



Code-Point[®] with polygons

User guide and technical specification

Code-Point with polygons

User guide

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Preface

This user guide (hereafter referred to as the guide) is designed to provide an overview of Code-Point® with polygons (hereafter referred to as the product). If you find an error or omission in this guide, or otherwise wish to make a comment or suggestion as to how we can improve the guide, please contact us at the address shown below under contact details or complete the product and service performance report form at [annexe A](#) and return it to us.

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Our Customer Service Centre will be pleased to deal with your enquiries:

Customer Service Centre

Ordnance Survey

Romsey Road

SOUTHAMPTON

SO16 4GU

Business enquiries: +44 (0) 23 8030 5030

General enquiries (calls charged at local rate): 08456 05 05 05

Dedicated Welsh Language HelpLine: 08456 05 05 04

Textphone (deaf and hard of hearing users only please): +44 (0) 23 8079 2906

Email: customerservices@ordnancesurvey.co.uk

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Back-up provision of the product

You are advised to copy the supplied data to a back-up medium.

Using this guide

The documentation is supplied in portable document format (PDF) only. Free Adobe[®] Acrobat Reader[®] software, which displays the guide, incorporates search and zoom facilities and allows you to navigate within. Hyperlinks are used to navigate between associated parts of the guide and to relevant Internet resources by clicking on the blue hyperlinks and the table of contents.

The guide provides an introduction to the structure and content of the product and assumes a general knowledge of geographic information. It also gives guidelines and advice on how a customer might derive the maximum benefit from the product.

If you are unfamiliar with any words or terms used and require clarification please refer to the glossary at the end of the document.

Chapter 1 Introduction

Using this user guide

This guide concentrates on the polygons that make up the Code-Point with polygons product. For information regarding the associated Code-Point data, reference should be made to the [Code-Point user guide and technical specification](#).

Dataset contents

The polygon dataset provides:

- A set of 120 postal-area-based files that, when viewed using appropriate geographical information system (GIS) software, provide a set of boundaries for the postcode units in Great Britain. Where possible these boundaries are nested within Geoplan postcode boundaries.
- Corresponding 120 postal-area-based files containing:
 - Vertical Streets; and
 - 120 containing PO boxes and Discards.
- Further associated data, metadata and information files are supplied on the accompanying Code-Point Product CD.

The data is supplied in two parts: firstly, the CD containing Code-Point data information and, secondly, the CD(s) containing the polygons. Both the Code-Point and the Code-Point with polygons CDs have to be loaded to ensure all the data is imported.

Chapter 2 Overview of Code-Point with polygons

Data overview

Basic principles

The Code-Point polygons are derived from ADDRESS-POINT[®], the Ordnance Survey dataset that provides National Grid reference (NGref) coordinates for each postal delivery address in Great Britain. A process is undertaken to create a set of polygons around individual postcodes. This is called a Thiessen process and the polygons are the result of a mathematical computation that creates polygons from point data. In this way, mathematically consistent boundaries are created between distinct postcode groups, creating this notional boundary set.

Postcode unit boundaries are by definition only the delivery point or collection of delivery points that constitutes the postcode units. The boundary is therefore a notional one, the position of which is arbitrary. What has been created, however, is a set of boundaries that follow a consistent logic and portray the notional footprint of each postcode unit, enclosing every delivery address for which positional data of sufficient quality is available, and which follow major physical features that could reasonably be regarded as part of the postcode boundary.

