Llywodraeth Cymru
Welsh Government

Section 2 - Consultation stage Economic Impact Assessment

Building Regulations Update - Approved Documents A, B & C 2016

September 2016

Building Regulations Part A, B, C review impact assessment

Economic Impact Assessment

1.0 Development of these proposals

1.1 Consultants working for the Welsh Government have developed proposed technical updates to Approved Documents A, B and C in Wales. The proposals do not involve policy change, but are based on updating of references to technical standards that were undertaken by the Department for Communities and Local Government (DCLG) for England in 2013. The views of the Building Regulations Advisory Committee for Wales (BRACW) have been sought in developing these proposals.

1.2 The Building Regulations

1.21 The Building Regulations 2010 control certain building work - principally to protect the health, safety and welfare of people in or around buildings. The Regulations themselves are expressed in "functional" terms and do not dictate how the desired level of performance must be achieved. However, for the benefit of both industry and building control bodies, advice on how the requirements of the Building Regulations may be met are contained in guidance approved by Welsh Ministers, known as Approved Documents. These cover some of the more common building situations, but there may well be alternative ways of achieving compliance with the provisions. However, if followed, the guidance in Approved Documents may be relied upon in any proceedings as tending to indicate compliance with the Building Regulations.

1.3 Main issues covered in this consultation paper

Part A (Structure)

1.31 The main changes proposed in Chapter 2 are replacement of the currently referenced standards in Approved Document A with the updated British Standards based on Eurocodes. Other more minor and generally related amendments are proposed, for example, in relation to disproportionate collapse and wind maps.

Part B (Fire safety)

1.32 Chapter 3 sets out two proposals intended to resolve practical problems in the application of Requirement B2 (Internal fire spread (linings)). Firstly, it is proposed to make a technical amendment to ensure wall coverings are not inadvertently and unnecessarily disadvantaged because of how certain wall coverings are assessed under the European classification system for fire performance. Secondly, to amend the existing guidance in relation to lighting diffusers which is now believed to be unnecessarily onerous.

Part C (Site preparation and resistance to contaminants and moisture)

1.33 The main element of the proposals in Chapter 4 is an amendment to align the Approved Document C guidance with the most up-to-date radon maps, in effect, ensuring that the current safety provisions are targeted at the appropriate parts of the country. Other minor amendments to the Approved Document proposed include updating a number of referenced standards

2.0 Part A

Introduction

2.1 In December 2012 the Department for Communities and Local Government (DCLG) published an impact assessment to accompany changes to the structural engineering standards referenced by Parts A (& C) in England. The changes updated references to withdrawn British Standards so that the documents now refer to British Standards based on a Pan-EU harmonised approach to structural design, or Eurocodes. This consultation proposes to introduce the same changes for Wales.

2.2 The DCLG impact assessment estimated that the changes would result in a net present cost to industry of £50.5m over the 10 year evaluation period. Engineering firms which make the change from British Standards to the Eurocodes are assumed to incur direct costs such as membership of publication depositories, and transitional costs such as training and associated loss of productivity.

2.3 Adoption of structural design standards based upon Eurocodes was found to have a largely cost neutral impact upon the direct costs of construction. This was calculated by comparing design methods using notional building types. When designed using the Eurocodes instead of British standards, modest savings realised for smaller buildings are offset by marginal increases in costs for larger buildings.

2.4 The DCLG impact assessment also identified some benefits to industry which would be realised through increased by the standardisation of structural design standards. However, these have not been included in this analysis as they are difficult to quantify. Furthermore, the functional nature of Building Regulations mean that designers can continue to reference withdrawn standards, even if the Approved Statutory guidance references the most up to date British Standards based upon Eurocodes. However, in practice, many in industry simply adopt the approach referenced in the guidance which thereby becomes the industry norm. It is for that reason that Impact Assessments on the Building Regulations provide costs and benefits based on the approaches set out in the Approved Documents.

2.5 This impact assessment closely follows the same rationale that was used by DCLG when they calculated the transitional costs for England in 2012. Adjustments have been made to any inputs which have been subject to change since 2012, such as membership costs and average salaries. The assessment will also attempt to take into account the cross-border impact of England's 2012 changes.

2.6 Based on ONS data[1] Welsh construction outputs (5 year average) are approximately 4% of those for England.

[1] http://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputintheconstructionindustry
Table 6 and 13

The options considered

2.7 Two options are considered in detail in this Impact Assessment:

i. Option 0 - do nothing.
ii. Option 1 - update references to the newer British Standards based on Eurocodes, with measures to ease transitional burdens.

2.8 There are significant adverse impacts of a 'do nothing' approach which have led to Option 1 being selected:

- given the currently-referenced Standards will not be maintained, there is an ever-increasing risk that, as industry practice and construction techniques continue to progress, they become increasingly out-of-date and potentially less safe, and
- there is a significant risk of successful legal challenge if we do not reference the British Standards based on Eurocodes as Government would be seen as perpetuating a barrier to trade.

2.9 Option 1 will help to avoid the adverse impacts set out under the "do nothing" option above. However, in addition there are a number of consequential benefits that accrue, principally, in relation to delivering the benefits sought through the introduction of Eurocodes. In particular, Eurocodes have been designed with the following beneficial aims in mind:

- to provide a common approach for the design of buildings and other civil engineering works leading to enhanced competition at a European level
- to boost business in the sector by removing technical barriers to trade within Europe
- to foster improvements in quality and innovation, and
- to create job opportunities in the sector.

2.10 It is recognised, however, that updating references will impose some additional, one-off costs on industry – principally to engineering firms that feel compelled by the change to move their design approach to one based on Eurocode-based British Standards. We believe that the current, highly competitive nature of the construction industry and the fact that design fees are often determined as a percentage of the project cost means that any additional costs will be borne (and not passed-on to clients) by the structural design firms.

2.11 Conversely, in the longer-term, it is likely that these businesses may benefit from the development of the more up-to-date British Standards both because of the potential for greater European and global trade and also because the Standards are better attuned to more modern construction techniques (which, in turn, are often driven by efficiencies).

2.12 To ease the potential burden on business, we aim to mitigate the impact in two main ways:

- Changes to Approved Document A will come into force in early 2017, but to allow firms time to make that transition over a longer period, guidance will be provided to make clear we would expect that the withdrawn Standards should be viewed as also demonstrating compliance with the Building Regulations until at least 2018; and

- The guidance will also provide assurance that, for certain firms, it may be unnecessary to move to the new British Standards even beyond that date if, in their professional judgment, the previous British Standards remain satisfactory for the types of work their businesses are responsible for. We intend to clarify that building control bodies should accept such an approach where a designer is able to demonstrate it is appropriate for the particular structure proposed. Such an approach is likely to be more appropriate for smaller-scale and lower-risk work, and where engineers have appropriate skills and competencies.

2.13 The DCLG consultation noted that the updating to Eurocodes has been done in such a way as to minimise the cost to business, that is, there is no "gold-plating" involved with the implementation of this policy and efforts have been made to minimise the associated impact.

