



Proposals arising from a cost review of the English Housing Survey (EHS)

Consultation



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August 2010
Department for Communities and Local Government

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Summary of consultation

Scope of the consultation

Topic of this consultation:	Proposals arising from a cost review of the English Housing Survey (EHS).
Scope of this consultation:	Responses to this consultation will help inform the scope and size of the 2011/12 English Housing Survey.
Geographical scope:	England.
Impact Assessment:	An impact assessment is not required as this is a technical consultation relating to Official Statistics outputs.

Basic information

To:	Any organisation or individual that uses the results from the EHS. This includes local and central government, academics and private organisations.
Body/bodies responsible for the consultation:	Communities and Local Government.
Duration:	Five weeks from : Friday 13 August 2010 to : 5pm on Friday 17 September 2010
Enquiries:	Barbara Rose (or Meg Green) Housing Analysis and Surveys Division Communities and Local Government 4/J2 Eland House Bressenden Place London SW1E 5DU 0303 444 1112 (or 0303 444 2297) ehs@communities.gsi.gov.uk

<p>How to respond:</p>	<p>A summary of proposals and consultation questions is at page 20.</p> <p>Please send responses, preferably via email, to: ehs@communities.gsi.gov.uk</p> <p>or by post to Homa Ahmad Housing Analysis and Surveys Division Communities and Local Government 4/J2 Eland House Bressenden Place London, SW1E 5DU</p>
<p>Additional ways to become involved:</p>	<p>Housing Statistics Network www.housingstatisticsnetwork.co.uk</p>
<p>After the consultation:</p>	<p>The responses will be used alongside other sources of evidence to inform the scope of the 2011/12 EHS.</p> <p>A summary of the consultation responses will be published on the CLG website.</p>
<p>Compliance with the Code of Practice on Consultation:</p>	<p>As this is a technical consultation on statistical outputs it is not a formal 12-week public consultation.</p>

Background

<p>Getting to this stage:</p>	<p>The EHS was launched in April 2008 and brought together two former CLG surveys, the Survey of English Housing and the English House Condition Survey. Initial results from the survey were published as a Headline Report in February 2010.</p> <p>www.communities.gov.uk/publications/corporate/statistics/ehs200809headlinereport</p> <p>Fieldwork has continued throughout 2009/10 and into 2010/11.</p> <p>The EHS forms a key component of the housing evidence base both within CLG and the wider housing community. It is a complex two stage survey including both a face to face household interview and a physical assessment of the condition and energy efficiency of the home.</p> <p>The EHS is an expensive survey to fund. A review of the survey has been undertaken over the last six months to identify where savings could be made in the running costs of the survey. This document sets out options developed following that review and invites users' comments.</p>
<p>Previous engagement:</p>	<p>A consultation exercise was undertaken in November 2009 on a proposed EHS Dissemination Strategy</p> <p>www.communities.gov.uk/publications/housing/surveydisseminationstrategy</p> <p>A summary of responses will be posted shortly together with a finalised dissemination strategy which has been informed by responses to that consultation.</p>

1. Introduction

Aim

- 1.1 This document invites comments on Communities and Local Government's (CLG) plans for the 2011/12 English Housing Survey (EHS).
- 1.2 The EHS results are Official Statistics and CLG has a duty to comply with the Statistics and Registration Act 2007. As part of this Act, Official Statistics producers should comply with the *Code of Practice for Official Statistics*¹.
- 1.3 Two of the main principles are:
 - ensuring the statistics meet user needs
 - engaging users on changes to statistics.
- 1.4 This consultation is engaging users on the cost saving measures being proposed for the 2011/12 Survey and aims to ensure that the survey will continue to meet users' priority needs. The consultation will run for five weeks from **Friday 13 August 2010**.

EHS background and methodology

- 1.5 The EHS was launched in April 2008 bringing together two former long standing and well regarded surveys - the Survey of English Housing (SEH) and the English House Condition Survey (EHCS). The survey is run on a continuous basis as part of the wider Office for National Statistics (ONS) Integrated Household Survey (IHS)
- 1.6 The survey has a complex multi-stage methodology consisting of three main elements: an initial interview survey of around 17,700 households with a follow up physical inspection and a desk based market valuation of a sub-sample of 8,000 of these dwellings, including vacant dwellings.

¹ <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/code-of-practice-for-official-statistics.pdf>

- 1.7 The interview survey sample forms part of the Integrated Household Survey (IHS), and the core questions from the IHS form part of the EHS questionnaire. More information about the IHS is available from its webpage:

www.statistics.gov.uk/CCI/nugget.asp?ID=936&Pos=1&ColRank=1&Rank=224

- 1.8 Further information about the EHS and its predecessors is available at:

www.communities.gov.uk/housing/housingresearch/housingsurveys/

- 1.9 The EHS interview content covers the key topics included under the former SEH and EHCS. These include household composition, housing history and aspirations, tenancy deposits, second homes, work done to the home, attitudes to the home, neighbourhood and landlord, detailed housing costs, adaptations to the home, plus a detailed income module.

- 1.10 The physical survey is conducted by qualified surveyors who undertake an internal and external inspection of the home to record the type, age and construction type of the property. They assess the property's state of repair, heating system, energy efficiency characteristics and health and safety risks.

- 1.11 The market value component is a desk based exercise where qualified valuers assess the property's market value based on a short description of the property and photographs collected from the physical survey.

Users of the EHS

- 1.12 The EHS underpins CLG objectives relating to energy efficiency, vulnerable people in non-decent homes, children in poor housing, and satisfaction with home and landlords. It also underpins the Department for Energy and Climate Change (DECC) Fuel Poverty strategy and is widely used within CLG and across government particularly in relation to climate change, poverty and equality issues.

- 1.13 The survey is also a major and well used data set for the wider housing community. Reports will be published annually and an extensive set of tables and supporting user documentation will be made available on the CLG website for external users. We are proposing that the data will be deposited at the UK Data Archive (UKDA) and the ONS Virtual Microdata Laboratory. We set up an Advisory Group to improve

communications with external users. Members include the key EHS external users and stakeholders.

1.14 The survey results also have rich potential for secondary analysis.

2. The English Housing Survey Cost Review

Background to the cost review

- 2.1 The English Housing Survey (EHS) is a complex and expensive survey to run and absorbs a large proportion of the CLG Analytical Services research budget. As part of the current wider drive to deliver cost savings across government, research budgets are being closely scrutinised to identify where savings can be made. It is therefore necessary that savings are also sought from within the EHS running costs.
- 2.2 In looking for savings we have considered a wide range of options and looked well beyond a simple reduction in sample size aiming to build up a package of measures that would improve the overall cost-efficiency of the survey while minimising the impact on the functionality of the survey results. While a reduced sample was viewed as a less favoured option as this could reduce the utility of the survey for all users, a cut in the sample size is seen as the only viable means of delivering the significant cost savings required.
- 2.3 A further consideration has been to develop options that can be implemented easily in time for 2011 but at the same time be potentially sustainable in the longer term and can in effect be piloted in 2011. A longer term strategic review of the survey will be undertaken later in 2010 prior to the main data collection contracts being re-tendered for 2012 forward.
- 2.4 We are also in negotiations with key users in central government to develop a cost-sharing approach to the survey.
- 2.5 The main focus of the review has therefore been on:
- options for reducing the data content
 - identifying savings within the fieldwork and training operations
 - options for reducing the sample size.
- 2.6 These are outlined separately below.