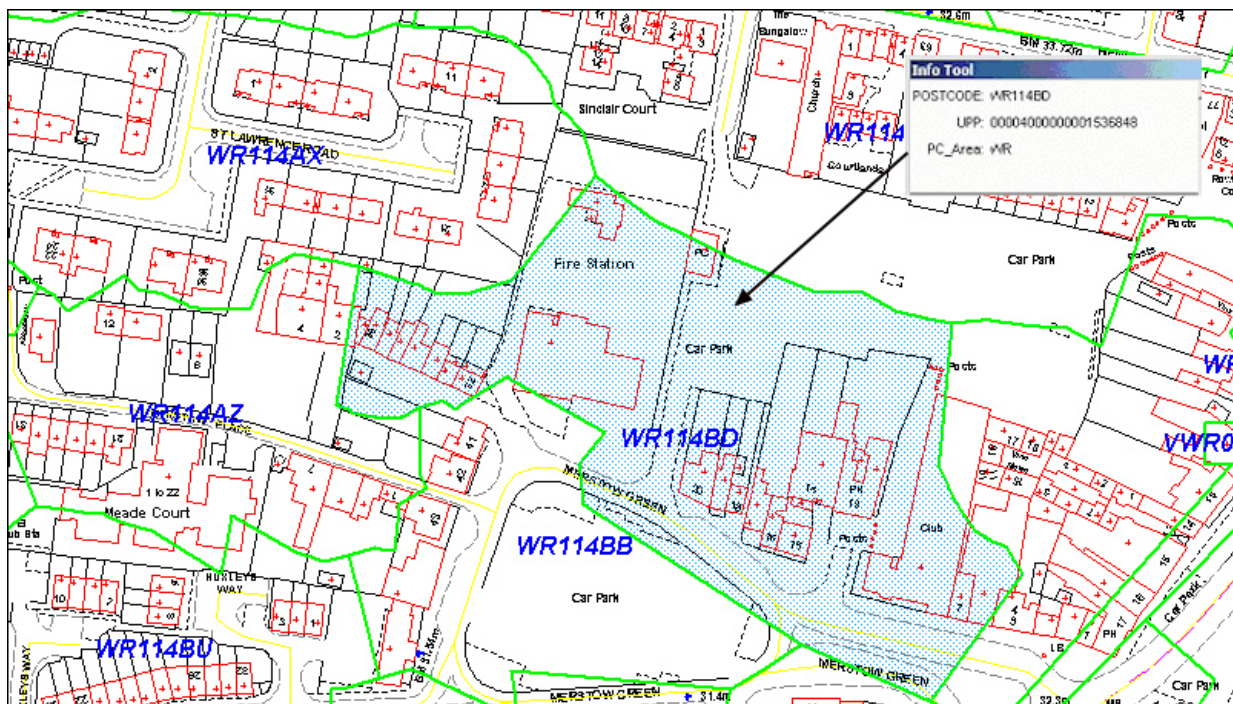
The quality of this polygon creation allows the polygons to be used for a wide range of applications. This will include analysis of geographically based information or statistics by postcode and the pictorial display of information that has been analysed or sorted by postcode.

The Code-Point CD is supplied with the polygon CD to provide a complementary set of point references for each postcode. The two datasets will both be created from the same edition of ADDRESS-POINT, ensuring that their data is synchronous.

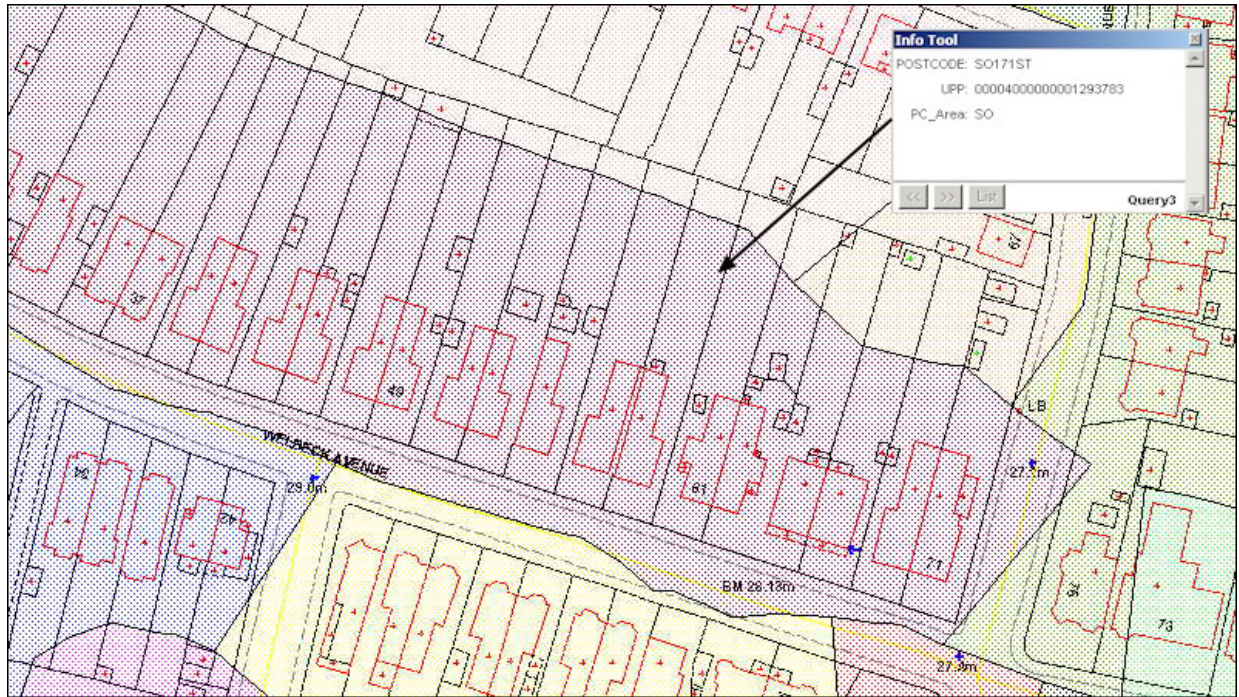
Using Code-Point with polygons

The uses of Code-Point georeferenced postcode data are covered in the [Code-Point user guide](#) specifically produced for use with that product. This user guide will only focus on the use of the unit postcode polygons. However, having access to the Code-Point user guide is recommended.