2.14 More information on the costs and benefits is contained below.

Response to England's 2012 Consultation

2.15 Respondents to DCLG's 2012 consultation on the subject of updating the British Standards were largely supportive of the changes, with 80% agreeing that the British standards referenced within the Approved Documents should be updated to reference British Standards based on Eurocodes. A minority felt that British Standards were still fit for purpose, and hence did not require updating.

2.16 There was, however, an across the board call to allow industry a practical transitional period of about five years to adjust to the changes in the Approved Documents.

Additional Research Conducted by Welsh Government

2.17 To further support the development of the evidence base for this proposal, the Welsh Government (with the assistance of the Wales branch of the Institution of Structural Engineers (IStructE)) conducted a brief survey of structural engineers working in Wales. Respondents provided information about which design method they tended to use, their preferred method of design and whether or not they had access to the Eurocodes. The survey also provided information on the size of the firms in question.

2.18 The survey received 83 responses. Of the 83 respondents, 49 different firms were represented. The survey found that 92% of respondents from engineering firms had access to the Eurocodes (and associated guidance). All of the 8% of firms who did not have access to the Eurocodes employed 2 persons or less. 61% of firms who responded stated that their personal preference was to use British Standards.

2.19 Respondents were also asked to provide comments on their preferred design method and the issue of accessing the Eurocodes. A list of the most common complaints is given below:

- Eurocodes are too expensive to access (8 comments);
- The use of Eurocodes on a given project is primarily driven by client preference (6 comments);
- British Standards continue to be used for structural design work on existing buildings (6 comments); and
- British Standards are a more 'user friendly' method (5 comments)

It is clear from the survey that, while the industry prefers to use the now withdrawn British Standards, the vast majority have access to Eurocodes. However, the costs associated with accessing Eurocodes is a clear concern for the industry.

Costs and Benefits

2.20 In developing this consultation document and Impact Assessment, the Welsh Government has drawn upon work previously undertaken by the Department of Communities and Local Government for England. That work in itself draws upon earlier work carried out in 2004 by the Institution of Structural Engineers (IStructE) for the then Office of the Deputy Prime Minister (ODPM), and also by the Scottish Government in 2010. The costs and benefits detailed below are all based originally on 2014 prices but have been updated to 2016 prices.

Option 0 – Do Nothing

2.21 Understanding the counterfactual is important for any consideration of policy. For the changes considered in this Impact Assessment, the previous work undertaken by DCLG for England on the take-up of Eurocodes so far provides a useful basis for not only establishing the current state of the market, but also making some estimates about future take-up if the Welsh Government was to do nothing.

Costs – Option 0 – Do Nothing

2.22 There are no additional direct costs associated with Option 0, as it would essentially maintain the status quo. However, DCLG's Impact Assessment identified a number of indirect costs associated with a failure to update the Approved Documents to include references to the European harmonised standards. There are, however, a number of indirect costs such as:

2.23 The costs associated with the risk of buildings being less structurally sound in the future; and potential associated consequences on a client's ability to obtain professional indemnity insurance.

2.24 A potential direct cost associated with option 1 would be the risk of infraction and imposition of financial sanctions on Wales from the European Court of Justice. DCLG estimated that the likely level might be significant, with a minimum lump sum of about

€9.666m and a possible substantial daily fine of thousands of pounds for continuing non-compliance.

Benefits – Option 0 – Do Nothing

2.25 There are no additional benefits associated with this option, given that it is the counterfactual.

Preferred Option 1 – Reference British Standards Based on Eurocodes

2.26 There are 2 distinct direct costs associated with updating the Approved Documents to reference British Standards based upon Eurocodes: The ongoing cost to construction, and the one-off transitional costs associated with the change.

Costs – Option 1 – Cost of Construction

2.27 DCLG's assessment analysed the impact on the cost of construction for four different notional building types:

- a two-storey detached house with masonry walls, timber floors and traditional
- timber rafter roof
- a single-storey office block, constructed similarly to the above house
- a seven-storey office building, constructed of reinforced concrete
- a seven-storey office building similar to the concrete building, but now of steel
- and steel-concrete composite construction.

2.28 The modelling suggested that the cost of construction might vary by around -0.3% and 0.4% and that overall the changes would be likely to represent a saving of less than 0.1%. Responses to DCLG's 2012 consultation suggested a lack of consensus with regards to the potential impact upon the cost of construction, with a common comment being that it was too early to say. However, in the absence of any further evidence to contradict the cost modelling, option 1 has been considered to have a cost neutral impact upon the cost of construction.

2.29 It is further noted that because the Building Regulations are functional requirements, designers would be free to use an alternative design method in the event that it delivered significant savings over British Standards based upon Eurocodes.

Costs – Option 1 – Transitional Costs

2.30 There will be one-off transitional costs to firms associated with a shift from British Standards to Eurocodes. The analysis has been split into two sections: the cost to individual firms, and the cost to the construction industry as a whole.

2.31 The analysis started by identifying the potential transitional costs to 2 notional engineering firms: a small 2 person firm; and a large 16 person firm. Two levels of transitional costs (low and high) were identified for each firm type, and the midpoint between these two costs is referred to below.

2.32 Table 1 provides an estimate of the costs to the two different firm types. The types of costs considered are the same as those used by DCLG in their 2013 RIA[2]. The values have been adjusted to reflect changes to average wages and the costs associated with BSi membership.

Table 1

Item	Midpoint transition cost to a 2 person firm (£)	Midpoint transition cost to a 16 person firm (£)
Cost of purchasing Eurocodes	£2,612	£2,683
Cost of buying guidance documents	£340	£340
Cost of updating software	£2,750	£6,625
Attendance at technical seminars (fee)	£620	£1,240
Attendance at technical seminars (lost hours)	£561	£1,123
Familiarisation	£3,929	£31,433
Alteration to in-house specification	£3,982	£3,982
Loss of productivity in first year	£5,987	£47,898
Total (2014/15)	**£20,134**	**£94,429**
updated from 2014/15 to 2016/17	**£20,453**	**£95,923**

2.33 Having established the costs to 2 notional firms of changing to British Standards based on Eurocodes, the English review estimated the potential cost to industry from BSi sales records from 2005-2011. It identified the number of engineering firms who had purchased the previous set of British Standards (4000 firms), and subtracted the number of firms who had purchased the new suite of British Standards based upon Eurocodes (3,000 firms). DCLG then estimated that from 2011-2013, a further 400-500 firms would have purchased the necessary British Standards based on Eurocodes. Using the midpoint of 450, DCLG concluded that, as of October 2013, 550 firms were yet to purchase the new British Standards based upon Eurocodes.

2.34 It should be noted that, in using BSi sales figures, DCLG did not attempt to distinguish between those firms who operated in England, and those who were based either elsewhere in the UK (such as Scotland, where Eurocodes had already been adopted), or firms based outside of the UK who may require the standards for a UK project. It is therefore likely that the October 2013 figure of 550 firms is a very

[2] *Changes to Parts A and C of the Building Regulations - Referencing of British Standards Based on Eurocodes*, Published by DCLG 30 July 2013
https://www.gov.uk/government/publications/referencing-of-british-standards-based-on-eurocodes

conservative estimate, and perhaps should be considered representative of the UK as a whole, rather than just England.

