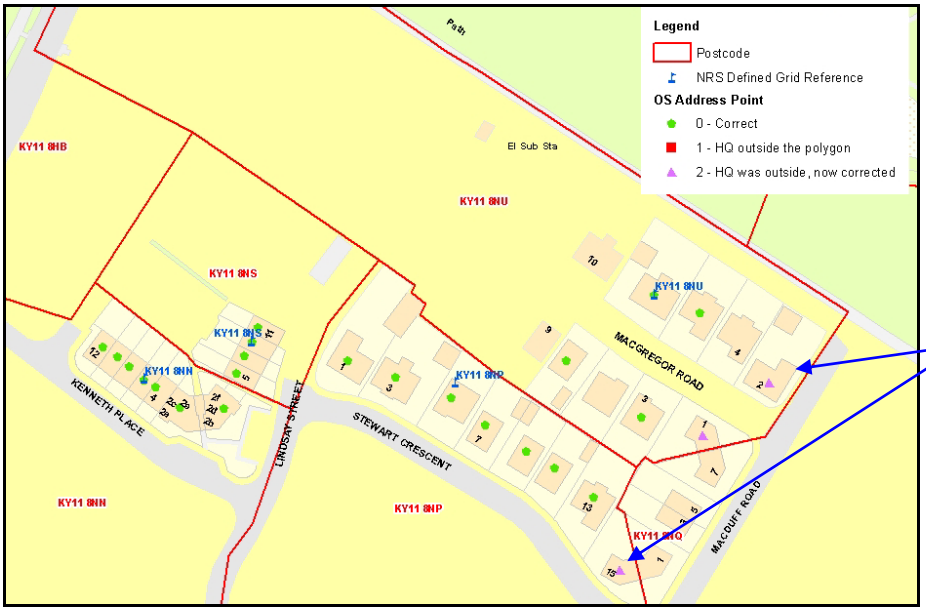
## ADDRESS-POINT®

NRS Geography IT staff have developed a system which compares our data to OS ADDRESS-POINT® and reports any discrepancies. We then investigate these discrepancies and correct our boundaries where possible and if necessary, report back any errors to Ordnance Survey and or Royal Mail® .

In both examples the majority of the mapping background is shown as yellow, these are areas of development that are continually being updated by Ordnance Survey.




The red squares '■ 1- HQ outside the polygon' highlight to us that we need to investigate these Address points as they are not in the correct postcode boundary.




The purple triangles '▲ 2- HQ was outside, now corrected' shows how we have improved the postcode boundaries.

## Gridlink

Gridlink® is the brand name for the joint approach to creating postcode location products. The Gridlink® consortium comprises the Office for National Statistics (ONS), Ordnance Survey, Royal Mail® , the National Records of Scotland (NRS) and the Ordnance Survey of Northern Ireland.

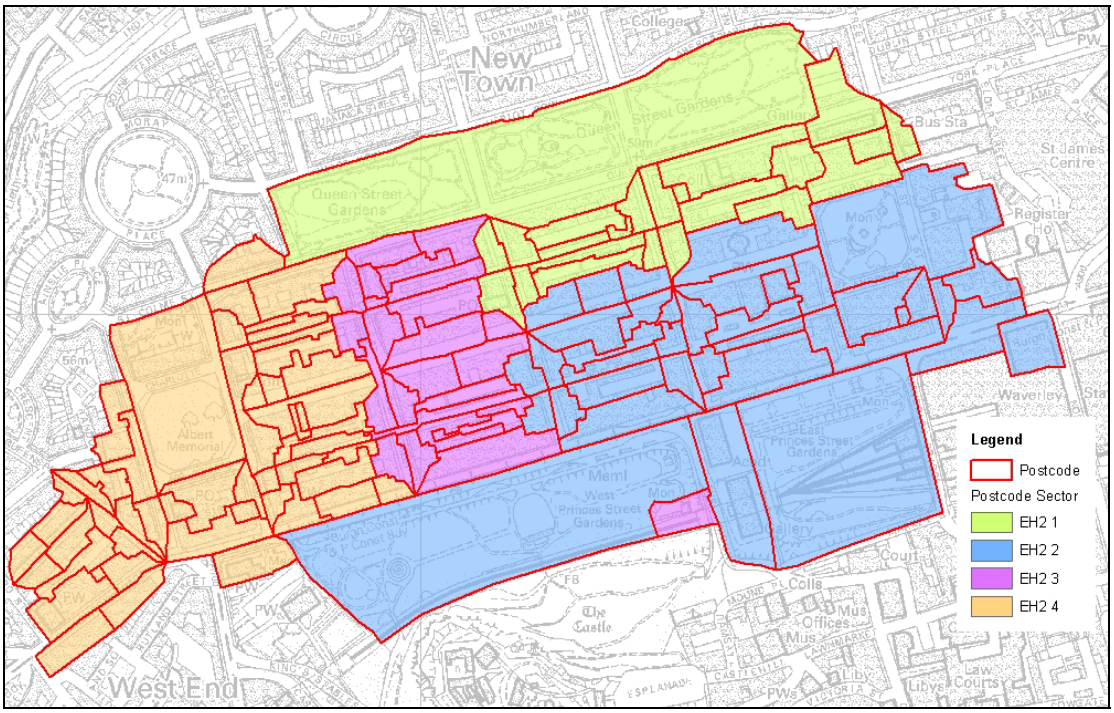
Each of the Gridlink® consortium members produces their postcode products based upon Gridlink® core data. NRS extract the Gridlink® grid reference for higher area assignation providing the Gridlink® grid reference is within the NRS postcode boundary. In certain circumstances the NRS grid reference is used.

