



Identifying Built-Up Areas for 2011 Census Outputs

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Introduction and background

Since 1981 census output geography for England and Wales has included built-up areas –

purpose: for statistics relating to where people live

Updated extents of built-up areas needed for 2011 census outputs

Previous production of the dataset (2001, 1991, 1981) was by manual digitising following guidelines on what constitutes a built-up area.....

What is a built-up area?

Having the character of settlements including villages, towns and cities

Minimum of 20 hectares (200,000m²) in size

Areas with less than 200 metres between them are joined to form a single built-up area

Research need...

Could built-up areas for 2011 be produced automatically from Ordnance Survey large-scale topographic data?

Aim:

To produce a **fit for purpose** and **cost effective** dataset of built-up areas compliant with previous built-up area guidelines

Project initiated by a UK government consortium led by the Office for National Statistics

User survey - what matters in built-up areas data

Short [context of use interviews](#) with users in 9 public sector contexts

Results: built up areas used in a wide range of tasks including:

- reporting [statistics by urban/rural area](#)
- [spatial analyses](#) & analysis of [urban/rural change over time](#)
- producing [contextual maps](#)

Factors most frequently highlighted as important to dataset use:

- [spatial consistency](#) of built-up area definition
- [reliability](#) of method
- [consistency of method](#) between censuses

Option 1

Manual capture

Built-up areas are manually digitised, based on detailed mapping and specified rules

- ✘ Resource intensive, therefore expensive to produce
- ✘ Spatial inconsistency in capture between operators
- ✓ Cartographically pleasing, leading to...
- ✓ Perceived greater consistency between censuses, by end users