2.35 The DCLG analysis assumed that 300 of the 550 firms would choose not to adopt Eurocodes. As stated previously, the functional nature of Building Regulations would not preclude the use of withdrawn British Standards, even if Approved Document A references British Standards based on Eurocodes. It is argued that engineers are be able to set out to a building control body why the alternative design approach they have taken satisfactorily addresses the safety provisions in the regulations.

2.36 DCLG have therefore provided costs based on the assumption that there are 250 firms who are yet to purchase the necessary Eurocodes.

2.37 For the purposes of this RIA, the Welsh Government has therefore assumed that just over 5% (13 firms) of the 250 firms are those based in Wales. This estimate is based upon Wales' population share compared to the rest of the UK. It can be considered a conservative estimate, as it does not take into account the fact that a large number of structural engineering firms based in Wales will also operate in England, and are therefore likely to have already adopted the Eurocodes. Furthermore, due to the nature of the construction sector, it is likely that there are fewer engineering firms per capita in Wales than there are in England.

2.38 The Welsh Government's structural engineering survey suggested that 93% of firms already had access to Eurocodes, despite them not currently being referenced with the Approved Documents in Wales. This is further evidence to suggest that the estimate of 13 firms is conservative.

2.39 To calculate the cost to industry as a whole, the English review took the two levels of transitional costs to firms, and multiplied them by the estimated number of engineering firms who are yet to adopt the Eurocodes. A 20:80 split between large (16 person) firms and small (2 person) firms was applied based upon ONS data which suggested that 80% of construction firms had 4 or less employees[3].

2.40 The English review also provided a central estimate that 50% of the 3,450 firms who have already purchased Eurocodes will not have purchased the full suite of documents. In their analysis they assumed that 50% of firms who had already purchased some Eurocodes had only incurred 25% of the transitional costs.

2.41 This has been reflected in Table 2 below. The central estimate assumes that 50% of 173 firms in Wales will incur 75% of the total transitional costs. As with other estimates, the transitional costs have been calculated on a 80:20 ratio for small and large firms. The table also includes high and low estimates, based on 75% or 25% of firms in Wales respectively incurring further transitional costs over the next 5 years.

[3] UK Business: Activity, Size and Location, 2012: http://web.ons.gov.uk/ons/data/dataset-finder/-/q/datasetView/Economic/UKBABb?p_auth=AW2rO5fm&p_p_auth=WT6Eyge1&p_p_lifecycle=1&_FOFlow1_WAR_FOFlow1portlet_geoTypeId=2013WARDH&_FOFlow1_WAR_FOFlow1portlet_UUID=0

Table 2

Item / Assumption	Number of Firms	Average Cost per year over 5 years (constant prices)	Total cost over 5 years constant prices
Potential UK Market for the Eurocodes	4000		
Minus 3000 UK firms who have already purchased some Eurocodes	1000		
Minus 450 UK firms who are estimated to have purchased some Eurocodes between 2011 and 2013	550		
Minus 300 UK firms who are expected to continue using British Standards	250		
Assumed that 5% of firms yet to purchase the Eurocodes will be based in Wales	13		
20% (3) firms incurring the costs of a 16 person firm (£99k)	3	£59,214	£296,070
80% (10) firms incurring the costs of a 2 person firm (£21k)	10	£41,562	£207,810
Total Transitional costs to firms that have not yet purchased the Eurocodes		**£100,776**	**£503,880**
Number of firms in Wales who have already purchased some Eurocodes (5% of 3450)	173		
Central estimate of the additional cost to 50% of firms in Wales who have purchased <u>some</u> Eurocodes (assumed that 75% of expenditure is still outstanding)		**£470,444**	**£2,352,219**
High Estimate - Additional cost if 75% of 173 firms in Wales still have 75% of the costs to incur	129	£813,207	£4,066,036
Low Estimate - Additional cost if 25% of 173 firms in Wales still have 75% of the costs to incur	43	£271,069	£1,355,345
Total Cost - Central Estimate (2014/15)		**£571,220**	**£2,856,099**
Updated from 2014/15 to 2016/17		**£580,258**	**£2,901,290**

Other Costs

2.42 It is acknowledged there are potential costs to Building Control as a result of updating the standards. However, it has been assumed that where Building Control bodies needed to appraise structural design calculations, they would generally employ a third party structural engineer who would be included in the cost benefit analysis above.

Benefits – Option 1

2.43 As stated in paragraphs 2.28-2.29, the impact of Option 1 upon construction costs is assumed to be negligible. As a result, there are no assumed benefits to construction costs as a result of Option 1.

2.44 However, it is noted that adoption of a harmonised standard brought with it a wide range of benefits to the construction:

- providing a common design criteria and methods of meeting necessary requirements for mechanical resistance, stability and resistance to fire, including aspects of serviceability, durability and economy
- providing a common understanding and usage regarding the design of structures between owners, operators and users, designers, contractors and manufacturers of construction products
- facilitating the exchange of construction services between Member States
- facilitating the marketing and use of structural components and kits in Member States
- facilitating the marketing and use of materials and constituent products, the properties of which enter into design calculations as a common basis for research and development, in the construction industry
- allowing the preparation of common design aids and software
- increasing the competitiveness of UK and European structural and civil engineering firms, contractors, designers and product manufacturers in their world-wide activities; other countries, some with standards based on existing national standards of EU member states or that perceive Eurocodes will offer a good competitive basis are also interested in adopting Eurocodes, making them even more powerful and accepted worldwide and therefore driving further benefits to UK firms operating internationally.
- provide a common basis for research and development activities in civil engineering and building research
- provide a more uniform level of construction safety in the different European regions

2.45 Evidence in support of the benefits associated with increased standardisation can be found in the DCLG literature review[4] which identified a number of studies which had established a clear connection at macroeconomic level between standardisation, productivity growth and overall economic growth.

[4] *Changes to Parts A and C of the Building Regulations - Referencing of British Standards Based on Eurocodes*, Published by DCLG 30 July 2013 (paragraphs 96-109)
https://www.gov.uk/government/publications/referencing-of-british-standards-based-on-eurocodes

Other Consequential Changes

2.46 In addition to the principal changes to Approved Document A, there are a small number of other changes to both Approved Documents A and also C (Site preparation and resistance to contaminants and moisture) to reflect the updating of the currently referenced standards to ones based on Eurocodes. These consequential changes are:

Approved Document A

- Updating of wind speed map and associated texts for small residential buildings design guidance under A1/2 to reflect Eurocodes loading standards;

and

- Updating of robustness guidance under A3 to reflect Eurocodes disproportionate collapse/robustness standards.

Approved Document C

- Updating of site investigation techniques under Section 1 to reflect Eurocodes geotechnical standards.

2.47 The Welsh Government believes that, as with the main changes set out above, these updates will not result in any net increase in the cost of construction. Also, as these changes affect the same people in industry as the principal changes to Approved Document A, we do not believe there to be any additional transitional costs to those firms. Similarly, the benefits to accrue are as for those non-monetised ones set out above.