Options for delivering savings

A. Reducing the survey data content

INTERVIEW SURVEY

- 2.7 The EHS currently comprises three components – an initial 45 -50 minute household interview for around 17,700 households; a follow up physical inspection of around 8,000 of these properties and an independent market valuation (the Market Value Survey or MVS) by the Valuation Office Agency (VOA) of these same 8,000 homes.
- 2.8 As well as saving costs, a reduction the length of the interview survey would bring other advantages – it would be less burdensome and intrusive to respondents which in turn would be likely to boost response to the interview survey and to the follow up visit by the surveyor. We are therefore proposing a number of changes to the interview content.

IHS CORE QUESTIONS

- 2.9 The interview survey comprises both a ‘Core’ set of questions which are currently asked across all the component surveys which make up the Integrated Household Survey (IHS) and a ‘Housing’ module of questions that are specific to the EHS.
- 2.10 A number of the Core questions have only limited relevance to a housing survey and were not present in either the former SEH or EHCS. ONS are currently reviewing the content of the Core and expect to reduce it considerably in line with European statistical requirements. CLG would welcome users’ comments on the proposal to drop questions related to:
- national identity (but retain nationality and ethnicity)
 - sexual identity
 - religion
 - previous address details (but retain length of time resident at current address)
 - smoking
 - attendance on government training schemes
 - looking for work details (but retain job details and occupation)
 - education (but retain key variables on type of qualification and highest level of qualification).

EHS QUESTIONS

- 2.11 Demands on the interview content are high and we are already making effective use of 'rotating modules' to bring questions in /out of the survey to meet users' demands. There are some additional topics in the survey however where findings do not change significantly year on year and we are therefore proposing to extend the number of topics that will only appear on a rotating basis rather than continuously.
- 2.12 Currently we are rotating modules relating to Fires in the home, Adaptations for Disabled People and Work Done to the home. This arrangement will continue and we are proposing this is extended to include:
- condensation and damp
 - second homes.
- 2.13 It is envisaged at this stage that these two topics would not be asked in 2011/12 and 2012/13 but run again in 2013/14 and 2014/15.
- 2.14 In addition there are other related sections of the questionnaire where we are proposing to make changes as follows:
- drop questions on access to cars/vans
 - cut back satisfaction questions eg satisfaction with: accommodation, repairs and maintenance, landlord, but retain some key measures
 - cut back on views on the neighbourhood but retain some key measures
 - cut back on questions to private renters about tenancy deposit scheme – this is now well established.
- 2.15 We estimate these changes would reduce the interview length to around 30 minutes making it much more acceptable to respondents and consequently easier for interviewers to secure an interview.

Users' views on these proposals are now sought, including an indication of what are seen as key measures to be retained.

- 2.16 These proposed changes will not impact on the key functionality of the survey with essential topics still covered on a permanent basis as follows:
- demographics/household composition
 - accommodation type and rooms including bedrooms

- tenure
- nationality/ethnicity
- length of residence
- health and disability
- type and highest level of qualifications
- housing history/previous tenure/reasons for moving
- subletting/concealed households
- waiting lists
- Council Tax/heating bill payments
- leasehold/freehold type
- ownership /how property purchased/mortgage details including arrears
- rents/Housing Benefit – including arrears
- succession tenancies
- buying aspirations
- economic status (as assessed by respondent)
- detailed income and benefits information for Household Reference Person and partner as collected in the former EHCS, plus monthly income of all adults in household.

2.17 CLG commissioned the Building Research Establishment (BRE) to look at the possibility of cutting back on the detailed income module which could potentially save ten minutes of interviewing time and also reduce the complexity of the data modelling work. The work has shown however that this would create some serious discontinuities for key analyses including defining vulnerable households and for Fuel Poverty related work. By relying on a cut-back set of income questions the size and composition of these groups would change because of under reporting by respondents.

PHYSICAL SURVEY

2.18 The physical survey data collection process involves a complex and detailed proforma covering many aspects of the dwelling's construction and condition. The proforma has been refined over many years and the information feeds into a number of models used to derive for example energy efficiency ratings, repair costs and indicators of stock condition. The main costs are incurred in travelling to the property and the surveyors' unit cost per survey. Introducing major changes for 2011/12 would be labour intensive and any resultant discontinuities could

undermine important time series. We are not therefore at this stage proposing any significant changes to the physical survey. It will be reviewed routinely in 2011/12 to see if new questions should be introduced to reflect new priorities and to identify where any cuts can be made, particularly where this would make fewer demands on the respondent. A more fundamental review will be made for the 2012/13 survey to see if any further efficiencies can be achieved.

THE MARKET VALUE SURVEY (MVS)

- 2.19 The MVS is a desk based exercise conducted by the Valuation Office Agency (VOA) to provide an independent market valuation of the home based on a 'pen-picture' and photographs provided from the physical survey - in conjunction with the Valuation Office's own transaction based data base. The valuations involve skilled valuer input and are therefore relatively expensive to collect. The information is used primarily to:
- compute a reliable equity assessment which can be used for example to assess eligibility for loans
 - derive a total stock valuation across all tenures including properties that would rarely come onto the property market and therefore not appear in transaction based estimates.
- 2.20 Results from the market value survey are published through the annual EHS stock report. It has also been used to assess the role equity can play in funding housing improvements and adaptations for vulnerable home owners; and in carrying out econometric analyses such as the (variable) gap between actual and potential market rents for public sector housing.
- 2.21 A self-assessed market valuation is also obtained from owner occupiers as part of the interview survey which could act as a proxy for the owner occupied VOA assessments. We have commissioned the Building Research Establishment to undertake comparative analysis of the respondents' assessments against those of the VOA and found, as expected, considerable variation from the VOA figures:
- Forty per cent of household valuations are within 10 per cent of the VOA estimate while 24 per cent of respondents' valuations differed by more than 25 per cent from the VOA assessment. Owner occupiers are much more likely to overestimate the value of their home than underestimate it. Because respondents tend to overestimate property value, using these will overestimate equity.
 - Recent movers, those on highest incomes or in highest value properties overvalue their homes the most while those living alone, those over 60 and those living in their homes for a long period were

most likely to underestimate the value of their home. Around 4 per cent of homes have no estimate provided by the household.

- 2.22 Self assessed valuations and any resultant assessment of equity would therefore need to be used with caution. Further results from the BRE assessment can be made available on request.
- 2.23 We do however already hold independent valuations for the first two years of the EHS (and for all former years as part of the EHCS) which would provide a rich set of backcloth evidence to support analysis in this area.
- 2.24 **On balance we do not feel market valuations are needed every year and are proposing to drop the MVS for the 2011/12 survey** and to review alternative methodologies as part of the EHS strategic review/ re-tendering exercise in 2012/13 to identify precise CLG requirements and possible alternative cheaper data sources. This is a self-contained exercise which can be easily dropped without any knock-on effects on the rest of the survey or important time series.

The survey can also be dropped for the 2010/11 survey without incurring any contractual penalties and we therefore propose to stop the MVS collection after the 2009/10 exercise completes this summer.

B. Savings from training operations

- 2.25 Following a review of the conduct of both the interview and physical survey fieldwork operations we have concluded there is scope to identify efficiencies in the physical survey training regime. Currently all 200 surveyors receive an annual two day residential refresher training before re-starting in the field. These are expertly organised and delivered and have been key to maintaining high standards of data collection for which the survey is widely regarded.
- 2.26 We have discussed options in detail with the contractors and are proposing an alternative one day non-residential regime. The training would be conducted by the current training team who would travel around to five regional venues to deliver a consistent briefing to two surveyor groups on consecutive days.
- 2.27 Potential concerns are:
- Time will be much more limited so any significant changes to the survey form may not be adequately briefed. This could be an issue

as new more complex demands emerge to meet needs of the climate change agenda e.g. scope for retro-fitting energy efficiency measures.

