



Advisory Group Paper AG (05) 09

## 2011 Census Small Area Outputs Geography Policy

### 1. Summary

This paper sets out ONS' proposed small area geography policy for 2011 Census outputs. A principle of stability and strong comparability with 2001 Census Output Areas (OAs) and Neighbourhood Statistics Super Output Areas (SOAs) is proposed.

Further research and analysis needs have been identified to establish how OAs and SOAs should be maintained, and what the scale of maintenance required is likely to be. It is also recognised that future policies in statistical disclosure control and potential time series outputs for the next Census are closely linked with any small area geography policy.

**Advisory groups are asked to give their views on the proposed policy at the meeting and/or in writing by the end of the year.**

### 2. Background

Output Areas (OAs) for Census 2001 were designed and released in 2003.

OAs were designed to :

- have very similar population and household numbers (tightly grouped around a population mean of approx 300 and a household mean of 125);
- have a high degree of homogeneity in terms of housing tenure and type.

In this respect OAs provided a real 'statistical geography' - an improvement on existing geographies which have broad population ranges and are subject to regular re-organisation.

Several constraints were imposed on this geography. OAs were nested within the wards and parishes that existed at the time. They were also built from the 'soft' geography of whole postcodes. The imposition of these constraints on the OA geography resulted in boundaries that often appear strange on a map as they do not follow a 'hard' physical geography (such as streets, rivers, railways, hills, land parcels etc).

The Neighbourhood Statistics (NeSS) geography policy built upon the idea of OAs and introduced the concept of a stable building block geographical hierarchy, to aid data comparison over time and between areas. In other words, to move away from wards and other local or functional geographies that are designed and maintained for non statistical purposes.

The Super Output Areas (SOA) hierarchy has been designed to provide this stable building block geography. It was built directly from the OA geography. The Lower and Middle Layers were both released in 2004. Again both layers were designed for statistical purposes along similar lines to OAs.

There are critics of OAs, and as a result anything that's built from them. However, the idea of a stable building block hierarchy, potentially allowing a wealth of cross analysis and time series analysis of datasets, is broadly welcomed both by data suppliers and by users.

When designed, OAs were not viewed as the future building block for a stable geo-statistical hierarchy. Indeed, the main emphasis at the time was that the accurate geo-referencing of data would allow flexibility for future outputs. In other words, that alternative output geographies could subsequently be produced, and that past data could be re-released against these newer geographies. Such a concept required further work to be carried out to devise methodologies and policies to handle overlapping geographies, disclosure, and recasting and these have gone forward in the NeSS programme. Recently, however, the emphasis has been as much on outputs built from stable building block geographies (the OAs and SOAs) and it is this that underpins current thinking as outlined below.

### **3. Advantages and disadvantages of stability**

ONS proposes that we should keep stability with 2001 OAs and SOAs.

The **advantages** of keeping a stable hierarchy beyond 2011 are as follows:

- The OA / SOA hierarchy performs well on statistical measures such as having compact household and population distributions, and having greater external heterogeneity and internal homogeneity than wards;
- Whilst there will be some degradation in terms of these statistical measures over time, countrywide this is not expected to be marked;
- A critical driver for SOAs was that they should be stable over time. This will facilitate both time series analysis and also greater cross analysis potential as SOAs become embedded and more data is released for them;
- We will have a stable output geography between Censuses – allowing comparison (within some constraints – see below);
- A stable output geography between Censuses will allow comparisons for the quality assurance of Census results, which has not been possible before;
- Public statements have been made that SOAs are intended to be stable;
- There is no guarantee of success if we attempted to create a further geography;
- There is a broad aim to reduce the number of geographies used, not to increase them.

Some **potential disadvantages** have been identified. They are:

- The possibility that we could design something better, either now or in the next few years with subsequent technical, data and policy developments;
- Some user demands for OAs to be redrawn to better reflect local concepts and definitions of neighbourhoods;
- Uncertainty over future disclosure control policies for small area Census outputs;
- OAs will not relate well to many wards by 2011. There is still a large local demand for “definitive” ward level data to be reported for political and policy setting reasons. However, virtually all wards change at some point, and the precision associated with the counts is probably misleading. No harm seems to have been done in Scotland who realised this decades ago;
- There are likely to be a number of methodological differences between the 2001 and 2011 Censuses. These may be most apparent where estimates are made in areas

suffering from lower response rates. Direct comparison between 2001 and 2011 at the OA level may therefore throw up spurious results. However, a consistent geography removes one area of uncertainty with regard to the effects of those differences.