Option 2

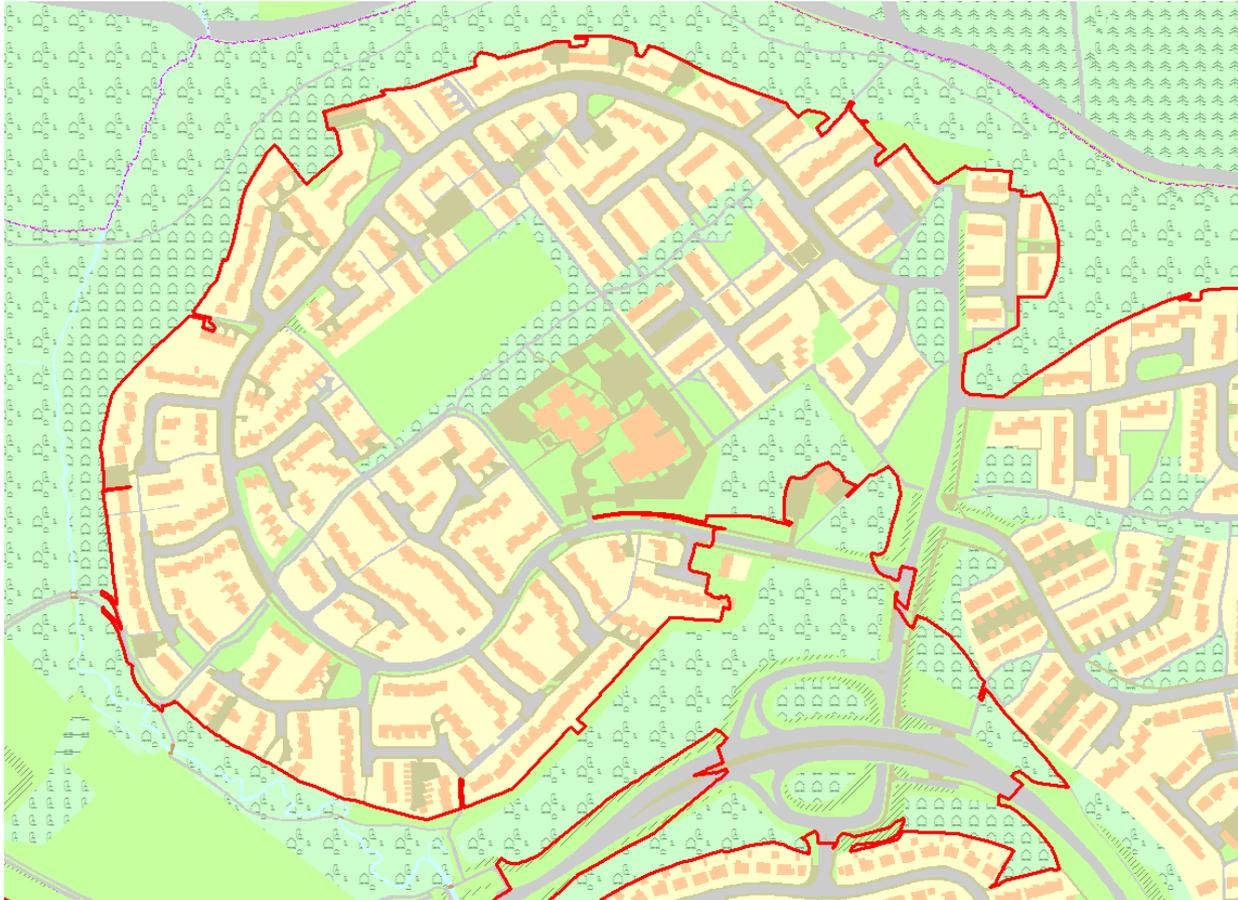
Automation from Polygon Data

Topographic features are combined into built-up area polygons using their true geometries

- ✓ Possible 'accurate' boundaries where topographic features exist
- ✓ Potentially cartographically pleasing
- ✗ Processing large areas is complex and time consuming

Option 2

Polygon Based boundary of Built-Up Area



Option 3

Automation from Grid Data



Detailed Topographic Mapping

Create 50m Grid

Generate Attributes for each Grid Cell

Building:	16%
Road:	8.8%
Roadside:	16.5%
Garden:	38.7%

Option 3 - Continued

Built-Up Area Polygons from Grid Data

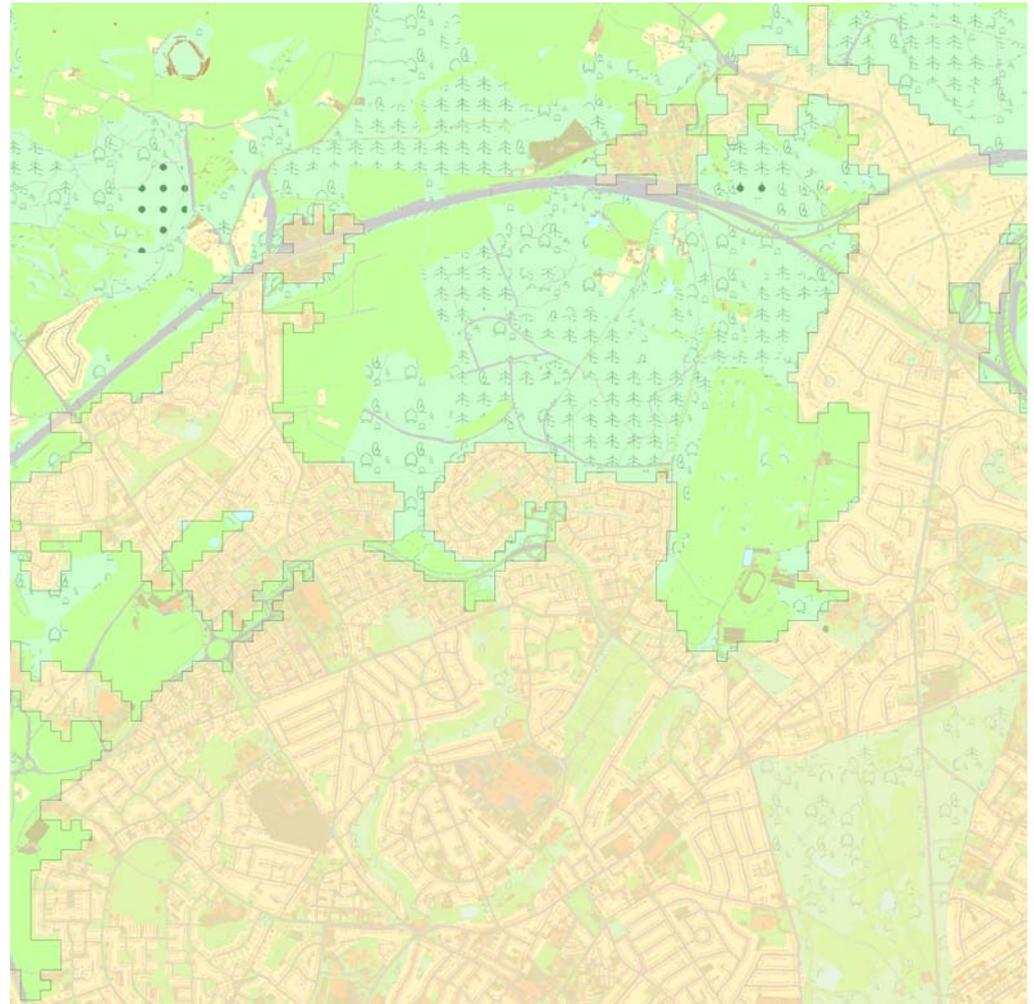
Select grid cells passing thresholds:

Building: 2%
Roadside: 25%
Garden: 8.5%

Road: 50%



Built-Up Areas created by merging cells, removing holes and defining minimum areas.

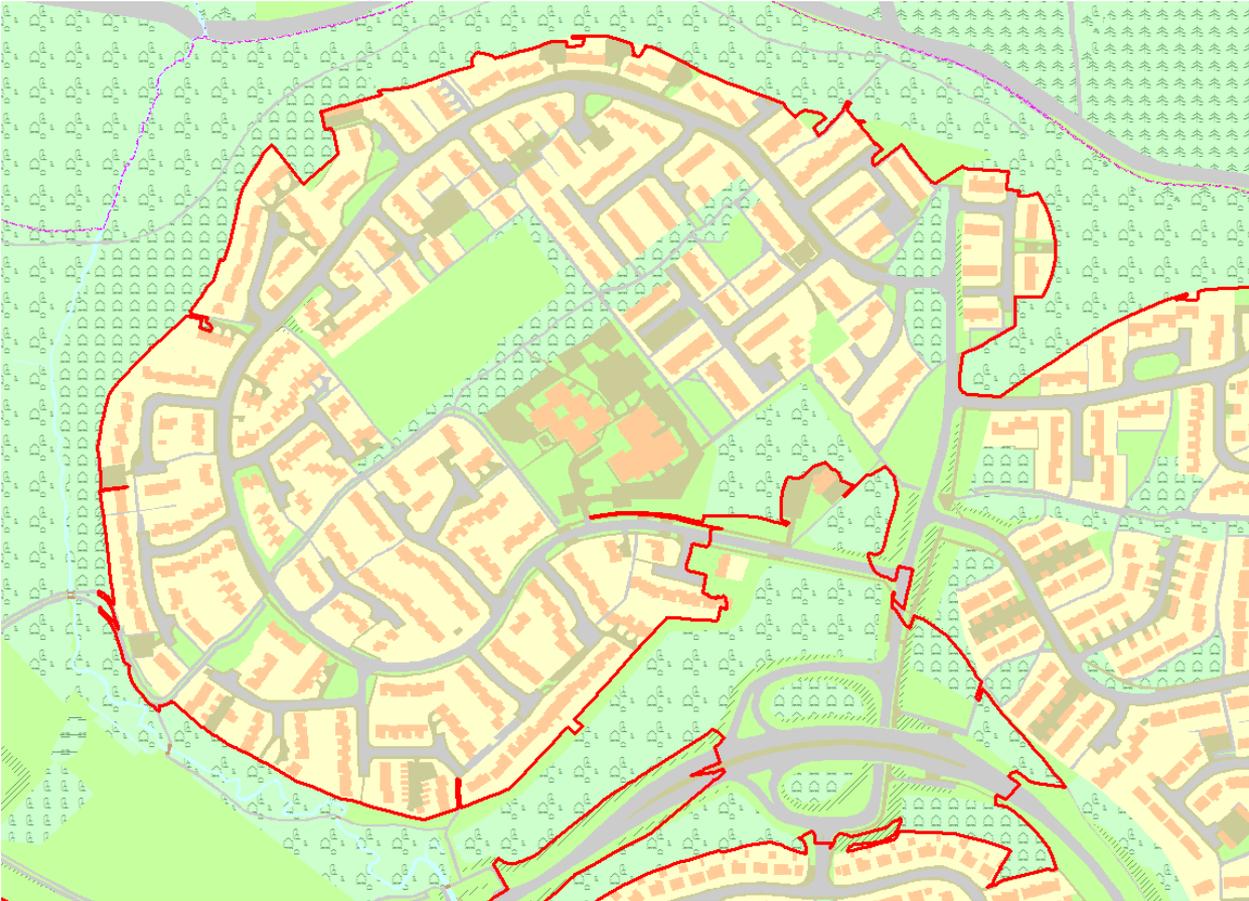


Option 3 - Continued

Automation from Grid Data

- ✓ Grid data is simple and fast to generate
- ✓ Selecting and merging grid cells into Built-Up Areas is also simple
- ✓ New rules can be applied without regenerating the grid
- ✗ Boundaries may not be cartographically pleasing