- There will be no opportunity for practical fieldwork exercises and for surveyors' responses to be calibrated against model answers. There is some risk variability will rise.

- 2.28 To address some of these concerns it is proposed to develop on-line training exercises to be completed before and/or after the briefing to cement the lessons delivered on the day.
- 2.29 Surveyors new to the survey would continue to receive a six day residential training which is seen as an essential pre-requisite to allowing surveyors to work on this project.
- 2.30 Surveyor performance would continue to be closely monitored through accompanied visits, close management scrutiny of completed surveys and through annual calibration workbook exercises.
- 2.31 On balance therefore we feel this is a measure worth piloting in 2011/12 to establish if it is seen as a viable long term approach and we can review prior to the 2012/13 survey. **We are therefore proposing to develop the appropriate new training material and implement regional surveyor briefings for 2011/12.**

C. Reducing the sample size

- 2.32 Reducing the sample is an obvious area to deliver savings but one which needs careful evaluation to see the wider implications on the utility of the survey estimates. We first consulted CLG analysts and external users through the EHS Advisory Group to establish key information requirements of the survey and then worked closely with the ONS Methodology Consultancy Unit to appraise how a sample reduction could best be achieved in relation to these needs.
- 2.33 Some of the Methodology Consultancy Unit's detailed findings are presented in the Appendix. The Methodology Consultancy Unit looked at a range of cost saving options in the context of delivering key information requirements and their precision needs. **However severe financial constraints now require us to look towards the highest savings options considered in detail by the ONS Methodology Consultancy Unit, and to also consider a further option which would mean a larger sample size reduction than those investigated by ONS.**
- 2.34 The table below sets out the approximate sample sizes (and their expected tenure distribution) required to achieve two cost savings options for this consultation, and compares them to the current samples of the

EHS. Both options for cost savings are based on proportionate reductions in the interview and physical surveys – Option 1 being a 20 – 25 per cent reduction in sample size for both component surveys, and Option 2 a 35 – 40 per cent reduction.

2.35 Option 1 in this consultation equates to Option C in the Appendix.

Table 1: Predicted achieved sample sizes to deliver different field work cost savings			
	Current	Option 1: 20-25% sample reduction	Option 2: 35-40% sample reduction
Interview Sample			
owner occupied	12,268	9,223	7,559
private rented sector	2,199	1,653	1,355
local authority	1,519	1,142	936
housing association	1,705	1,282	1,051
Total	17,691	13,300	10,900
Physical Sample			
owner occupied	4,079	3,172	2,558
private rented sector	1,353	1,052	849
local authority	1,183	920	742
housing association	1,357	1,055	851
Total	7,972	6,200	5,000

Note: these options entail proportionate reductions in the sample sizes of both the interview and physical surveys.

- 2.36 The EHS interview survey sample within the four tenure categories is approximately proportional to the actual number of households in each category in England. In order to secure sufficient numbers of sample cases in each of the rented sectors for the physical survey, the EHS already disproportionately sub-samples by tenure from the interview survey (that is, it over-samples from those renting and under-samples from those owning their homes).
- 2.37 The Methodology Consultancy Unit also looked at the possibility of introducing an initial office-based sift by tenure to reduce the number of owner occupiers in the interview sample and so obtain a larger number of rented tenure cases to support analysis of these groups. Details are set out in the Appendix. For Option 1 above, for the physical sample, the sift could increase the private rented sector by approximately 100 cases and the social sector combined by around 350 cases while reducing the owner occupied sector by around 450 cases. The use of an 'office sift' would be considered in the detailed planning required to implement which of these options is taken forward.
- 2.38 A reduction in the sample size increases the margins of error around all estimates from the survey, but particularly has an impact on (smaller) sub-sections (including the rented sectors) of each sample and on the capacity to measure annual change.
- 2.39 For Option 1 (20-25% sample reduction) above, these impacts are assessed in detail in the Appendix². The detailed analysis carried out by the ONS Methodology Consultancy Unit indicates that, while there is a general increase in sampling error, the samples would support national and most regional level analysis.
- 2.40 Nevertheless:
- the capacity to monitor some annual trends would be significantly reduced
 - analysis of small sub-groups (eg recent movers) in the interview survey may need to be undertaken using a two-year average rather than an annual data set, meaning it may take longer for some trends to emerge and smaller changes will be 'smoothed'
 - the scope for some regional level analysis would also be considerably curtailed.
- 2.41 The impacts of Option 2 (35-40% sample reduction) have not been assessed in the same detail, as this is beyond the scope of the work

² Option 1 in this consultation equates to Option C in the Appendix.

commissioned from ONS. This option would achieve additional cost savings but with higher margins of error for all estimates from the survey.

- 2.42 The analysis carried out by the ONS Methodology Consultancy Unit indicated that reducing the physical sample size below 6,000 cases would lead to more estimates failing to meet the stated precision criteria, and notes that there is already some concern on using two-year data sets for the physical survey estimates.
- 2.43 This larger (35-40%) reduction in sample size may require greater use of combined data sets to provide findings for sub-sections of households and the housing stock. For the physical sample it may require greater use of three year combined data sets which, as indicated in the Appendix, would increase the reporting time-lag and further increase the smoothing effect on trends (that is, reduce the responsiveness of estimates to any measured change in an established trend).

3. Summary of proposals and consultation questions

Summary of proposals

- A.** CLG are proposing to drop some little used questions from the interview survey; scale back some topics and only include some other topics on a rotating basis.
- B.** CLG are proposing to drop the independent market valuation exercise in both 2010/11 and 2011/12 and rely on either historical data sets or the proxy measure provided by owner occupiers.
- C.** CLG are proposing to introduce one day annual regionally based briefing courses for surveyors rather than residential courses.
- D.** CLG are proposing a cut in the sample size. Two options are presented:
 - a lower saving option involving a 20 – 25 per cent cut in the interview and physical sample sizes; or
 - a higher saving option involving a 35 – 40 per cent cut in the interview and physical sample sizes.

Consultation questions

In summary the full list of questions asked in this consultation is:

- 1.** What are users' views on the proposals summarised above? Background details supporting any concerns should be provided. It is important we understand the specific work that you feel would be undermined by implementing any of these proposals.
- 2.** Which choice of sample cut is seen as acceptable? Please provide reasons if the higher cost saving option is considered unacceptable.

3. In responding to these issues users should make clear any specific demands on the survey that could not be met in full if any of the above proposals were implemented – please provide as much detail as possible of:
- the analysis you need to undertake, for what purpose
 - its frequency; need for time series and expected year on year change
 - at what geographic level analysis is required?
 - what level of precision is required for these estimates?
 - what would be the consequences if key estimates were no longer available or only available in a more aggregated form?
 - what would be the consequences if more aggregation over years was required and estimates were therefore less timely?

Please note:

We are grateful for the feedback already received from a number of users regarding the analysis they undertake on the survey. This has informed the shaping of the sampling recommendations we are making here. These users are welcome to make any further observations on the above proposals but do not need to re-supply contributions that have already been provided.