The polygons provide a boundary around the addresses within postcode units and so can be used to relate any occurrence or point within that boundary to the postcode concerned.



Where data is already analysed by postcode, a pictorial representation – for example, using a colour scheme – that will differentiate between postcodes or groups of postcodes can be obtained:



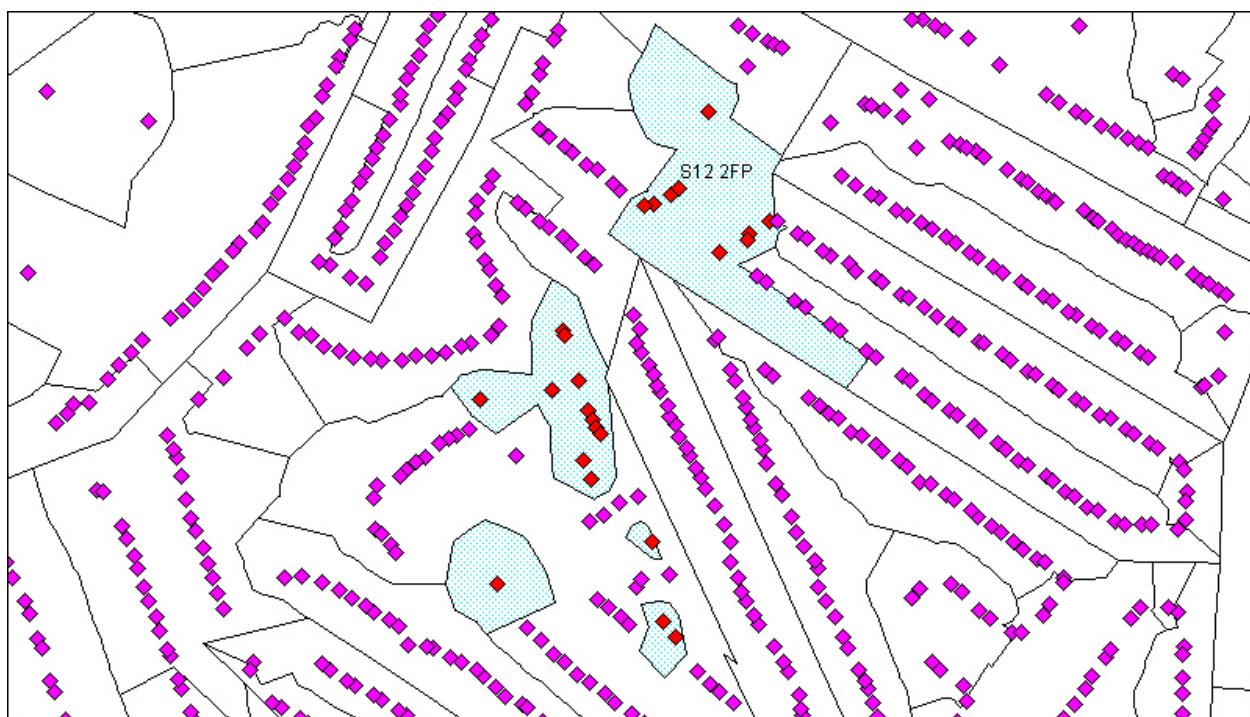
Chapter 3 Code-Point with polygons explained

This chapter contains an overview of the polygons; a full description of the polygon specification is located in the [technical specification](#).

Description of the polygon set:

- The set is produced by the tessellation (or tiling) of ADDRESS-POINT coordinates for individual Royal Mail delivery addresses.
- Only addresses in ADDRESS-POINT having a Positional Quality (PQ) value of 2 or 3 are used to create the polygons file. Postcodes of addresses of lower quality will be included in the discard files.