Risks and Assumptions

2.48 The assumptions used in arriving at the costs of pursuing Option 1 are set out clearly as part of the explanation as to how costs and benefits have been estimated. The Welsh Government welcomes any comments on the assumptions made. Key assumptions are:

- costs/savings associated with the cost of construction are on the whole neutral;
- the estimates on the individual elements of the cost on firms, largely relate to software, other design aids, productivity and familiarisation costs;
- that large firms would have incurred the costs of moving to Eurocodes voluntarily;
- that the make-up of those firms that will incur additional cost is 80:20 in favour of the smallest firms;
- a small proportion of firms in Wales will not move over to Eurocodes by 2015 ((5 years after the withdrawal of British Standards), or at all; and
- that approximately a half of firms in Wales that will have purchased Eurocodes have yet to incur 75% of their costs.

3.0 Part B

Introduction

3.1 This consultation proposes amendments to Approved document B in relation to guidance associated with lighting diffusers and wall coverings[5].

3.2 This consultation proposes the same changes as DCLG has made for England. The English impact assessment identified significant benefits - reduced costs to development and manufacturers together with energy and carbon savings. Transitional one off costs related to familiarisation of the changes by engineers and building control professionals.

3.3 DCLG analysis showed a net benefit to industry in England from the proposed change. We expect a similar impact in Wales, and we have therefore undertaken what we consider to be a proportionate assessment of the likely impact.

3.4 Based on ONS data[6] Welsh construction outputs (5 year average) are approximately 4% of those for England.

Background on the Building Regulations

3.5 The Building Regulations control certain building work - principally to protect the health, safety and welfare of people in or around buildings. Part B of Schedule 1 of the regulations relates to fire safety aspects of building design and construction and Approved Document B contains statutory guidance that demonstrates how the provisions can be complied with.

3.6 The regulations themselves are expressed in "functional" terms and do not dictate how the desired level of safety *must* be achieved. However, for the benefit of both industry and building control bodies, advice on how the requirements of the Building Regulations *may* be met are contained in guidance approved by the Secretary of State. This covers some of the more common building situations, but there may well be alternative ways of achieving compliance with the provisions. However, if followed, the guidance may be relied upon in any proceedings as tending to indicate compliance with the Building Regulations.

3.7 Requirement B2 of the Building Regulations restricts the spread of flame and heat release rate of the materials used in lining any partition, wall, ceiling or other internal structure. The guidance in Approved Document B sets reasonable standards by reference to both the European (EN) and British (BS) test and classification systems. The appropriate classification varies in the guidance depending on the location of the wall lining and either system of classification can be used. These design standards

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5 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/39372/121128_-_Part_B_IA_-_to_publish_for_web.pdf

6 http://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputintheconstructionindustry
Table 6 and 13

provide a baseline set of technical performance requirements for fire safety, but are not exclusive of other options being used to show compliance.

The Issues to address

Thermoplastic lighting diffusers

3.8 The existing guidance in Approved Document B covering the application of requirement B2 to lighting diffusers was developed some time ago. Since then lighting technology has changed considerably and requirements for energy efficiency have become more stringent. This review takes forward a solution which would allow more efficient lighting layouts by relaxing the restrictions on use of acrylic lighting diffusers.

Decorative wall coverings

3.9 The existing guidance in Approved Document B covering the application of requirement B2 to wall linings does not clearly differentiate between decorative wall coverings and wall linings that form part of the construction. As a result there is uncertainty as to how decorative coverings should be addressed. This is particularly pertinent at this time as a mandatory requirement to use the European classification system for fire performance which took effect in 2013 has the potential to introduce unintended consequences and increased costs for certain types of wall coverings.

Rationale for intervention

3.10 Building Regulations apply to “building work” (typically the erection or extension of a building) and seek to ensure buildings meet certain minimum health, safety, welfare and sustainability standards. Part B seeks to ensure that a building is safe in the event of a fire. This addresses an important information failure in that assessing fire safety performance after construction is complex and costly to rectify. By specifying fire safety performance standards at the point of build these costs are minimised. Designers, builders and even owners might take too short term a perspective in respect of fire safety and be too optimistic in assessing risk. There are also agency issues in that they also might not face the full costs of fire damage if the building is occupied by tenants who face the health and safety risk, cost of fire service provision are borne by the public sector or they are able to obtain insurance against such an incident.

3.11 As the legislative provision is “functional”, statutory guidance contained in the Approved Documents sets some of the ways, for the more common buildings, of ensuring basic minimum health, safety and welfare standards are achieved when constructing buildings. This provides certainty for building control bodies and industry alike as it sets out what is sufficient (whilst providing flexibility to provide alternative building approaches where beneficial). Importantly, it also ensures that a proper cost/benefit assessment and consultation with industry has been undertaken by Government to assess what reasonable minimum standards are appropriate (and avoids the risk of unnecessarily onerous and costly standards being imposed on business).

3.12 The proposed changes in respect of Part B are sought to address two industry concerns:

Thermoplastic lighting diffusers

3.13 The Lighting Industry Federation previously submitted a request to DCLG seeking clarification of the provisions in Approved Document B that affect the specification of thermoplastic lighting diffusers.

3.14 Supporting evidence in the form of a research report by BRE global supported the technical case for allowing greater use of acrylic materials, which indicated that a layout allowing acrylic material would deliver fire safety 'equivalent to or better than' the current approach[7].

Decorative wall coverings

3.15 As it stands the guidance does not clearly differentiate between decorative wall coverings and wall linings. As a result there is uncertainty as to how decorative wall coverings should be addressed.

3.16 The guidance in Approved Document B sets reasonable standards by reference to both the European (EN) and British (BS) test and classification systems. The appropriate classification varies in the guidance depending on the location of the wall lining and either system of classification can be used.

3.17 However the main provisions of the EU Construction Products Regulation (305/2011) took effect from 1 July 2013 in the UK. From this date, manufacturers of wall coverings have to test and label their products in accordance with harmonised European standards and classification systems before they place them on the market. The primary objective of this is to establish a "common language" for specifying the essential characteristics of construction products rather than to restrict the use of any particular products.

3.18 The Guidance in Approved Document B for Wales currently calls for wall linings in the corridors and other circulation spaces of non domestic buildings to be rated as either "Class O" under the British Standard classification system or "Class B" under the European system.

3.19 At present most decorative wall coverings for use in non domestic applications are rated as "Class O" under the British Standard classification system and would be acceptable for use in corridors and other circulation spaces. However, evidence suggests that the same product would tend to be rated as "Class C" or even "Class D" under the European classification system and, under the current guidance in Approved Document B, would not be permitted in those locations. This is a problem peculiar to thin wall coverings such as wall papers and does not manifest itself for other lining products subject to the same guidance.