4. Do you have any further comments on plans for the 2011/12 English Housing Survey?

4. Confidentiality and data protection

- 4.1 Information provided in response to this consultation, including personal information, may be disclosed in accordance with the access to information requirements (mainly the *Freedom of Information Act 2000*, *Data Protection Act 1998* and the *Environmental Information Regulations 2004*). If you wish the information you provide to be treated as confidential, please be aware that, under the *Freedom of Information Act*, there is a statutory Code of Practice with which public authorities must comply and which deals with, amongst other things, obligations of confidence. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation. However, we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality notice generated by your IT system will not, of itself, be regarded as binding on the Department.
- 4.2 A summary of the responses to this consultation will be published on the Department's website www.communities.gov.uk. Any confidential responses will be included in the statistical summary of numbers of comments and views expressed, although the respondent will not be identified.

5. How to respond

- 5.1 This statistical consultation will run for five weeks from **Friday 13 August 2010 to 5pm on Friday 17 September 2010**.
- 5.2 When responding, please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear who the organisation represents, and where applicable, how the views of the members were assembled.
- 5.3 Comments are invited from all interested parties who wish to be involved in this consultation process.
- 5.4 Please send your consultation response (by email or post) to:

ehs@communities.gov.uk

c/o Homa Ahmad
Housing Analysis and Surveys Division
Communities and Local Government
4/J2, Eland House
Bressenden Place
London
SW1E 5DU

6. About this consultation

- 6.1 This consultation document and consultation process have been planned to adhere to the Code of Practice on Consultation issued by the Department for Business Innovation and Skills and is in line with the seven consultation criteria, which are:
1. Formal consultation should take place at a stage when there is scope to influence the policy outcome.
 2. Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.
 3. Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.
 4. Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.
 5. Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.
 6. Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.
 7. Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.
- 6.2 Representative groups are asked to give a summary of the people and organisations they represent, and where relevant who else they have consulted in reaching their conclusions when they respond.
- 6.3 Information provided in response to this consultation, including personal information, may be published or disclosed in accordance with the access to information regimes (these are primarily the *Freedom of Information Act 2000* (FOIA), the *Data Protection Act 1998* (DPA) and the *Environmental Information Regulations 2004*).

- 6.4 If you want the information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.
- 6.5 The Department for Communities and Local Government will process your personal data in accordance with DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.
- 6.6 Individual responses will not be acknowledged unless specifically requested.
- 6.7 Your opinions are valuable to us. Thank you for taking the time to read this document and respond.
- 6.8 Are you satisfied that this consultation has followed these criteria? If not or you have any other observations about how we can improve the process please contact:

CLG Consultation Co-ordinator
Zone 6/H10
Eland House
London SW1E 5 DU

Or by e-mail to: consultationcoordinator@communities.gsi.gov.uk

Appendix

EHS Consultation: Reducing the Sample Size

- A.1 This Appendix is based on analysis commissioned by CLG from the ONS Methodology Consultancy Unit. It provides background information for the sample size reduction proposals in the consultation, but note that, due to financial constraints, the low and medium saving options are not now seen as affordable, and so are not included in the consultation.

Section 1: Options for cost savings

1a. Range of options

- A.2 In our investigation of potential cost-saving designs, we consider cutting the sample in three ways:
- a proportionate cut to both the household and physical surveys
 - a reduction in the household survey alone
 - a reduction in the physical survey alone.
- A.3 These are not the only options for reduction available: in principle any design where the household survey is larger than the physical survey could be seen as a candidate design. However the three options for reduction demonstrate the range of issues faced and keep the task of deciding between the options manageable.
- A.4 We identified a number of options based initially on potential levels of cost savings – low, medium and high. Using simplified assumptions about unit costs per interview/physical survey we derived a number of possible options - see Table A1 below.
- A.5 Note that these and all predicted sample sizes in this section are for a random sample and subject to variation in response rates.

Table A1: Predicted achieved sample sizes to deliver different cost savings			
	Low saving	Medium saving	High saving
Proportionate	Option A	Option B	Option C
Household Survey	16,100	14,700	13,300
Physical Survey	7,500	6,900	6,200
Household cut only	Option D	Option E	Option F
Household Survey	14,700	12,100	9,500
Physical Survey	8,100	8,100	8,100
Physical cut only	Option G	Option H	Option I
Household Survey	17,300	17,300	17,300
Physical Survey	6,900	5,700	4,400

Note: Predictions are subject to sampling error and variations in response

- A.6 The EHS already sub-samples by tenure on cases which are selected for the physical survey – based on the tenure identified in the interview sample - in order to boost the number of rented properties. This approach would continue in all the options identified to help optimise the tenure split for the physical survey.
- A.7 Within these options we have also looked closely at the possibility of introducing an initial sift by tenure to reduce the number of owner occupiers in the interview sample and so retain a larger number of rented tenure cases to support analysis of these groups. This is particularly important for options D, E and F in Table A1 as the EHS currently retains all the rented sector cases from the interview survey into the physical survey. While sub-sampling would bring potential advantages and be technically feasible it has some drawbacks. In order to deliver any effective cost savings the sub-sampling would have to be undertaken through an initial office-based sift (rather than on the doorstep).
- A.8 This is not straightforward since there is no readily available sampling frame at the address level which includes tenure. Sub-sampling would therefore have to be based on a postcode level file which allows less

control over the selection process, since some dwellings have a different tenure from the predominant recorded tenure in the postcode.

- A.9 It is also important to recognise that this leads to sub-sampling at different rates within tenures which does reduce the efficiency of the survey estimates by reducing the effective sample size. With the options we have pursued below, however, the effect is relatively modest.

1b. Low-saving option

- A.10 Since the physical sample is already being analysed on a two year rolling basis because of the smaller sample size, we felt either options A or D in Table A1 would be preferable to Option G. The choice was therefore seen as between a smaller cut of around 7 per cent to both the interview and physical surveys (option A above) to 16,100 interviews and 7,500 surveys or a larger 15 per cent cut to the interview sample only (14,700 interviews and 8,100 physical surveys).
- A.11 Within both these options there would be the further option of whether to introduce an office sift to help maintain the size of the rented tenures. As mentioned earlier, this is particularly important for option D as the reduced interview survey would mean that an across-the-board cut would lead to major reductions in the rented tenures with a knock on effect on the tenure split for the physical sample.
- A.12 Having looked at numerous possibilities we identified that the two most promising options which achieved good working samples for both the interview and physical survey analysis would both involve a 7 per cent cut to the overall sample either with or without the initial office sift. The expected tenure split under both these options is shown below (Table A2).

Table A2: Predicted achieved tenure distribution - Low-Saving Option A			
<i>Assumes proportionate cut to both interview and physical samples - with and without office sift</i>			
	No office sift	With office sift	<i>Achieved 2008/09</i>
Household Survey			
owner occupied	11,165	10,699	12,268
private rented sector	2,001	2,027	2,199
local authority housing association	1,382	1,616	1,519
	1,552	1,759	1,705
Total	16,100	16,100	17,691
Physical Survey			
owner occupied	3,837	3,433	4,079
private rented sector	1,273	1,409	1,353
local authority housing association	1,113	1,258	1,183
	1,277	1,400	1,357
Total	7,500	7,500	7,972

- A.13 Both these options would seem acceptable although the simple proportionate cut to both surveys with no office sift may be seen as preferable as it represents the least disruption to the survey methodology and least likely to cause any discontinuities.
- A.14 There would be some impact of such a cut on the standard errors around all survey estimates but these would be small and we have not identified any significant user requirements that would be seriously jeopardised by a modest cut of this size. See below and section 2: 'Assessing the impact of a reduction in sample size'.