Built-Up Area boundary comparison



2011 census statistics and built-up areas

2011 Census, Key Statistics for Built-Up Areas in England and Wales

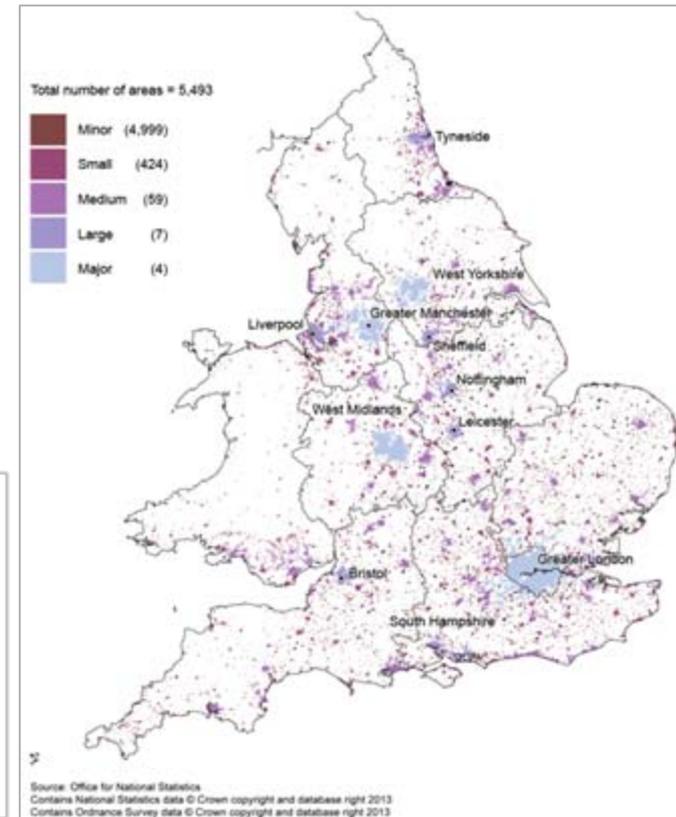
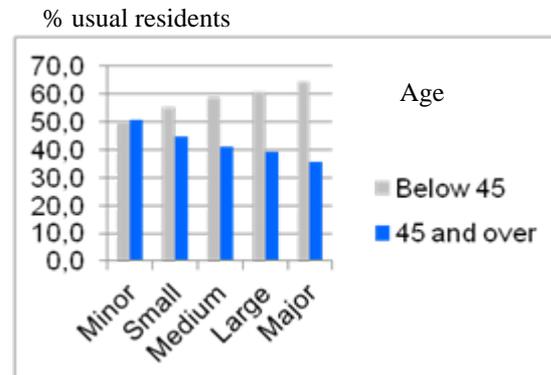
- data released in June 2013

<http://www.ons.gov.uk/ons/rel/census/2011-census/key-statistics-for-built-up-areas-in-england-and-wales/index.html>

Example statistics:

- Total built-up land area in 2011 was 1.4 million hectares (9.6 % of England and Wales)