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[7] 2 http://www.planningportal.gov.uk/uploads/br/BREG_Report_127687.pdf , page 31

3.20 This had not previously been a problem, as use of the European standards and CE marking labelling system has been voluntary in the UK. CE marking of these products is now mandatory making the issues highlighted of more significance. A building control officer *could* choose to accept a product achieving "Class 0" under the British System despite a European classification of "Class C" rather than "Class B", but this would be a matter of discretion. Furthermore, industry had expressed significant and valid concerns that professionals responsible for specifying materials required would tend towards products classified as "Class B" under the European system in order to ensure compliance.

3.21 It should be noted that the amendments proposed are not intended to reduce standards of safety and would not change the need to CE mark products in accordance with the Construction Products Regulation. However it is possible to mitigate some of the unintended consequences of imposing the European classification system by amending our own national provisions.

Additional research undertaken in England informing final proposals

3.22 Research commissioned by the British Coatings Federation, the Association of Interior Specialists and the British Contractor Furnishers Association and conducted by Exova Warrington Fire examined the performance of eight commercial grade decorative wall covering systems. Of the eight products analysed six were classified "Class 0" and two "Class 2" according to the British test system. The two graded "Class 2" and four of the others were classified as European Class C whilst two products classified as "Class 0" under the British System were classified as "Class D" according to the European testing methodology. These results suggest overall that a European "Class C" is the closest equivalent to a British "Class 0".

3.23 Requiring a European "Class C" would therefore allow most products currently in common use to continue to be marketed as they are, and would, according to this research, deliver a marginal improvement in fire safety overall. Maintaining the current reference to European Class B would effectively increase provision for fire safety for which a cost-benefit case has not been made.

3.24 Most other European countries would allow European "Class C" for use in corridors and circulation spaces, so the policy approach provides for greater consistency in terms of use and application of products in the single market, alongside a common system of testing and labelling.

Description of options considered

Option 0 – Do nothing

3.25 A 'do nothing' option would lead, in Wales, to continued use of polycarbonate lighting diffusers and the missed opportunity for cost savings by allowing acrylic lighting diffusers whilst maintaining an appropriate degree of fire safety. Do nothing in respect of current requirements on wall coverings would lead to higher costs to development in Wales where specifiers would have to source European 'Class B'

products which are likely to be less available than 'Class C'. The size of the Welsh market may not warrant UK or Welsh manufacturers developing 'Class B' products.

Option 0, do nothing

Costs:

3.26 There are no additional costs for this option since it is the baseline (beyond foregoing the benefits of option 1).

Benefits:

3.27 There are no additional benefits associated with this option.

Preferred Option 1 - Amend the guidance supporting requirement B2

3.28 The proposed policy option is to simplify of the guidance in Approved Document B for Lighting Diffusers and Wall Coverings. The costs and benefits of policy are considered below against a counterfactual 'do-nothing' scenario. The policy will reduce costs for business whilst maintaining an appropriate standard of fire safety.

Monetised and non-monetised costs and benefits of the chosen policy

Costs

3.29 As with any change to Building Regulations Guidance there will be some transitional costs associated with users of the guidance familiarising themselves with the changes. Given the very limited nature of these proposals we do not consider that any additional training would be required and it is most likely that professionals will familiarise themselves with the changes when they come to use it for the first time.

Lighting diffusers

3.30 Transition costs have been estimated as approximately £77,000. This assumes that around 2600 electrical engineers based in Wales will have to spend one hour familiarising themselves with the new guidance, equivalent to around one engineer per electrical firm, and 202 building control professionals operating in Wales will similarly have to spend one hour. In reality some firms will specialise in commercial installations and every staff member will need to become familiar with the new guidance and some firms will avoid such work and might only need to familiarise themselves with the guidance at the point of doing a commercial job. It is also the case that given the changes have already been made in England and some electrical engineering companies based in England will work on Welsh projects and vice-versa. This is also the case for approved inspectors registered in England working for clients with a business interest in England and Wales.

3.31 Estimates of hourly costs are based on annual income survey[8] to which 30% has been added to cover national insurance and pension contributions. This resulted in £27.11 for electrical engineers and £19.37 for building control professionals.

[8] http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashetable14

Wall coverings

3.32 The proposed amendments to the guidance are designed to ensure that those products which are currently used will remain acceptable and therefore there are no transitional costs associated with this proposal. In the counterfactual scenario over the longer term, greater use of European "Class B" products or reduced use of wall coverings altogether could result. However, the English consultation supported the view that any fire safety benefits resulting from increased use of European Class B products would be marginal.

3.33 The BRE report noted that 'fire statistics do not contain sufficient detail to evaluate whether or not any wall coverings specifically contributed to fires'. The report also suggested that fires originating in circulation spaces were uncommon (<10%) and that the proportion of fires that spread from the room of origin was low (10-20%).

Benefits

Lighting diffusers

3.34 There are two classes of diffuser material; TPa and TPb. Current guidance on the spacing of TPb lighting diffusers tends to drive designers to use TPa materials which perform better in fire but worse than TPb in terms of lighting efficiency. As a result more light fittings are used to deliver the required degree of illumination.

3.35 Current guidance in Wales provides for the unlimited use of TPa products but restricts TPb products to a maximum total area of 15% of ceiling area in circulation spaces and to 50% in rooms. In addition, individual panels or groups of panels are limited to a maximum size of 5m2 and must be located a minimum of 3m apart. The amended guidance retains the limits on total area but provides a reduced spacing requirement, shown in the proposed new Diagram 27A for Approved Document B volume 2 and reproduced in the consultation document, for panels that are less than 1m2.

3.36 As shown in Diagram 27A the spacing requirement is reduced so that the minimum distance between two rectangular diffusers must be no less than the length of the diagonal of the diffuser. Since a typical diffuser would have a diagonal length of less than one metre this allows the diffusers to be placed more closely together than the current three metre minimum. For circular diffusers the minimum separation between diffusers must be greater than the diameter of the diffusers.

3.37 The proposed changes to the guidance on spacing of TPb diffusers will allow designers to achieve the desired light level with slightly less units. The TPb diffusers would typically be further apart than the TPa diffusers which are currently widely used but closer together than is currently allowed for TPb diffusers. There is no significant cost difference between the two materials.

3.38 For the English changes DCLG modelled a number of building types:

- small offices, shallow plan, less than 250m2

- medium offices, shallow plan, 250m2 to 1000m2
- large offices, shallow plan, 1000m2 +
- deep plan offices, 5098m2 +
- retail premises
- educational premises
- health care centres.

3.39 This enabled an assessment of the changes on the number of light fittings due to the greater spacing of TPb diffusers to be made from which estimated energy and carbon savings were derived.

3.40 The modelling identified capital cost savings for each building type and refurbishment of offices whilst maintaining desired lighting levels.

3.41 The work also identified significant energy and carbon savings over the lifetime of the fittings.

3.42 As an example they estimate that for a medium office, shallow plan 250-1000m2 the following:

Table 1

Capital cost saving	£8680
Annual energy saving	£355 (central energy price)
Annual carbon saving	£23 (central carbon price)

3.43 The net present value across the 10 year assessment period for all new and refurbishment non domestic activity in England is set out in table 2 £399m. Based on ONS data[9] (Table 6 and 13) Welsh construction outputs (5 year average) are approximately 4.1% of those for England.