1c. High saving option

- A.15 The choices open to us here (options C, F and I above) are effectively very limited.
- A.16 Option I would deliver only 4,400 physical surveys which is not considered a viable sample that would support the range of analytical demands placed on this part of the survey. Reporting is already undertaken using a two-year rolling sample and analysis has identified 6,000 as a threshold below which the ability of the survey to monitor significant trends would be substantially undermined. (See section B: 'Assessing the impact of a reduction in sample size').
- A.17 Option F - designed to protect the physical sub-sample - is not deliverable in practical terms. If the household sample were reduced to only 9,500, given the attrition between the interview and the physical survey (i.e. the number of respondents refusing the follow up physical survey) this would be insufficient to deliver an 8,100 physical sample. Cutting the household survey to 9,500 would also have a severely detrimental impact on the size of the rented tenure groups achieved.
- A.18 This therefore leaves a substantial proportionate cut to both samples of around 20 -25 per cent (Option C) as the only viable means of delivering a high saving. Again within Option C we would have a choice between a straight proportionate cut to both samples across all tenure groups or introducing office sub-sampling to reduce the number of owner-occupiers and so retain a larger sample of rented tenures to support analyses of these groups. The expected tenure split under both these options is shown below.

Table A3: Predicted achieved tenure distribution - High-Saving Option C*Assumes a proportionate cut to both interview and physical samples - with and without office sift*

	No office sift	With office sift	Achieved 2008/09
Household Survey			
owner occupied	9,223	8,533	12,268
private rented sector	1,653	1,691	2,199
local authority housing association	1,142	1,487	1,519
	1,282	1,588	1,705
Total	13,300	13,300	17,691
Physical Survey			
owner occupied	3,172	2,602	4,079
private rented sector	1,052	1,176	1,353
local authority housing association	920	1,158	1,183
	1,055	1,255	1,357
Total	6,200	6,200	7,972

- A.19 The office sift option would deliver an improved tenure split for the physical survey giving larger samples for all the rented tenures. Introducing this additional level of sub-sampling does however lead to some loss of sample efficiency through weighting. Whilst the loss of efficiency for the owner occupied tenure is modest at 3 per cent, for the other tenures the predicted losses are greater at 6 per cent for private rented and 8 per cent for local authority and housing association.
- A.20 Applying these effective reductions shows however that sustaining the rented tenures is worthwhile even after this reduced efficiency is taken into account. On balance therefore to deliver the high-saving option an office sift should be seriously considered.
- A.21 With this high-saving option, the impact on sampling error is clearly larger and capacity to monitor some annual trends will be significantly reduced. From the analysis of the impact on estimates, some of the differences in

the household estimates that are currently found to be significant would be lost with this cut.

- A.22 In addition, analysis of small sub-groups (e.g. recent movers) in the interview survey may need to be undertaken using a two-year average rather than an annual data set, meaning it may take longer for some trends to emerge and smaller changes will be 'smoothed'. Some examples of the implications of this scale of sample cut are provided in section 2: 'Assessing the impact of a reduction in sample size'.
- A.23 The scope for some regional level analysis would also be considerably curtailed. From the analysis of the impact on estimates, some of the differences in household estimates that can currently be identified as significant would no longer be identifiable with this cut. A further drawback is that, even with sub-sampling to influence the tenure distribution, we predict that the private rented sample size for the physical survey would be around 180 cases smaller than at present and the housing association sample some 100 cases smaller.
- A.24 Further background is included in section 2: 'Assessing the impact of a reduction in sample size'.
- A.25 This option while less attractive from an analytical perspective would however maintain a viable interview and physical sample that would support national and most regional level analysis. There will be no change to the survey methodology beyond the introduction of the office sub-sampling and the size of the achieved sample - so no potential additional source of bias – just a quantifiable increase in sampling error.

Section 2: Assessing the impact of a reduction in sample size

2a. Overview and conclusions

- A.26 We have attempted to assess the negative impact a change to the sample size is likely to have on the quality of the key survey estimates. The analysis looks at the impact on some key stock and households estimates.
- A.27 The impact of reductions in the physical survey from 8,000 dwellings to 4,000 in steps of 1,000 dwellings is assessed against precision criteria defined by CLG analysts. A summary conclusion for each of the six measures is given and, while no entirely compelling case is made for any particular sample size against any other, there does appear to be a recurring finding that reducing the physical sample size below 6,000

dwellings would lead to more estimates failing to meet the stated precision criteria.

- A.28 That said, there is already some concern on using two-year data sets for the physical survey estimates. It is less simple to quantify the impact this has through smoothing out patterns in the data and making estimates less timely, but it should be noted that this is an existing concern.
- A.29 The analysis for the household estimates looks at patterns of change that would be found to be significant under different sample sizes. The case for any particular sample size over any other is less compelling still, although there are measures where some significant comparisons are lost below a sample size of 16,000 households.

2b. Stock-related measures

- A.30 These estimates use information from the physical survey relating to the energy efficiency and condition of the dwelling stock.
- A.31 The current annual target sample sizes for physical surveys by tenure group are as follows:

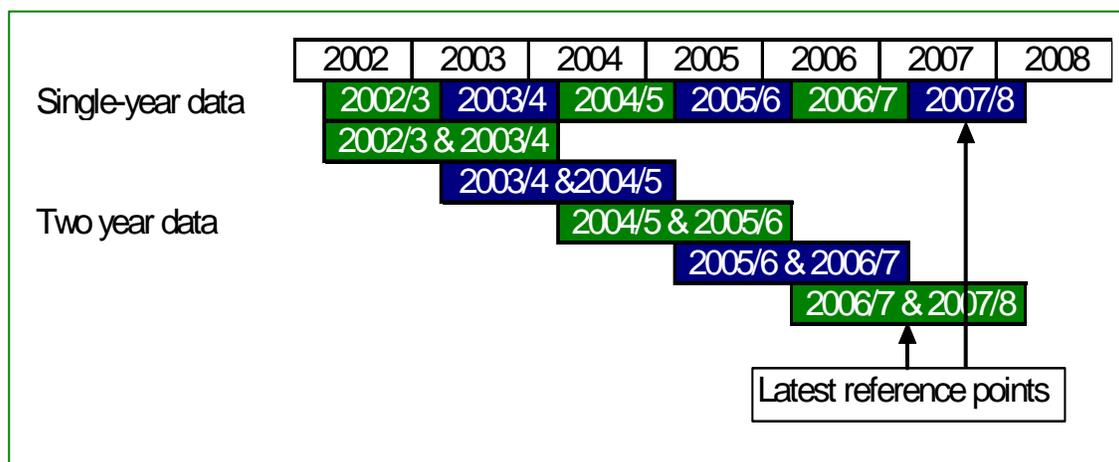
Table A4: Current Physical Survey Target Sample Sizes		
Tenure Group	Physical Surveys target	Achieved 2008/09
owner occupied	4,000	4,079
private rented	1,000	1,353
social rented	3,000	2,491
<i>Of which:</i>		
local authority rented	2,000	1,134
housing association rented	1,000	1,357
All tenures	8,000	7,972

- A.32 To reduce the sampling error of survey estimates for this analysis, the data are currently aggregated over two years, as illustrated in the following diagram. The reference point for a single year data set is the end of September for that financial year but for a two-year data set the reference point is the beginning of April of the middle year. Hence, when the data for 2007/8 became available, single-year estimates could be made centred on end-September 2007, but two-year estimates were

centred on six months earlier in April 2007. Thus, although the estimates based on two years are more precise, they are less timely.