#### **4. Proposed policy**

The following principles lie behind the policy being proposed:

- 2011 Census and NeSS geography policies must be aligned;
- We need a geography which is good for statistics and policy development;
- SOAs are the fundamental geography for NeSS and will be a good small area geography for time series analyses between censuses. As a result, the stability of the current OA / SOA hierarchy carries a very high weight;
- The potential for flexible output geographies and the release of past and future data against them still exists. To be realised it requires that unit records be accurately geo-referenced and that enabling disclosure control policies and methods be established.

With these principles as our basis, ONS proposes the following policy for small area geographical outputs.

1. The OA / SOA hierarchy will continue in its present form for the foreseeable future, and certainly beyond the next Census.
2. “Definitive” 2011 Census outputs will be released for this hierarchy (OA – SOA – Local Authority).
3. If disclosure thresholds were raised, OAs will simply be amalgamated where necessary for reporting purposes. If disclosure thresholds are reduced, OAs will remain unchanged.
4. Maintenance of the hierarchy will be required to respond to changes in the real world. Each layer of the hierarchy will have fixed minimum population and household thresholds to facilitate data release. They will also have guideline maximum thresholds to maintain a relatively tight distribution across the country. It is to be expected that as time passes some areas will fall below or above these thresholds. ONS will develop and evaluate approaches to maintenance.
5. Maintenance may also be required to fix existing problems. Any structural changes to fix problems will be limited to less than 5% of OA boundaries. Strict criteria will be established for assessing local requests for changes to be made to the hierarchy. Sufficient time will be given before the next census for requests and assessments to be made. If criteria are met, the task of redrawing will be owned by ONS.
6. Maintenance and reworking of the hierarchy will be carried out post census, well ahead of the release of any small area data.
7. Work will be undertaken to assess the potential for better aligning OA boundaries to features on the ground and to OS MasterMap. A range of different approaches will be considered. This work will have as a prime concern that there should be no loss of

IPR to Ordnance Survey and no detrimental impact on our ability to freely disseminate digital boundaries for OAs and SOAs.

One consequence of this policy is that it may not be possible to produce “definitive” ward level data for the next Census. At the very least, however, ward outputs will still be produced by best fitting data produced for OAs to wards.

A further consequence is that methodological differences between censuses may be apparent by comparing data at the small area level. It is argued that this should not be a reason for throwing away the geography, but rather these potential differences should be clearly highlighted upfront.

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### Testing the policy

The proposed policy outlined above has been tested internally within ONS, and externally with our Geography Advisory Group. This is a small group of leading academic, central government, local government, and commercial representatives with a professional interest in geo-statistical issues.

Feedback received has been broadly very supportive. Areas for further research and analysis have been suggested, whilst the point has been made that a lot can change in five years.

A small selection of comments to reflect those received are given below:

*“It is better to have stability in units rather than trying to produce a ‘better’ set of OAs, as it will never be possible to meet all the criteria.”*

*“This position is generally sound and it is helpful to put out some initial statements for public information and comment.”*

*“You will remain under heavy pressure to provide ward statistics. ONS needs to consider how it can better manage expectations in its markets. How can it educate users on the subtleties of apparent precision versus statistical reliability issues inherent in any survey work.”*

*“There is a case for maintenance of SOAs wherever possible, but I’m less convinced that we need to stay with 2001 OAs.”*

*“I strongly agree with the suggestion of sticking with OAs as currently defined for the 2011 census output. I think the benefits for research and policy making will be huge (of the order of many tens of millions of pounds worth of added value to the census if this choice were costed).”*

*“We are unable to judge yet whether SOAs meet our requirements, but the impression is so much better than previously available ward data.”*

*“Are ONS weighing up the costs and benefits of disclosure? Not just in a purely statistical environment but as a cost benefit to the nation? Too tight statistical disclosure control undermines the purpose of this data, to help develop policy to help people.”*

*“Coordinate referencing of a database allows geography for time series to be kept up to date almost indefinitely. The research effort should concentrate on determining area levels and statistical content for reliable time series, and on addressing the disclosure control issues of changing geographies.”*

*“The balance struck between the extremes of absolutely no change and wholesale revision was about right.”*

*“Concerns about disclosure by differencing have led to a lot of the current approach. Do we and will we still have the same views about this?”*

*“You need very low level geo-referenced data for flexible geographical outputs and the supply of such data is not yet good.”*

*“The arguments for stability and continuity provided by using the existing OAs etc far outweigh any against.”*

*“All of this is sensible and supported by us at Marks & Spencer – modifying bricks is a real pain.”*

*“There will be a some local disapproval if OAs are maintained.”*