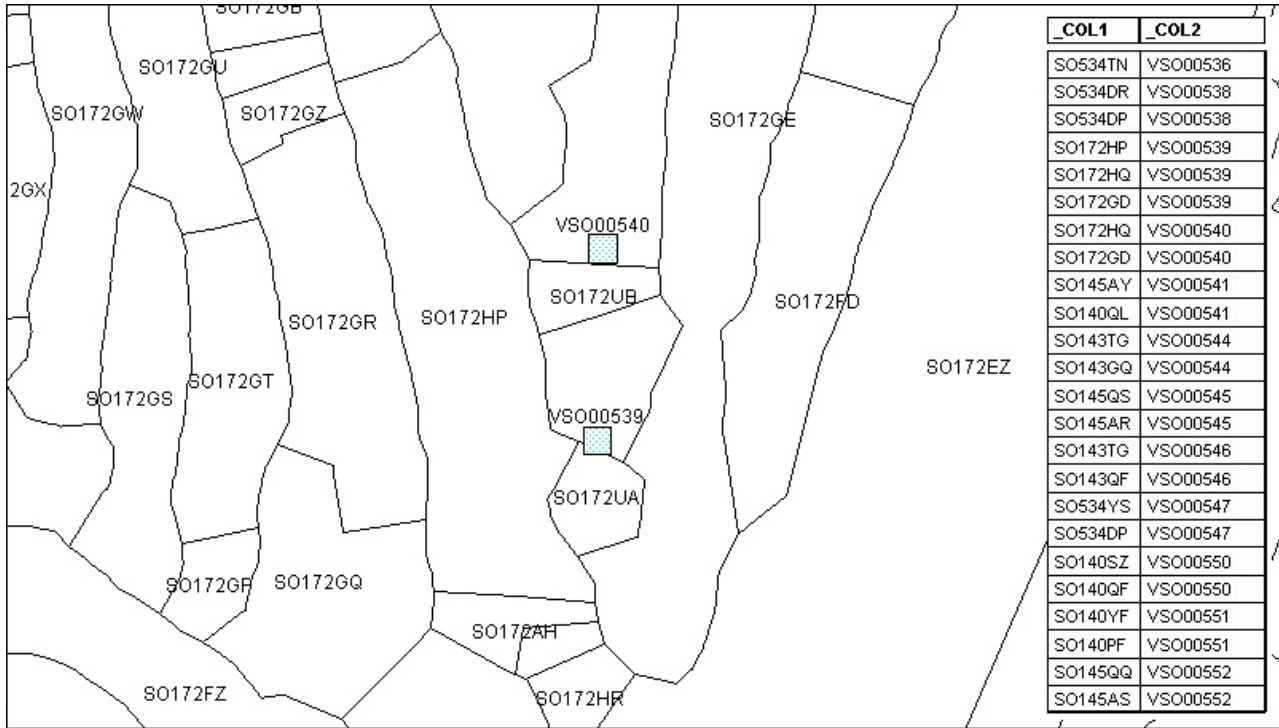
Due to the nature of postcode geography, the polygons representing some postcode units are unavoidably split. Every effort has been made to ensure the absolute minimum of postcodes is represented by multiple polygons. Furthermore, these split polygons representing a single postcode remain a single object with one set of attributes. When this occurs, any issues arising will depend upon the mapping package used and the nature of its use. Typically, users may see only one of the group polygons labelled; however, it is worth checking the labelling options in your mapping package. If, however, the user was to query the polygon(s) or display associated data (using the postcode as a link field), all the split parts of a polygon would correctly represent the associated attributes. An example of such a polygon is shown on this page, with seed ADDRESS-POINT locations for that postcode shown in red:



- Each polygon is assigned a unique identifier. The identifier will be a 16-digit series. These identifiers are not reused should a polygon be deleted.
- The polygon dataset contains non-overlapping polygon coverage of Great Britain, constrained by the extent of realm (EOR) coastline from Ordnance Survey's Boundary-Line™ data and Geoplan postcode polygons. Should any addresses fall outside the constraining datasets, the postcodes should be included in the discard files.
- As a result of the complex creation specification there may be some rare occurrences of polygons or areas enclosed by polygons without a postcode allocation.
- The Code-Point CD contains a read-me file that provides information regarding the currency of the data used, including the date of the version of ADDRESS-POINT and the Postcode address File (PAF) release therein.
- The data is divided into 120 postcode area files, each file named with a one- or two-letter postcode area code.

- Where two or more postcodes are associated with a single building seed, a single distinctive square polygon will represent all the postcodes attached to the seed. These polygons have a special series of identifiers, all commencing with the letter **V**. A separate Vertical Streets look-up table lists the postcodes and their 16-digit unique identifier that are represented by each special polygon. Where these distinctive polygons are crowded closely together, they are reduced in size to prevent overlaps hiding some of the polygons.