- A.33 In addition to the extra time lag introduced from using two-year data sets, the resulting estimates are also less specific. Rapid year-on-year change is smoothed out by using two year data sets. For example if, for some population parameter, 2006/7 is an exceptionally high year then the impact of this is averaged with 2005/6 in one data set and with 2007/8 in another. This is particularly evident around a turning point where the highest or lowest annual value at the turning point is included with the years either side and the peak or trough smoothed out.

Figure A1: Single and two-year data sets



- A.34 Because estimates are based on two-year data sets, the standard error of estimates of change between years is typically of a different size depending on whether the years being compared are consecutive and therefore share common data, or non-consecutive. For consecutive years, the impact of the common data cancels and the random variation in their year-on-year change is due to the variation in non-shared years. This means that the sampling error associated with consecutive-year change is lower than with non-consecutive years. However, where a measure is showing a consistent trend, the size of the change being statistically tested is larger with data sets that are further apart and so even with the larger standard error of change, the difference may be significant.
- A.35 One reaction to a reduction in sample size would be to accumulate data over more years. This would make the estimates still less timely, so for a four-year data set the reference point at the middle of the combined dataset is a year further back than for the two year data set. Rapid changes, such as around a turning point are further smoothed out. Also,

calculating sampling errors around change becomes yet more complex as two four-year aggregated data sets will share one, two or three common years in the overlap depending on the gap between the years.

- A.36 The standard error estimates shown in the following make some simplifying assumptions. In particular, they assume a design factor of one. The actual design factor for the EHCS was substantially larger than one, because of the multi-stage sample, but the EHS design has a single stage sample and we are here considering options for that current design. The standard errors for the *all tenures* estimates include an allowance for the differential sub-sampling but no allowance is made for the impact of surveyor variance.
- A.37 The key customer for these estimates has provided some precision criteria against which to judge the impact of sample cuts. In practice the quality of the estimates reduces smoothly as the sample size is reduced, so an estimate not quite achieving a criterion is nearly as good as one that just achieves it, but it is useful in assessing the impact to have absolute target criteria.³

Measure: proportion of energy inefficient homes

- A.38 This key measure estimates the proportion of energy inefficient homes which are those rated in bands F and G, by tenure group, with the social-rented tenures grouped together.
- A.39 Estimates for three recent two-year periods are presented in the following table.

³ In our assessment of statistical significance of change, we are assuming that a two-sided t-test is used. In some cases it might be argued that the underlying change can only conceivably be in one direction and any observed change in the opposite direction must be from random variation alone. Such an assumption would lead to using a one-sided test but we have not done so here.

Table A5: Energy inefficient homes (bands F&G), combined years						
	2002/3 & 2003/4	2005/6 & 2006/7	2006/7 & 2007/8	Mean annual absolute change	Standard error of year-on-year change	
	%	%	%	%	non- consecutive	consecutive
owner occupied	28.0	24.4	21.3	1.7	0.7	0.5
private rented	31.1	27.5	24.3	1.7	1.3	0.9
social rented	12.3	7.5	7.5	1.2	0.5	0.3
all tenures	25.3	21.7	19.2	1.5	0.6	0.4

Note: Bands F and G refer to the lowest two Energy Performance Certificate rating bands.

- A.40 The observed proportion of energy inefficient homes has decreased over the years shown. The table includes the mean annual absolute year-on-year change for each tenure group, although in this case every year-on-year change in the two-year estimates has been a fall averaging 1.5 percentage points per year.
- A.41 The data users for these estimates have specified a precision requirement that an observed change of one percentage point should be regarded as significant. The 95 per cent confidence interval around any such change estimate is 1.96 times (i.e. about twice) the standard error shown. Therefore, under the sample sizes achieved for these years, the precision criterion is met for the overall population and for the owner occupied and social rented tenure groups for consecutive years only. (Note that for the same groups the criterion is close to being met for non-consecutive years.)
- A.42 If the targets for the physical survey sample size were reduced, with tenure-specific targets reduced in proportion, then the standard errors of change in the two-year estimates would increase as shown in the following table.

Table A6: Energy inefficient homes (bands F&G), precision with reduced sample

	Mean annual absolute change %	Standard error of year-on-year change							
		non-consecutive years				consecutive years			
		7k	6k	5k	4k	7k	6k	5k	4k
owner occupied	1.7	0.7	0.8	0.9	1.0	0.5	0.5	0.6	0.7
private rented	1.7	1.5	1.6	1.8	2.0	1.0	1.1	1.2	1.4
social rented	1.2	0.6	0.6	0.7	0.8	0.4	0.4	0.4	0.5
all tenures	1.5	0.6	0.7	0.7	0.8	0.4	0.5	0.5	0.6

Note: Bands F and G refer to the lowest two Energy Performance Certificate rating bands.

A.43 With the reduced sample sizes shown the estimate for the owner-occupied sector no longer meets the precision criterion. This is also the case with the all tenures estimate for the smaller sample sizes shown.

Summary conclusion:

With any cut the precision criterion is no longer met for the owner-occupied estimate and for sample sizes less than 6k is no longer met for the all tenures estimate.

Measure: proportion of stock with condensing boilers

A.44 This key measure estimates the proportion of the housing stock that has a condensing boiler fitted, for the whole stock and for tenure groups, with the social rented sector grouped together.

A.45 Estimates for three recent two-year periods under the current tenure targets are presented in the following table.

Table A7: Presence of condensing boilers						
	2002/3 & 2003/4	2005/6 & 2006/7	2006/7 & 2007/8	Mean annual absolute change	Standard error of year-on- year change	
	%	%	%	%	non- consecutive	consecutive
owner occupied	3.0	8.2	11.6	2.1	0.4	0.4
private rented	2.3	6.0	9.1	1.7	0.7	0.6
social rented	2.7	8.4	12.5	2.4	0.5	0.4
all tenures	2.9	8.0	11.4	2.1	0.4	0.3

- A.46 This measure has shown a consistent upward trend in the two-year averages.
- A.47 The data users have specified a precision requirement of regarding a one percentage point change as significant at the 95 per cent level. Using the same test as for the previous measure, this requirement is met for the overall stock estimate and separately for the owner-occupied and social-rented tenure groups. For the private rented group, the confidence intervals of change are a somewhat larger than the required one percentage point.
- A.48 Again, if the targets for the physical survey sample size were reduced, with tenure-specific targets reduced in proportion, then the standard errors of change would all increase as shown in this table:

Table A8: Presence of condensing boilers, precision with reduced sample sizes

	Mean annual absolute change %	Standard error of year-on-year change							
		non-consecutive years				consecutive years			
		7k	6k	5k	4k	7k	6k	5k	4k
owner occupied	2.1	0.4	0.5	0.5	0.6	0.3	0.4	0.4	0.5
private rented	1.7	0.8	0.8	0.9	1.0	0.7	0.7	0.8	0.9
social rented	2.4	0.5	0.5	0.6	0.7	0.4	0.5	0.5	0.6
all tenures	2.1	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3

A.49 The original precision criterion of regarding an observed one percentage point change as significant is still met for the stock as a whole for both consecutive and non-consecutive years. For the owner-occupied tenure, the criterion is met for comparisons of consecutive years, but not for the private-rented sector and only where the sample remains larger for the social-rented sector. For non-consecutive years, only the owner-occupied comparisons meet the criterion and then only for the 7k and 6k sample options.

Summary conclusion:

With any cut the criterion is no longer met for the social-rented, non-consecutive years and there is further change as the sample drops below 6k.