In the past, competition between different organisations had led to duplication of effort on postcode products. Gridlink® now ensures a standard and consistent approach to postcode referencing products in the UK. It is an important example of modernising government and implementing 'joined-up geography'.

## Postcode Sector boundaries

The Postcode Sectors are the next hierarchical level above the unit postcode. For example, if the unit postcode is EH2 3HT, then that postcode falls within Sector EH2 3.

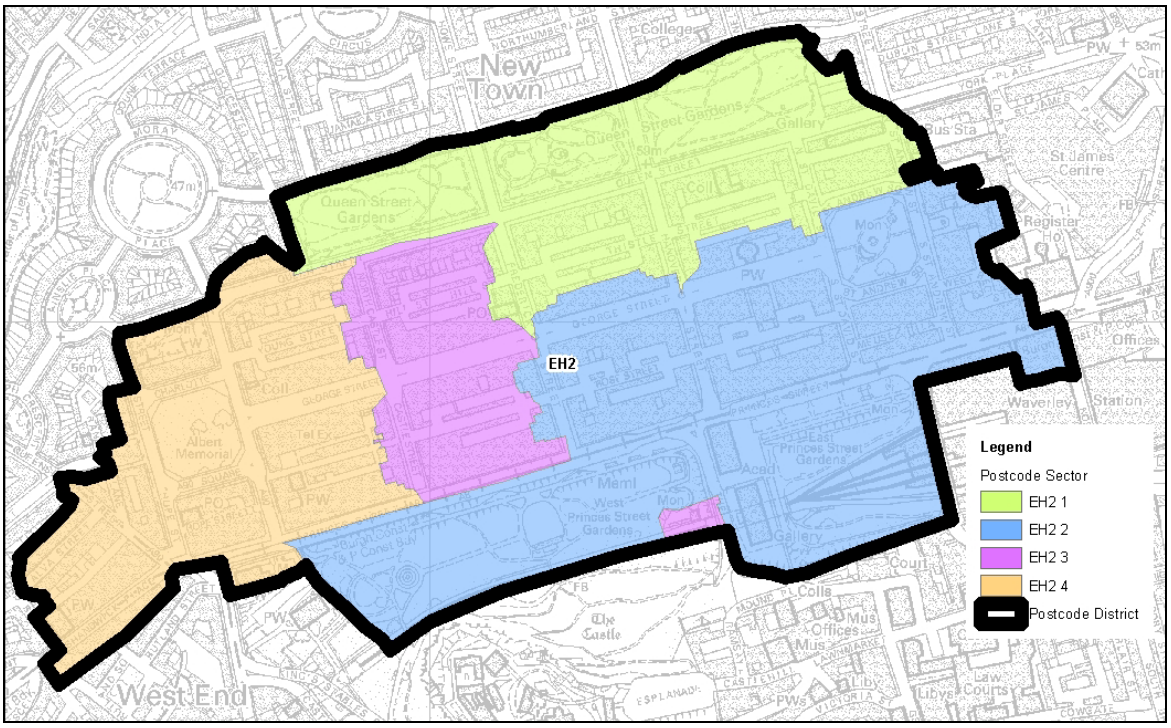
All postcodes that fall within the same Sectors are identified and the postcode boundaries are dissolved in ArcGIS to create the Postcode Sectors map.



## Postcode District boundaries

The Postcode Districts are the next hierarchical level above the Postcode Sectors. For example, if the unit postcode is EH2 3HT, then that postcode falls within District EH2.

All postcodes that fall within the same Sectors are identified and the postcode boundaries are dissolved in ArcGIS to create the Postcode Districts map.






## Higher area assignation

Postcode boundaries are not contiguous with all geographic boundaries.

If a unit postcode straddles a ward (or higher level) boundary, you have to decide to which ward to allocate the data. NRS Geography takes the grid reference of the postcode centroid and matches this up to digital administrative boundaries using a 'Point in Polygon' method.

A large user postcode that has been linked to a small user takes on the higher area attributes of that small user postcode.

## Recoding

Areas can also be recoded and codes can be re-used in a different place after just two years. Continuous monitoring is therefore required to avoid data misallocation. Details of these larger reorganisations are provided in the Royal Mail's 'Postcode Update' (Royal Mail® website) series.