Example showing two vertical streets and, on the right, an extract from the Vertical Streets look-up table:



Annexe A Product and service performance report form

Ordnance Survey welcomes feedback from its customers about Code-Point with polygons.

If you would like to share your thoughts with us, please print a copy of this form and when completed post or fax it to the address below.

Your name:

Organisation:

Address:

.....

.....

Postcode:

Phone:

Fax:

Email:

Quotation or order reference:

Please record your comments or feedback in the space below. We will acknowledge receipt of your form within three (3) working days and provide you with a full reply or a status report within 21 working days.

If you are posting this form, please send it to:

Code-Point with Polygons Product Manager, Ordnance Survey, Romsey Road, SOUTHAMPTON, SO16 4GU.

If you wish to return it by fax, please dial 023 8079 2615.

Any personal information that you supply with this report form will be used by Ordnance Survey only in the improvement of its products and services. It will not be made available to third parties.

Code-Point with polygons

Technical specification

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Introduction

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Ordnance Survey is committed to providing customers with consistently high quality geographic information. As such Ordnance Survey regularly applies several data quality measures to the product and the associated documentation. These quality measurements are based on the principles identified in ISO 19113, Geographic Information-Quality principles (2002).

NOTE: According to North America Standards Institute, although ISO 19113:2002 is applicable to digital geographic data, its principles can be extended to many other forms of geographic data such as maps, charts and textual documents.

ISO 19113:2002 does not attempt to define a minimum acceptable level of quality for geographic data.

If you are unfamiliar with any words or terms used and require clarification please refer to the glossary at the end of the document.

Chapter 1 Background information

This is the specification referred to in the Framework Direct Licence, Specific Use Framework Partner Licence or other customer contract.

This technical specification provides detailed technical information that is designed to help you fully understand the data structure of Code-Point with polygons.

What you need to use Code-Point with polygons

Hardware

Code-Point is a data product and does not include software for analysis, but can be used with a variety of programs. Code-Point can be loaded onto any desktop PC. Consult your geographical information system (GIS) vendor to establish actual system requirements.

Software

Most proprietary GIS packages will suffice, for example, MapInfo[®], ESRI[®] or Autodesk[®] products.

Code-Point with polygons supply

The polygon data coverage is Great Britain, the associated Code-Point coverage is for United Kingdom as it includes Northern Ireland postcodes.

Update

Updates will normally be at six-monthly intervals and are a complete resupply of the national dataset.

Transfer format(s)

Code-Point polygons are available in the following formats, the preferred choice of which will be influenced by the software used:

- ESRI Interchange format Shapefile
- MapInfo Interchange format MID/MIF

Media, data compression

Code-Point with polygons is supplied on CD-ROM. The Code-Point polygon files (only) contain substantial amounts of information, which in both Shapefile and MID/MIF formats necessitate that file compression be used. Code-Point with polygons data is currently supplied as Microsoft[®] WinZip[®] files.

File sizes

The following table outlines the total file sizes for both formats in compressed or uncompressed states.

Compressed	Uncompressed
Polygons in MID/MIF format 1 Gb	Polygons in MID/MIF format 3.5 Gb
Polygons in Shapefile format 1.1 Gb	Polygons in Shapefile format 4.5 Gb

Code-Point with polygons version numbering

Each edition of Code-Point with polygons will have a version number showing the year, the release number for that year and the version (if appropriate) of that release, for example:

2006.1.0 is the first release in 2006.

2006.2.0 is the second release in 2006.

Within the Code-Point with polygons product set, the Code-Point data and the polygons will have their own version numbering based on the same principles as above, for example, Code-Point with polygons Vs 2006.1.0 will contain a set of Code-Point Vs 2006.1.0. and a set of polygons Vs 2006.1.0. Both Code-Point and the polygons are initially sourced from the same version of ADDRESS-POINT and PAF.

Chapter 2 Specification

Lineage

To the PAF address records for Great Britain, Ordnance Survey add National Grid coordinates, mainly to 0.1 m resolution, and other information to produce the product called ADDRESS-POINT. This unique product thereby provides highly accurate positioning of all postal addresses in Great Britain.

ADDRESS-POINT is then used to create both Code-Point and the Code-Point unit postcode polygons.