- Within built-up areas - age structure varied by size of the area



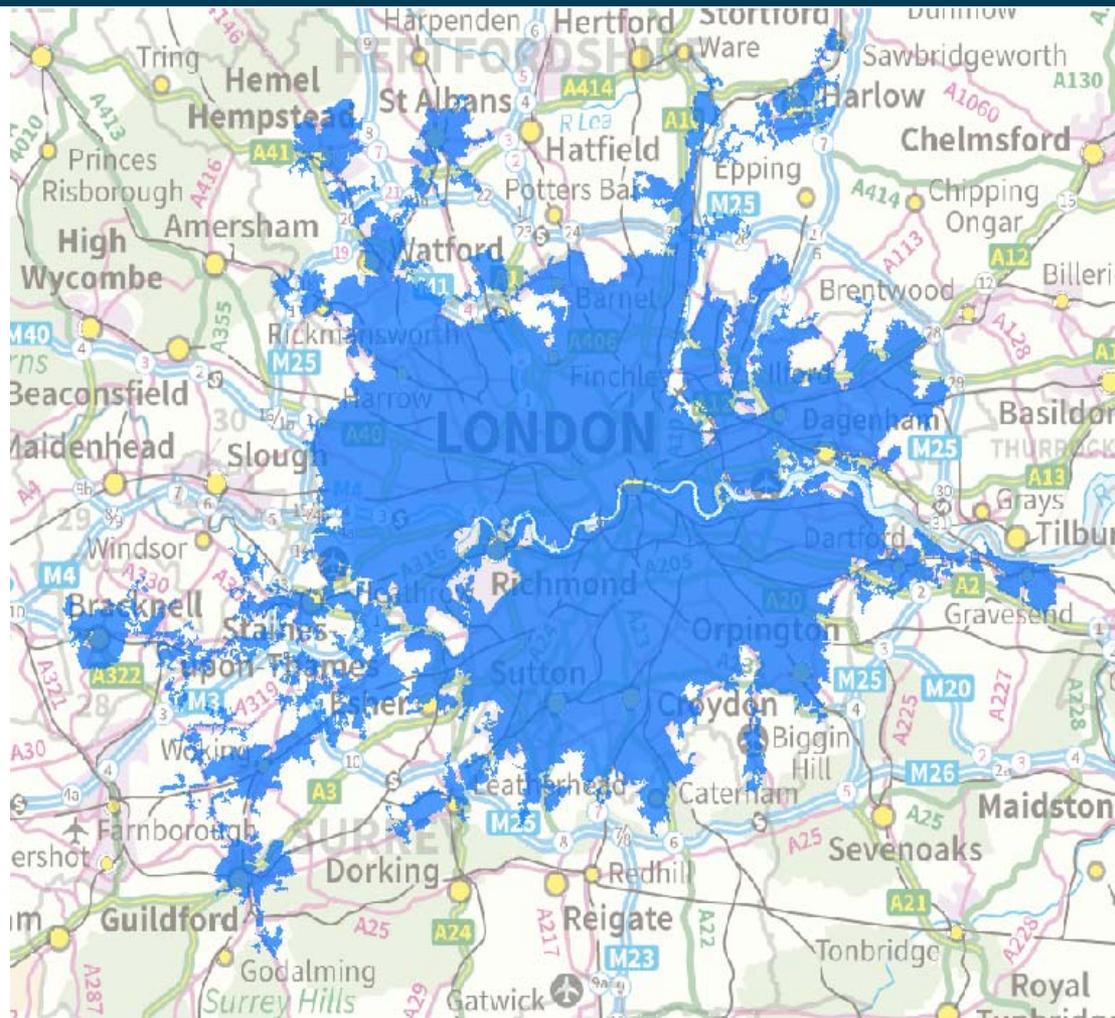
2011 census statistics and built-up areas

“2011 Census data for built-up areas in England and Wales *provide information on the villages, towns and cities where people live, rather than the wider administrative areas*”

(Office for National Statistics)

Greater London

Greater London Built-Up Area



User feedback so far...



- a useful dataset for local area profiling and service delivery planning (user in a local authority)
- polygons will help to create an improved definition of rural crime.
- praised ONS for their customer focus (user in a police force)
- used for visualising the location and extent of larger urban settlements nationwide (user in Dept. for Communities and Local Government)

“output is far more accurate, efficiently produced, repeatable and cost-effective than previous versions”

User feedback so far...



- a perception that large conurbations were not 'fairly' defined – i.e. some conurbations appeared to encompass more outlying built-up areas than others
(explained - due to the 200m linking rule)

Summary

User survey identified range of usage for built-up areas data

A key requirement: the rules base and methodology for delimiting 'built-up' areas needs to be spatially consistent and repeatable

Grid based approach provides spatial consistency and repeatability with efficiency

“a cost-effective solution that has provided real value for money”
(Office for National Statistics)

Further information about built up areas and UK census statistics can be found on the Office for National Statistics web pages at:

<http://www.ons.gov.uk/ons/rel/census/2011-census/key-statistics-for-built-up-areas-in-england-and-wales/index.html>

Thankyou

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www.ons.gov.uk/ons/rel/census/2011-census/key-statistics-for-built-up-areas-in-england-and-wales/index.html

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