3.44 It is reasonable to assume similar levels of savings relative to the scale of Welsh building activity. No separate assessment of the savings that would accrue in Wales has therefore been undertaken.

Table 2

Benefits of reducing restriction on use of TPb diffusers (England)	**Low**	**Central**	**High**
NPV(10 years) England Updated to 2016 prices	£175m	£418m	£694m
NPV(10 years) Wales	£7m	£17m	£27m

9 http://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputintheconstructionindustry
Table 6 and 13

Wall coverings

3.45 The amendments to Approved Document B will reduce costs to industry, since it avoids the additional cost associated with producing European “Class B” products.

3.46 The proposed amendments to the guidance are designed to ensure that those products which are currently acceptable for use will remain acceptable without modification. However, if the proposed changes are not taken forward then it may no longer be possible to use certain products and more expensive alternatives may need to be used instead. Information received by DCLG from the British Coatings Federation prior to the consultation estimated the value of sales of commercial wall coverings to be between £25 to £28 million a year and estimated that manufacturing costs could increase by between 10% and 20% if these changes are not taken forward.

3.47 Further information received from Muraspec in response to the English consultation indicated that European “Class B” would need to be sold at a price nearly 60% above that of products produced to British “Class 0” and that the size of the UK wall coverings market was around £40 million (although only 35% of the total market, in volume terms, would be subject to the requirements of Part B of the Building Regulations for use in circulation spaces). The information provided indicated that with an additional primer coating Class B products could be produced, although at a cost around 29% higher than the current cost.

3.48 The English assessment focussed on the additional production costs associated with producing Class B rather than Class C wall coverings; this is the burden avoided by amending Approved Document B. Implicitly this assumes that all manufacturers would switch to producing European Class B products. The effects of product switching were not taken account of; the ultimate impact of keeping a European requirement of Class B would be felt through a reduction in demand for heavy duty wall coverings as potential buyers switch to alternative means of interior decoration but the cost increase provides a reasonable way of approximating the impact.

3.49 Case study evidence submitted to DCLG suggested that where UK firms have marketed Euroclass B products demand has been extremely low.

3.50 The DCLG assessment concluded that the benefits of amending Part B to reference European Class C for wall coverings ranged from NPVs of £7.5 million (low scenario) to £32.5 million (high scenario) with a central assessment of £18.6 million.

3.51 Updating these figures, and pro rating to the size of the Welsh construction market (assuming the same levels of activity for wall coverings), Welsh construction outputs (5 year average) 4.1% of that of England, indicates a positive annual benefit ranging from £42,000 to £181,000 and NPV ranging from £360,000 to £1,554,000

Table 3

Wales 2016			
Table 3: Benefits of amending Part B to reference European Class C for wall coverings	**Low**	**Central**	**High**
Annual benefits of Part B amendments (cost increase averted)	**£43,000**	**£105,000**	**£184,000**
NPV (10 years)	**£366,000**	**£903,000**	**£1,579,000**

3.52 Whilst this assessment does not assess the impact on Wales with reference to the Welsh market for wall coverings it is reasonable to assume the nature of the proposed change will lead to some savings to developments. Given the English assessment that current demand for European Class B products where they are marketed is low, and by inference manufacturing capacity is equally low, not revising the Welsh requirements could present developers with problems sourcing compliant products or needing to specify alternative wall finishes.

4.0 Part C

Introduction

4.1 This consultation proposes changes to Approved Document C in relation to Radon protection measures.

4.2 This consultation proposes similar changes to radon protection measures made by DCLG for England. The English impact assessment identified a net benefit. The benefits related to health benefits as the installation of radon protection measures will reduce future lung cancer incidence. The costs related to installing radon protective measures in radon risk areas and transition costs for firms.

4.3 We expect a similar benefit in Wales and we have therefore undertaken what we consider to be a proportionate assessment of the likely impact, given the view that most of the Industry in Wales already follows the revised good practice in installing current radon protective measures that these proposed changes would implement recommendations as set out in the DCLG circular dated 7/07/08.

Executive Summary

4.4 Radon is a naturally occurring radioactive gas linked to lung cancer. Current Welsh Government policy includes targeted intervention through the Building Regulations which requires radon protection in new buildings in areas of elevated radon risk. This Impact Assessment deals with amending guidance to reference the most up-to-date radon maps.

4.5 We propose that the Building Regulations and supporting statutory guidance (Approved Document C) is clear on current radon risks, and ensures buildings are fitted with proportionate measures to prevent the ingress of radon and thus reduce radon-related lung cancers. Currently, the guidance within Approved Document C refers to radon maps issued in 1999 but more detailed maps were published in 2007. By amending guidance in Approved Document C we will ensure that radon measures are installed based on the latest assessment of radon risk.

4.6 Two options have been considered in this impact assessment: (a) do nothing; and (b) updating the Building regulations guidance to align it with the current radon risk maps (Option 1). The Department for Communities and Local Government issued a Circular Letter in 2008 (prior to the devolution of the Building Regulations to Wales) promoting the use of the new radon maps as good practice (see link above). Following this non-regulatory action a high proportion of industry started providing protective measures in line with these maps. Our preferred option is Option 1, maintaining a policy of targeted regulatory intervention aligned with the latest radon maps, to counter the risk that in Wales the few remaining building control authorities that do not currently would continue not to voluntarily subscribe to the current good practice.

4.7 Our assessment is that this preferred option will have a negligible cost impact for the Industry, as most of the Industry already follows the good practice in installing radon protective measures, and many firms will already have experience of working in existing radon areas.

Background on Part C of the Building Regulations

4.8 Part C of Schedule 1 to the Building Regulations requires the buildings it addresses - generally new buildings and extensions including material changes of use - to be constructed in such a way as to deliver reasonable precautions to avoid danger to the health and safety of occupants which might arise from the site or contaminants it contains, and to provide them adequate protection from moisture such as groundwater and rain. Contaminants include radioactive substances including radon gas.

4.9 In a comparable way to other Approved Documents, the existing guidance in Approved Document C explains technical approaches which it states, if followed, will demonstrate compliance with the regulatory requirements. Approved Document C provides guidance relating to contaminants including guidance on how to protect against radon gas and how to establish where this may be necessary (based on referencing radon maps).

Background on radon

4.10 Since 1988 the contaminants addressed by Part C have included radon gas. Radon is a naturally occurring colourless and odourless radioactive gas that can seep out of the ground and build up in houses, buildings, and indoor workplaces. Epidemiological studies have established that exposure to radon is a cause of lung cancer, with a linear dose-response relationship. Exposure to radon is now recognised as the second largest cause of lung cancer in the UK after smoking and analysis for the Public Health England (formally the Health Protection Agency) indicates that about 1100 UK deaths from lung cancer each year are caused by exposure to radon (most caused jointly by radon and smoking)[10].