Content

Code-Point with polygons contains:

- Code-Point georeferenced postcode unit data, with associated metadata such as address counts and quality indicators. Also provided are the health and administrative area codes related to each postcode. The coverage of the Code-Point data is the whole of the United Kingdom and it is provided in both CSV (Comma Separated Values) format and NTF (National Transfer Format).
- Also provided, in association with the Code-Point data, is a text file that provides the full text equivalents of the administrative area codes, and another that provides the numbers of postcode units in each postcode area.
- Postcode unit polygons describing notional boundaries around the approximately 1.7 million postcode units in Great Britain. This data is supplied in either Shapefile or MID/MIF formats.
- Also provided, in association with the polygon data, are two sets of CSV text files:
- Vertical Streets – a list of polygons, identified by a serial number that is prefixed by the letter V, which contain more than one postcode. This situation can occur in, for example, blocks of flats where there is more than one postcode within a single building.
- Discards – a list of the postcodes for which polygons have not been included because there is no data of sufficient quality to use in the polygon creation, or because their constituent addresses lie outside the Extent Of Realm (coastline). Also in the discard file, PO boxes – a list of the PO box postcodes, none of which will have been used in the creation of the polygon set.
- An info folder, containing files called CD_INFO.TXT, LICENCE.TXT and DISCCARE.TXT, is also part of the CD-ROM file structure. For more information, please see [page 15](#).

Code-Point with polygons product structure

On the polygon product CD-ROM(s), the root directory contains two folders: Info and Data.

The Info folder contains the following files:

- CD_INFO.TXT – a file summarising the content and file structure of the CD-ROM.
- LICENCE.TXT – a file summarising the licensing of Ordnance Survey data.
- DISCCARE.TXT – a file summarising recommendations on the handling and storage of CD ROMS

The Data folder contains the following subfolders:

- Polygons – containing polygon data in 120 postcode area files (either MID/MIF or Shapefile).
- Vertical Streets – a look-up table of 120 text files of vertical street reference codes and the postcodes contained in them.
- Discards – a look-up list of 120 text files of the postcodes that have not been included in the polygon creation process because either there are no ADDRESS-POINT records of sufficient PQ classification or they are PO Box postcodes.

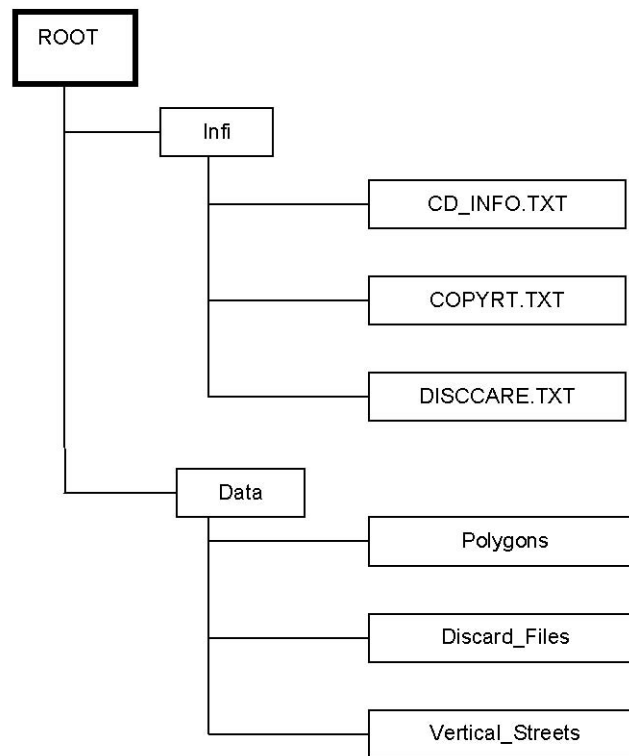
These files are contained on the accompanying Code-Point CD:

- Metadata – lists the number of postcode units, in each postcode area and the date of the most recent version of the Royal Mail PAF that has been incorporated into the data.
- Codelist – a list of the ONS (Office of National Statistics) county, district and ward codes and their full text equivalents.

- Code-Point – containing Code-Point point data in two sets of 121 postcode area files (both CSV and NTF).
- The user guide to accompany this product can be downloaded from the Code-Point with polygons product page found at www.ordnancesurvey.co.uk.

Structure of the Code-Point with polygons CD-ROM

Text



Completeness

The Code-Point product contains a point reference for every postcode unit in England, Scotland, Wales and Northern Ireland that is contained in Royal Mail's PAF product at the time of creation of the dataset.

The polygon set contains a polygon for every postcode in England, Scotland and Wales that is contained in Royal Mail's PAF product, with the following exceptions:

- postcodes for which there is no data of sufficient quality in ADDRESS-POINT;
- postcodes for which there is no data that lies within the extent-of-realm coastline in ADDRESS-POINT;
- some postcodes fall outside the EOR; also some fall outside of the Geoplan postcode boundaries, for example, Loch Lomond;
- postcodes that relate to PO boxes; and
- postcodes that are vertically stacked, that is, two or more postcodes within a single building that are represented by a single Land-Line[®] building seed. In these situations, a single square polygon represents all the postcodes attributed to the single building seed.