Measure: average energy efficiency (SAP) rating

A.50 The energy efficiency Standard Assessment Procedure (SAP) rates properties on a log scale of 1 to 100 where 1 is very inefficient (very high cost to heat home) and 100 very efficient (virtually zero costs to heat home). The average SAP rating is estimated for the whole stock and separately by tenures, with the social rented tenure grouped together.

A.51 The following table shows estimates for three recent two-year periods.

Table A9: Average SAP rating						
	2002/3 & 2003/4	2005/6 & 2006/7	2006/7 & 2007/8	Mean annual absolute change	Standard error of year- on-year change	
	Mean SAP	Mean SAP	Mean SAP		non- consecutive	consecutive
owner occupied	45.0	46.9	48.1	0.8	0.2	0.2
private rented	44.4	46.6	48.1	0.9	0.5	0.4
social rented	53.9	57.4	57.8	1.0	0.3	0.2
all tenures	46.6	48.7	49.8	0.8	0.2	0.1

A.52 The precision target here is that an observed improvement in SAP rating of 0.5 points or better is regarded as significant. This criterion, which equates to a standard error of change of 0.25 points, is currently met for the whole stock estimate, for the owner-occupied subgroup and the social rented, but only when comparing consecutive years.

A.53 Again, if the sample were to be reduced then these standard errors would be expected to increase as shown in this table.

Table A10: Average SAP rating, precision with reduced sample

	Mean annual absolute change %	Standard error of year-on-year change							
		non-consecutive years				consecutive years			
		7k	6k	5k	4k	7k	6k	5k	4k
owner occupied	0.8	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2
private rented	0.9	0.6	0.6	0.7	0.8	0.4	0.4	0.5	0.5
social rented	1.0	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.2
all tenures	0.8	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2

- A.54 For non-consecutive year-on-year comparisons, the owner occupied estimates no longer meet the criterion for samples of 6k and below and the same for the whole stock for sizes shown below 6k. For consecutive year comparisons the same pattern is retained.

Summary conclusion:

As the sample drops to 6k the criterion is no longer met for the owner-occupied estimates, non-consecutive years, and for samples shown below 6k, the criterion is no longer met for the whole stock, non-consecutive years.

Measure: Non-decent homes by ethnic group

- A.55 The key estimate of the proportion of homes that are non-decent is measured for the whole population of households and separately according to ethnic group.

A.56 The following table shows this measure for two recent years. The table also shows the standard error of change for consecutive years. Since only two consecutive years are currently available, we have not included the standard error of change for non-consecutive years, but this would be approximately forty per cent larger.

Table A11: Non-decent homes by ethnicity of HRP				
	2005/6 & 2006/7	2006/7 & 2007/8	Observed annual change	Std Err of change
	%	%		
White	34.2	33.9	-0.3	0.4
Black	37.8	37.7	-0.1	2.1
Asian	33.4	32.7	-0.7	1.9
Other	37.7	38.3	0.6	2.5
All households	34.3	34.1	-0.2	0.4

A.57 The stated precision criterion is for an observed change of two percentage points to be regarded as significant. In practice this criterion is currently met only for all households taken together and the white ethnic group.

Table A12: Non-decent homes, by ethnicity of HRP, precision with reduced sample					
	Observed annual change	Std Err of change, consecutive years			
		7k	6k	5k	4k
White	-0.3	0.4	0.5	0.5	0.6
Black	-0.1	2.2	2.7	2.7	2.9
Asian	-0.7	2.1	2.5	2.5	2.7
Other	0.6	2.7	3.2	3.2	3.6
All households	-0.2	0.4	0.5	0.5	0.5

A.58 As might easily be predicted from the earlier table, the precision criterion continues to be met for the whole sample and for the white ethnic group as the sample size is reduced, and for the other ethnic groups is not met.

Summary conclusion:

No change in the pattern of whether the precision criterion is met under reduced sample sizes.

Measure: decent homes and private sector vulnerable households

A.59 The proportion of private sector vulnerable households that are occupying decent homes is monitored by the survey, for all such households and separately for those in the owner-occupied and private rented tenures. The following table shows this for two recent years:

Table A13: Private sector vulnerable households

	2005/06 & 2006/07	2006/07 & 2007/08	Observed annual change	Std Err of change
	%	%		
owner occupied	63.2	64.9	1.7	1.4
private rented	45.3	48.2	2.9	1.9
all private	59.1	61.0	2.0	1.5

A.60 The precision criterion stated for these change estimates is that a one-percentage point change should be regarded as significant. From the above table we can see that this criteria is not (nearly) met under the current sample size. For this reason we have not explored this further for potential reduced sample sizes.

Summary conclusion:

As the criterion is not nearly met by the current sample, we see no change in the pattern as the sample reduces.

Measure: very poor loft insulation

A.61 The proportion of homes with very poor loft insulation is measured by the survey, for all homes and broken down by the usual three tenure groups.

Table A14: Very poor loft insulation (none, or less than 50mm)

	2002/03 & 2003/04	2005/06 & 2006/07	2006/07 & 2007/08	Mean annual absolute change	Standard error of year- on-year change	
	%	%	%		non- consecutive	consecutive
owner occupied	8.1	7.2	6.2	0.6	0.4	0.3
private rented	10.5	8.9	8.9	0.4	0.9	0.6
social	3.0	2.8	2.8	0.3	0.3	0.2
All tenures	7.4	6.6	5.9	0.4	0.4	0.2

- A.62 Rather than state an absolute precision requirement here, the users have stated the requirement to be able to measure this for as long as possible with an increasingly residual number of poorly insulated properties.
- A.63 One way to investigate this is to look at the current design's ability to regard current levels of change as being significant. To do this, we have looked at the mean annual absolute change and compared that with the standard error of year-on-year change. Where the ratio of these exceeds 1.96, such observed change would be regarded as significant. As indicated by the shading in the above table, this interpretation of the precision criterion is met only for the owner-occupied estimates where the greatest change has been observed, but only when looking at consecutive years, and neither for the two rented tenures nor the whole stock estimate. As the proportion with poor insulation continues to fall, we might expect the observed year-on-year differences also to fall. However, the absolute standard errors of each estimate and therefore of the change will also fall.
- A.64 As with most of the earlier estimates, we have predicted the standard errors of change we would expect to see with a variety of reduced sample sizes in the following table.

Table A15: Very poor loft insulation, precision with reduced sample sizes

	Mean annual absolute change	Standard error of year-on-year change							
		Non-consecutive years				Consecutive years			
		7k	6k	5k	4k	7k	6k	5k	4k
owner occupied	0.6	0.4	0.5	0.5	0.6	0.3	0.3	0.4	0.4
private rented	0.4	1.0	1.1	1.2	1.3	0.7	0.7	0.8	0.9
social	0.3	0.3	0.4	0.4	0.4	0.2	0.2	0.2	0.3
all tenures	0.4	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.3

A.65 Here the shading reflects the same criterion as above, with the cell shaded if the ratio of the mean annual absolute observed change divided by the standard error is less than 1.96. We can see that because the criterion we have set is currently only just met for the one tenure group then any change leads to none of the estimates meeting this criterion.

Summary conclusion:

The challenging target of regarding typical year-on-year change as significant is only just met for one tenure group under the current design and therefore not met with any cut.

2c. Household-related measures

A.66 These measures are based on the larger household survey sample size, and are estimated using data from a single survey year, from the SEH up to 2007/08 and from the EHS for 2008/09. In what follows, we look at the way the standard error of the latest year's estimates would increase as the sample size changes from the current achieved sample size of approximately 18,000 households down to 12,000 households in steps of 2,000.