4.11 Radon concentrations within buildings are determined by various factors including the geology of the ground, construction details and factors such as the methods of heating and ventilation. The concentration is measured in Bequerels per cubic metre (Bq m-3). Advice published by the Public Health England explains how health experts estimate that an increase in radon concentration of 100 Bq m-3 in a dwelling increases an occupant's risk of lung cancer by up to 31%, with a central estimate of 16%[11].

4.12 As set out in the previously referenced report by an independent Advisory Group, the available evidence suggests this percentage increase in lung cancer risk applies for men and women, across all age groups and for current smokers, ex-smokers and lifelong non-smokers. Since the baseline risk of lung cancer is much higher among smokers than non-smokers, and as radon appears to act to increase cancer risks in smokers in a multiplicative way, this means that - in absolute terms - the increase in lung cancer risk due to radon is much higher among smokers than non-smokers. The respective cumulative risks of lung cancer affecting people by age 75 years in the UK at 100 and 200 Bq m-3 are 0.42% and 0.47% for non-smokers and 17% and 19% for continuing smokers. The risks for ex-smokers will be in between the risks for these two groups, with a risk level which varies according to when they stopped smoking.

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[10] "Radon and Public Health. Report of an independent Advisory Group on Ionising Radiation". Chilton, Docs RCE 11, HPA 2009 . Available at: https://www.gov.uk/government/publications/radon-and-public-health

[11] "Limitation of Human Exposure to Radon – Advice from the Health Protection Agency".

The Problem

4.13 In addition to examining the health risk evidence, Public Health England carries out surveys and tests of radon activity in existing buildings in the UK. The information from these is used in radon mapping by the Agency with the British Geological Survey. The Agency publishes atlases of probabilistic radon activity maps for the UK. The Building Research Establishment has, since 1998, published guidance[12] that shows the areas of increased radon levels and technical details of measures that can be installed to provide precautions against radon.

4.14 The current (2004) edition of Approved Document C, by reference to the Building Research Establishment (1999) guidance, outlines the radon action areas (areas of elevated risk) in Wales where radon protective measures should be installed. These are described as areas where either "basic" or more comprehensive "full" protective measures should be provided: these are the areas where 3-10% and above 10% of homes surveyed were found to have radon levels above 200 Bq m-3, respectively. This publication also provides technical guidance on different construction approaches that can be used in these areas to provide reasonable precautions against radon.

4.15 In 2007, following detailed surveys and studies, the Public Health England and the British Geological Survey published an updated atlas of radon maps[13]. These show how the areas of higher levels of radon are more widespread than those identified in 1999. BRE also published a revised BR211"Radon: Protective Measures in New Homes" in 2007, with the maps of areas where radon protection is required updated in line with the revised atlas.

The 2007 map is available at higher resolution than its predecessor and therefore provides a more accurate identification of radon risk in a particular area.

4.16 In outline, "**basic**" radon protective measures involve the fitting of a gas tight ground barrier to protect against radon ingress. This, which also acts as a damp-proof membrane, should cover the whole building foot print and be lapped to the damp proof course in the walls and sealed around service penetrations.

"**Full**" radon protective measures requires the radon-proof ground barrier, together with a sump below the barrier, ready to take a fan if high levels of radon are detected after occupancy.

Rationale for intervention

4.17 In 2008 (prior to devolution of the Building Regulations to Wales), the Department for Communities and Local Government issued a Circular Letter highlighting the revised radon maps, their implications and the updated BR211 guidance. It also indicated that they would look to update Approved Document C to align it with this revised guidance – work that DCLG did in 2013. The Department also used that Circular Letter to recommend as good practice the use of the latest revised guidance in BR211 (2007).
Evidence from Building Control Bodies in Wales indicates that the 2008 Circular Letter has had considerable influence in promoting this good practice. In June 2014,

[12] This guidance includes BR211 "Radon: Protective Measures in New Homes" - published in 1999, revised in 2007&2015
[13] "Indicative Atlas of Radon in England and Wales"

a Welsh Government survey was sent to all Local Authority Building Control Departments in Wales and Approved Inspectors with offices based in Wales. From the responses received, 95% indicated that they used the latest BR211 (2007) guidance when considering compliance with Part C. In addition, all of the responses replied that they are not aware of any instances in the last 12 months where the applicant/developer carrying out applicable building work only wishes to follow the guidance and maps contained within the **1999** BRE Report.

4.18 The survey does not include the fact that the National House-Building Council (NHBC), who provide the building control service for the majority of new housing developments in Wales, advise that they would expect developers to provide protective measures in line with the 2007 versions of the radon maps.

4.19 Therefore the above figures indicate that the 2008 Circular Letter has had considerable influence in promoting this good practice in Wales. It is estimated that NHBC provide the Building Control service for 68% of new housing development in Wales. As a result of our survey it is estimated that 95% of the remaining housing development (i.e. the remaining 32%) is also carried out using appropriate protective measures. This equates to an estimate of 98% of new housing in Wales within the radon risk areas, are now carried out using appropriate protective measures. (For the purposes of the effect on new extensions, we have used the 95% figure as NHBC do not typically provide the Building Control service for new extensions.)

4.20 This small market failure may result from builders lacking sufficient incentive to build radon precautions into work in the new areas, when it is not seen as a regulatory requirement described in Approved Document C. They are exposed only to costs that arise from installing protective measures and do not receive the benefits that subsequently accrue. Furthermore, as householders and homebuyers often lack awareness of radon, they may not make informed decisions about their homes and radon precautions and so fail to create a demand for these precautions.

4.21 If a minority of development activity is not providing appropriate radon precautions in line with the latest maps, because this is not seen as a requirement described by the statutory guidance in Approved Document C, the absence of suitable radon protective measures in new developments will place occupants at higher risk of exposure to radon and associated health impacts. We consider intervention to address this in Option 1.

Policy Options considered

4.22 Two options are considered in this Impact Assessment:

i. Option 0 – do nothing ie leave the existing statutory guidance in Approved Document C referencing the out-of-date radon maps and rely on industry following good practice to ensure measures are properly targeted.

ii. Option 1 – revise statutory guidance in Approved Document C to reference the most up-to-date maps and thereby ensure protective measures are properly targeted.

4.23 The "**do nothing**" option is not preferred because:
i. it undermines the rationale for a targeted regulatory intervention if the provisions are not targeted on the basis of the most accurate and up-to-date information

ii. consequently some buildings that should be protected would not be leading to an increased incidence of lung cancer, and

iii. some homes would incorporate radon protection where it is not proportionate to do so.

4.24 Option 1 is preferred to avoid the adverse impacts set out under the "do nothing" option above. It will require either basic or full radon protective measures, as appropriate, to be provided to new buildings in the newly mapped areas of higher radon risk. This maintains but extends the current policy of targeted intervention in areas of higher risk and has clear health benefits over the current situation.

4.25 BRE211-1999 provided a multi-stage method of assessing the need for radon prevention based on radon measurements (Annex A) and geological attributes (Annex B). In the case of Annex B, the maps are intended for use in two stages: by inspection to determine whether protection might be needed in an area and, then triggering the use of an online local geological assessment from British Geological Survey (BGS) that would give site –specific advice, based on local geology.