Currency

Because of the dynamic nature of the source information, any comprehensive, national list of postal addresses can never practicably be 100% correct. The currency of the data will necessarily be impacted by the time taken to collect and incorporate additions, changes and deletions from the real world into the PAF, then into ADDRESS-POINT and hence into Code-Point and Code-Point with polygons.

Attribute accuracy

All polygons are attributed. Nothing is done to change the accuracy inherited from the PAF source data.

Logical consistency

The logic used to create both the Code-Point centroid point and polygon data is consistent across the whole of each dataset.

Medium

Code-Point with polygons is supplied on CD-ROM, ISO 9660.

Formats

MID/MIF is the transfer format of the MapInfo Company and Shapefile is the transfer format of ESRI (UK) Ltd. The data conforms to the latest published specification.

Record breakdowns for the transfer of Code-Point (polygons) MID/MIF

Field Name	Type	Width	Description	Example
POSTCODE	Character	8	Full Postcode from Code-Point	HG1 1BA
UPP	Character	20	Unique Polygon Identifier	00004000000000590783

Record breakdowns for the transfer of Code-Point (polygons) in Shapefile

Field Name	Type	Width	Description	Example
POSTCODE	Character	8	Full Postcode from Code-Point	HG1 1BA
UPP	Character	20	Unique Polygon Identifier	00004000000000590783

NOTE: Shapefile format automatically adds fields to show the values for: Surface Area, Perimeter and Region Identifiers (internal). For example, the Shapefile file for Postcode HG will also feature the following fields: AREA, PERIMETER, HG_REGION_ and HG_REGI

Annexe A Glossary

addressed premise

A permanent or non-permanent building structure with an address being a potential delivery point for Royal Mail. Examples of an addressed premise would be: a house, a flat within a block of flats, a caravan site, a bollard to which several houseboats may be moored, or an organisation occupying the whole of a building.

ADDRESS-POINT

An Ordnance Survey text data product that relates Royal Mail Postcode Address File (PAF) addressed properties within Great Britain to the National Grid.

area-based postcode

A type of large-user postcode that is allocated to a small number of organisations who receive an exceptionally large amount of mail. These postcodes still relate to a geographical area but may overlap other sector areas or be scattered.

building

A physical, walled structure connected to foundations that has, or will have, a roof. This definition includes buildings surveyed at foundation stage.

Code-Point

Code-Point provides a precise geographical location for each postcode unit in United Kingdom.

CPLC (Code-Point location coordinate)

A National Grid reference for each unit postcode. It is a two-dimensional coordinated point to a resolution of 1 metre. Coordinates are attributed from ADDRESS-POINT using an accuracy hierarchy.

Comma Separated Values (CSV)

The CSV file format is commonly used to exchange data between different applications, for example, Microsoft Excel™ and Access. Being a text file, CSV files can also be viewed in Notepad.

delivery point

A Royal Mail-defined point to which mail is delivered. This may be a property (private address), organisation, mailbox or even the name of an individual. These categories are derived from The Complete Guide to Postcode Products from Royal Mail. Distinct from the addressed premise because there may be more than one organisation at an address.

Gridlink®

Gridlink is the name given to a joined-up government initiative involving Royal Mail, the Office for National Statistics (ONS), the General Register Office for Scotland (GROS), Ordnance Survey of Northern Ireland® (OSNI®) and Ordnance Survey. All these organisations are involved in the georeferencing of postcodes and the relating of postcodes to administrative and National Health areas.

inward code or incode

See [postcode](#).

Land-Line data

Land-Line is Ordnance Survey's definitive product range of large-scale maps in digital form. A comprehensive dataset, depicting man-made and natural features ranging from houses, factories, roads and rivers to marshland and administrative boundaries, surveyed and digitised at three different scales according to location:

- 1:1250 scale in urban areas;
- 1:2500 scale in rural areas; and
- 1:10 000 scale for remote areas such as mountains and moorland

large-user postcode

A large-user postcode is normally allocated when:

- a firm or business at a new address regularly receives, in any one day, 25 or more items of mail in a town area or 50 or more items in a rural area;
- a private box (PO box) is provided;
- Royal Mail Selectapost service is provided;
- a Business Reply or Freepost licence is taken out; or
- all Freepost and Business Replies have their own postcode.

matched address

An address, resulting from a match between the Land-Line data and the PAF, which has been allocated a coordinate position. The match may be a result of either manual or automatic matching, the latter encompassing both full and fuzzy-logic matching.