A.67 In the case below we have looked at the history of the series and flagged which of the earlier points would be considered as being significantly different from the latest point, using the actual sample size for 2007/8 and a range of reduced sample sizes. The significance is assessed at the 95

per cent level (**: highly significant) and at the 90 per cent level (*: significant)⁴. A design factor has been applied to those estimates from the SEH to approximate the effect of the multi-stage design, but not for the EHS-based estimate based on a single-stage design. (This is in contrast to the earlier analysis of stock-based measures where an ongoing single-stage design is assumed.)

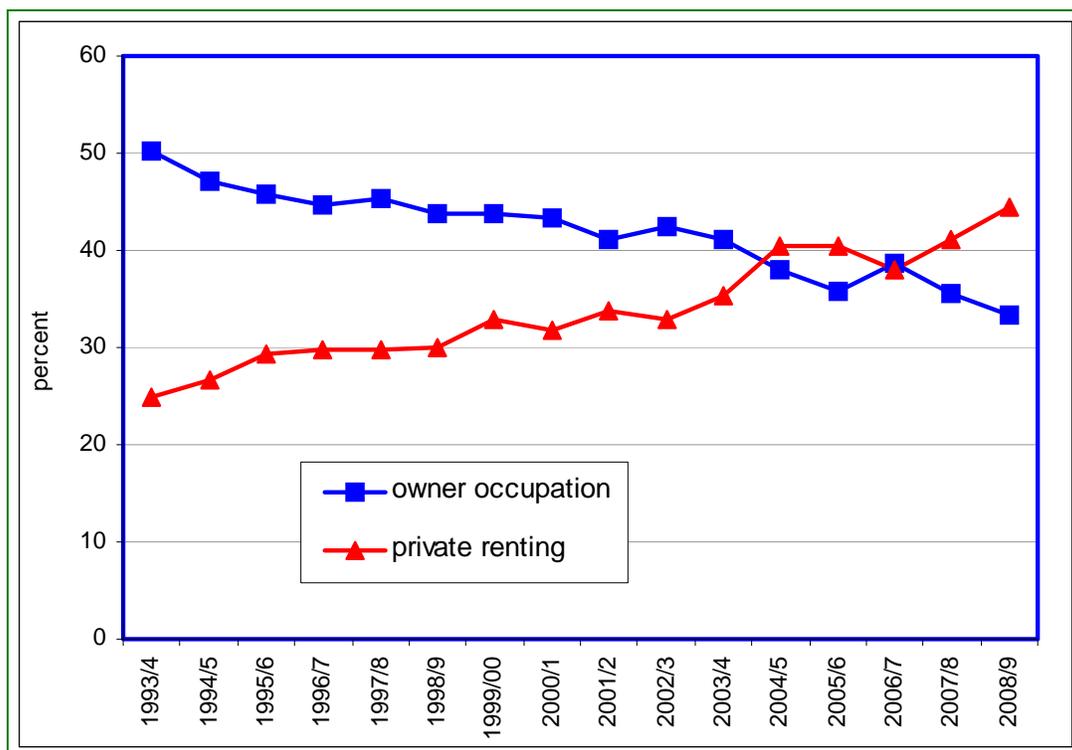
- A.68 It should be stressed that we are *not* saying that with a different sample under a reduced sample size we would have observed the same value in the latest year but that if we did then this would be the outcome of our statistical test.
- A.69 It should also be noted that in practice the annual presentation and commentary on these estimates is not confined to those changes found to be (highly) significant.
- A.70 This analysis is intended to give a feeling for where the observed patterns in the time series reflect underlying change that is found to be significant and how the strength of those findings would likely change under a reduced sample. In effect we are trying to explore how long patterns in the data take to emerge.

Measure: tenure of ‘young’ households

- A.71 This measure looks at the distribution over tenures of those households where the household reference person is aged under 30. The measure is calculated as a proportion of all such households, adding to 100 per cent across the three tenures but the main focus is on the owner occupied and private renting tenures where it is used to look at problems of affordability. In 2008/09, the base for the tenure proportions was 1,568 households and this base has generally reduced over the years considered as this group has fallen in the population.
- A.72 The recent trend in these proportions is shown in the following chart which shows how the proportions of these younger households in owner occupation and privately renting converged between 1993/4 and 2004/5 and then crossed so that the proportion of these younger households renting now exceed those in owner occupation. In testing individual year-on-year changes, only one change in the owner-occupied proportion is regarded as highly significant and one as significant. For the privately rented proportion, three of the year-on-year changes are highly significant.

⁴ Note that this *highly significant* and *significant* terminology is often, and perhaps more usually, used to indicate significance at the 99 per cent and 95 per cent levels respectively but we have used the lower levels to try to pick out the patterns better.

Figure A2: Trend in tenure occupied by households headed by Household Reference Person (HRP) aged < 30



A.73 The following table illustrates the impact of a potential reduced sample in the latest year. For illustration we take the latest year 2008/09 and reduce the sample in stages from 18k down to 12k. The standard errors of the latest estimates would increase as steadily as shown, from 1.2 to 1.8 per cent for the proportion in owner-occupation and from 1.3 to 1.6 per cent for the proportion privately renting.

A.74 Comparing the latest estimate for owner occupation with previous years, change over estimates up to 2004/05 is statistically significant at the 95 per cent level and the recent change over the last year but one 2006/07 is also highly significant. We predict that reducing the sample size as shown would not affect these findings.

A.75 For the privately renting proportion, we see that change over all years up to 2006/07 is regarded as highly significant and change over the 2007/08 is significant at the 90 per cent level. These findings hold with the

reduced sample, with the exception of the significance of the latest change which is lost with the smallest sample shown.

Table A16: Tenure where Household Reference Person (HRP) <30, significance of comparisons with earlier years under different sample options

Year	% who are owner occupiers	Se (%)	Sample options				% who are private rented	se (%)	Sample options			
			18k	16k	14k	12k			18k	16k	14k	12k
1993/4	50.3	1.1	**	**	**	**	24.8	0.9	**	**	**	**
1994/5	47.1	1.1	**	**	**	**	26.8	0.9	**	**	**	**
1995/6	45.7	1.1	**	**	**	**	29.4	1.0	**	**	**	**
1996/7	44.7	1.1	**	**	**	**	29.8	1.0	**	**	**	**
1997/8	45.4	1.1	**	**	**	**	29.7	1.0	**	**	**	**
1998/9	43.7	1.1	**	**	**	**	29.9	1.0	**	**	**	**
1999/00	43.7	1.2	**	**	**	**	32.9	1.1	**	**	**	**
2000/1	43.4	1.2	**	**	**	**	31.7	1.1	**	**	**	**
2001/2	41.2	1.2	**	**	**	**	33.9	1.1	**	**	**	**
2002/3	42.5	1.2	**	**	**	**	32.9	1.1	**	**	**	**
2003/4	41.1	1.3	**	**	**	**	35.4	1.2	**	**	**	**
2004/5	38.1	1.3	**	**	**	**	40.5	1.3	**	**	**	*
2005/6	35.9	1.3					40.5	1.3	**	**	**	*
2006/7	38.6	1.3	**	**	**	**	38.0	1.3	**	**	**	**
2007/8	35.6	1.4					41.0	1.4	*	*	*	
2008/9	33.4	1.2	1.2	1.3	1.4	1.5	44.4	1.3	1.3	1.4	1.5	1.6

Summary conclusion:

For this measure where both the proportions estimated have shown a strong and fairly consistent change over time, the existing sample identifies this change after around two years. We would expect the same finding under a reduced sample size.