4.26 The 2007 version of BRE211 has a single composite indicative map which is compiled at a more detailed resolution than the 1999 maps. This map uses a methodology that combines the influences of both radon measurements and geological attributes. BRE211-2007 shows this map in indicative form at a 1 km resolution. It is intended to be used in a manner similar to Annex B of BRE211-1999, either used "as is" to determine the radon protection needed or to trigger a site specific assessment. The site specific assessment could be an online inquiry via UKradon.org for locations with existing valid postcodes (i.e. mostly existing addresses) or on a spatial basis using the BGS Geo-reports service, available for all areas including land that does not have an valid postal address (e.g. many green field sites).

4.27 A comparison between the combined Annex A and Annex B in BR211-1999 with the maps in BR211-2007 has been carried out by Public Health England (PHE) in respect of Wales. This analysis indicated that the areas where protective measures might be required have reduced in 2007 when compared to 1999(see table 1 below). The area where '**Basic'** protective measures might be required reduced significantly in 2007, and the area in which '**Full'** measures might be appropriate also reduced.

Table 1

Data set	**Original resolution**	**Potential for Basic measures (km^2)**	**Potential for Full measures (km^2)**
BRE211-1999	5 km	19,400	8,100
BRE211-2007	1 km	16,000	6,200

4.28 It is important to note that the comparison of "indicative" areas does not necessarily point to a decrease in the number of addresses caught within the new radon risk areas. To do this would require further detailed GIS analysis. However given the reduction in radon risk potential areas and the counterfactual assumption about the level of good practice (estimated at 98%) generated by the 2008 Circular Letter, it was considered that further detailed GIS analysis would not be required at this stage. We welcome views on this approach in the consultation document.

Costs and benefits

Costs – Option 0, do nothing

4.29 There are no additional costs for this option since it is the baseline (beyond foregoing the benefits of option 1). We think that around 98% of new homes and 95% of new extensions are already following good practice and installing radon measures in homes that fall within the new map areas.

Benefits – Option 0, do nothing

4.30 There are no additional benefits associated with this option.

Costs – Option 1

4.31 The costs associated with this option are the additional build costs which will result from updating Approved Document C so it explicitly refers to BR211-2015 and requires that appropriate radon protective measures are installed in all new homes and extensions built in the additional radon risk areas identified on the 2007 maps (contained within BR211 – 2015).

Costs – Preferred Option 1, targeted protective measures in <u>new homes</u>

4.32 As discussed above, we think that around 98% of development is already following good practice and installing radon measures in homes that fall within the new map areas. This, together with the PHE analysis which indicated that the areas where protective measures might be required have reduced in 2007 maps when compared to 1999 maps, suggests that any impact of this change will be negligible.

4.33 An additional 2% of the remaining housing development in Wales will now be required to follow the guidance in BR211-2015, which contains the updated 2007 maps. For the purposes of this impact assessment and to highlight the negligible costs, we have assumed the worst case scenario that all these new houses will require '**full'** radon protection.

4.34 Next year (2017) it is estimated that there is to be 6,668 new homes built in Wales. The DCLG impact assessment in 2013[14] estimated that the worst case scenario cost of installing full radon protection on a new bungalow is £654 (*adjusted to 2016 costs using construction cost indices or the GDP deflator series).* Therefore taking another worst case scenario that all 133 (2%) of these new homes will now require full radon protection, this would equate to an annual cost of £86,982.

Costs – Option 1, targeted protective measures in <u>domestic extensions</u>

4.35 NHBC do not typically provide the Building Control Service for new extensions, however a survey of Building Control Bodies has indicated that around 95% of these are already following good practice and installing radon protective measures in line with the 2007 maps. This, together with the PHE analysis which indicated that the areas where protective measures might be required have reduced in 2007 maps when compared to 1999 maps, suggests that any impact of this change will be negligible.

4.36 However as an example of the cost to industry; we estimate that there are approximately 11,000 domestic extensions built in Wales each year. The DCLG impact assessment[14] in 2013 estimated that the cost of installing full radon protection on a new extension is between £220 and £315 (*adjusted to 2016 costs using construction cost indices or the GDP deflator series*). Therefore taking the worst case scenarios of £315, and that 550 (5%) of these new extensions will now require full radon protection, this would equate to an annual cost of £173,250 to the industry.

Transition Costs

4.37 As structural engineering firms, developers, contractors and Building Control Bodies are likely to be located in and carried out projects in radon affected areas, it is assumed that there will be no significant transitional costs.

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14 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225640/Radon_IA.pdf

5.0 Preferred Options Cost Summary

5.1 The costs associated with all the preferred options above are as follows:

- **Approved Document A**:

Cost of construction – Our assessment has estimated that the amendments would have a cost neutral impact upon the cost of construction.
Transitional costs - The estimated transitional costs for Wales is **£580,258** per year for next 5 years.

- **Approved Document B**:

Cost of construction – It is estimated that the draft amendments will provide an annual benefit of between **£42,000** and **£181,000** per year.
Transitional costs - Transition costs have been estimated as approximately **£77,000**.

- **Approved Document C**:

Cost of construction – It is estimated that the amendments would equate to an annual cost of **£86,982** for all new homes in Wales, and **£173,250** for all new extensions in Wales.
Transitional costs - As structural engineering firms, developers, contractors and Building Control Bodies are likely to be located in and carried out projects in radon affected areas, it is assumed that there will be no significant transitional costs.

6.0 Wider Impacts

6.1 The competition filter test

Question	**Answer Yes or No**
Q1: In the market(s) affected by the new regulation, does any firm have more than 10% market share?	No
Q2: In the market(s) affected by the new regulation, does any firm have more than 20% market share?	No
Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share?	No
Q4: Would the costs of the regulation affect some firms substantially more than others?	No
Q5: Is the regulation likely to affect the market structure, changing the number or size of firms?	No
Q6: Would the regulation lead to higher set-up costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q7: Would the regulation lead to higher ongoing costs for new or potential suppliers that existing suppliers do not have to meet?	No

Question	Answer Yes or No
Q8: Is the sector characterised by rapid technological change?	No
Q9: Would the regulation restrict the ability of suppliers to choose the price, quality, range or location of their products?	No

The competition filter test has been applied, the regulatory changes proposed are not expected to have a detrimental impact on competition in Wales.

The proposed updates to the Approved Documents bring us in line with changes made previously in England, and therefore we are not imposing costs that businesses in England have not already incurred since 2013. Therefore we believe the changes place no competitive disadvantage on Welsh business.

6.2 Social Impact Tests

The following social impact tests are mandatory for all Welsh Government policies:

- Health Impact Assessment
- Equalities Impact Assessment
- Rights of the Child Assessment
- Welsh Language Assessment
- Rural Proofing Assessment

We do not expect these proposals to have any negative impact upon any of the subjects listed above.

6.3 Environmental Impact Tests

We do not expect the proposal to have any sustainable development implications other than the non-monetised climate change resilience benefits (identified above) that come from industry using state of the art design approaches which reflect the most up-to-date knowledge of loadings including those from wind, snow and ground movement.