National Grid reference (NGref)

The National Grid provides a unique reference system that can be applied to all Ordnance Survey maps of Great Britain. The map of Great Britain is covered by 100 m by 100 km grid squares, with the origin lying to the west of the Isles of Scilly. When a National Grid reference is quoted, the easting (left to right direction) is always given before the northing (upwards direction).

A National Grid reference (to one metre) will identify the spatial position of the CPLC (Code-Point location coordinate).

National Transfer Format (NTF)

A vector interchange format used to distribute digital map products from Ordnance Survey that conforms to BS 7567 (Electronic transfer of geographic information (NTF)).

outward code or outcode

See [postcode](#).

PAF (Postcode Address File)

The PAF was created when all the separately held information was assembled and stored on a Royal Mail central computer system. PAF now contains the postal addresses and postcodes of approximately 26 million delivery points in Great Britain, including approximately 222 000 large users.

Positional Quality (PQ)

The PQ is a flag to indicate the positional accuracy of the Gridlink coordinates allocated to each postcode record.

All postcodes are to 1-m resolution, but Gridlink will seek to provide the most accurate coordinates according to the hierarchy detailed in the following table.

Status value	Description of status values
1	Automatically calculated to be within the building of the matched address closest to the postcode mean.
2	As for status value 1, except by visual inspection of Land-Line maps.
3	Approximate to within 50 m of true position.
4	Postcode unit mean – (mean of matched addresses with the same postcode, but not snapped to a building).
5	Postcode inputted by ONS by reference to surrounding known postcodes.
6	Postcode sector mean – mainly PO boxes
8	Postcode terminated. No postcodes of this type will be provided by Gridlink, nor should they be provided to Gridlink. Consortium members may wish to hold this information for historical purposes. The accuracy of the data is as indicated by its status value immediately prior to its termination.
9	No coordinates available.

postal address

A postal address is a delivery point that is currently receiving mail. There may be many delivery points within an individual building structure as shown in Land-Line data.

postcode

An abbreviated form of address made up of combinations of between five and seven alphanumeric characters. A postcode may cover between 1 and 100 addresses. The average number of addresses per postcode is 15.

There are two main components of a postcode:

- The outward code (also called outcode). The first two to four characters of the postcode constituting the postcode area and the postcode district. It is the part of the postcode that enables mail to be sent from the accepting office to the correct area for delivery.
- The inward code (also called incode). The last three characters of the postcode constituting the postcode sector and the postcode unit. It is used to sort mail at the local delivery office.

For example:

Outward		Inward	
NW	6	4	DP
			Postcode unit
		Sector	
	District		
Area			

postcode area

An area given a unique alphabetic coding by Royal Mail to facilitate the delivering of mail. The area is identified by one or two alpha characters at the start of the full postcode, the letters being derived from a town, city or district falling within the postcode area. There are at present 120 postcode areas in Great Britain, for example, SO for Southampton, MK for Milton Keynes, B for Birmingham or W for London West. The postcode area code constitutes the first part of the outward code.

postcode district

A sub-area of the postcode area, specified by the character sub-string within the first half of a full postcode, which may be numeric, alphabetic or alphanumeric; for example, 42 from MK42 6GH or 1A from W1A 4WW. There are approximately 2 800 postcode districts in Great Britain.

NOTE: There are certain non-geographic districts. In these instances a district code is allocated to cover all large users in the postcode area.

postcode sector

A sub-area of a postcode district whose area is identified by the number third from the end of a full postcode. There are approximately 9 000 postcode sectors in Great Britain. An example of a postcode sector code is 3 from GU12 3DH.

postcode unit

A sub area of a postcode sector, indicated by the two letters of the inward postcode, which identifies one or more small-user postcode delivery points or an individual large user postcode. There are approximately 1.6 million unit postcodes in the UK.

post office (PO) box

Generally, a non-geographic address allocated with a number by the Post Office®. PO boxes within ADDRESS POINT are now matched to the Royal Mail delivery office at which they are based (except in the Northern Ireland postcode area) rather than the average of location-matched addresses within the postcode sector.

Postzon®

A file marketed by Royal Mail that allocates a National Grid reference to each postcode unit. This coordinate is derived from a 100-metre square that contains the first of the range of addresses that form the unit postcode.

Theissen polygons

A method of mathematically transforming point data into thematic maps based not on predetermined reporting units but rather on proximity of the distribution of points. One of the points that defines the edges of a Thiessen polygon is always the nearest neighbour to the point in the centre of the polygon.

Vertical Streets

For example, a blocks of flats where there is more than one postcode within a single building. These are identified in the data by a serial number prefixed with a V.