Rialtas na hÉireann
Government of Ireland

Preliminary Regulatory Impact Analysis

Review of Part B (Fire Safety) of the Building Regulations

January 2023

Prepared by the Department of Housing, Local Government and Heritage

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1.0 Summary and Recommended Option

Department / Office: Department of Housing, Local Government and Heritage	**Title of Legislation:** DRAFT Building Regulations (Part B – Amendment) Regulations 2023, and DRAFT Technical Guidance Document B 2023 – Fire Safety – Volume 1 – Buildings other than Dwelling Houses
Stage: Public Consultation	**Date:** 18 January 2023

Related Publications:

1. Building Regulations, 1997 (S.I. No. 497 of 1997)
2. Technical Guidance Document B – Fire Safety 2006 (Reprint 2020)

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Introduction

This preliminary Regulatory Impact Analysis (RIA) has been prepared to evaluate the proposal to update Part B of the Second Schedule to the Building Regulations, and the associated Technical Guidance Document B.

What are the policy objectives being pursued?

1. Housing For all: A new Housing Plan for Ireland. Housing Policy Objective 25 - Drive compliance and standards through regulatory reform, Action 25.6 Review of Building Regulations.
2. Further enhance the health and safety of people in and around buildings.
3. Enhance readability, understanding and implementation of Part B of the Building Regulations.

What policy options have been considered?

A. Do nothing; or
B. Update Part B/TGD B. Introduce amendments as proposed to the Building Regulations, and associated minimum standards in Technical Guidance Document B – Fire Safety (TGD B)

What is the recommended option?

B. Introduce amendments as proposed to the Building Regulations and associated minimum standards in Technical Guidance Document B – Fire Safety.

Benefits	Costs	Impacts
• Enhanced clarity of provisions relating to the fire safety design of buildings in Ireland. • Consolidation of provisions for the fire safety design of buildings into one seamless document – applying a single common technical language in respect of fire safety • Introduction of a range of design options to enhance flexibility, while maintaining minimum standards in the application of fire safety in the built environment. • Strengthening of requirements relating to facades to inhibit the spread of fire on the face of a building. • Alignment with Irish policy and practice in respect of fire safety in buildings, such as evacuation policy. • Strengthening of safety provisions for the most vulnerable building users – older persons, buildings with a sleeping risk, buildings with very fast fire growth rates • The creation of Section 7 (Existing Buildings) will support the re-use of existing buildings by simplifying, clarifying and rationalising fire safety requirements for such buildings.	• Costs were assessed across a range of building uses and designs, comparing the current Part B / TGD B provisions to the proposed Part B / TGD B provisions • For buildings containing flats, the estimated cost increase could range from minimal cost to 0.25% to 1.7% above current base building design costs. • For buildings other than flats, the estimated cost increase could range from minimal cost to 12% above current base building design costs. • For flats, hotels, student accommodation, and offices, cost increases are highly variable and depend on: building design, façade configuration, internal layout, availability of sprinklers, external wall build-up, availability of a BS 8414 test, etc. • For shops, and warehouses, cost increases are variable and depend on the provision of internal compartmentation and overall building height • For nursing homes, cost increases are dependent on the provision of sleeping accommodation at upper levels	• There will be no impact on dwelling houses. These are subject to different technical guidance. • The provisions may have a design and cost impact on approx. 25 – 33.5% of buildings, compared with all buildings commenced 2018 - 2021. • It is expected that the vast majority of buildings that may be commenced c.65.5% - 75% should not be impacted. • The creation of section 7 should lead to and support and increased uptake in the re-use of existing buildings, where converted to dwellings. • Modernisation of Irish fire safety provisions in line with international practice. • Alignment of testing requirements to EU Standards (EN's), supporting the movement of goods from the EU 27.

Introduction

Part B of the Second Schedule to the Building Regulations and the associated Technical Guidance Document B (TGD B) deals with Fire Safety. Part B sets the legal performance requirements of buildings while the associated TGD provides guidance on how to achieve that performance in practice for common building types. Where works are carried out in accordance with the guidance in TGD B, this will, *prima facie*, indicate compliance with Part B. Technical Guidance Document B was first published in 1991, and was updated in 1997, and 2006, with additional guidance being published in 2020.

In February 2011, the then Chairperson of the Building Regulations Advisory Body, recommended a review of Part B and TGD B 2006. A public consultation commenced later that year to seek the views of the public with respect to the existing document.

In 2014, a decision was made to separate Technical Guidance Document B into two volumes: Volume 1: Buildings other than dwelling houses, and Volume 2: Dwelling Houses. In 2017, Parts B 6 to B 11, and Technical Guidance Document B Fire Safety - Volume 2 – Dwelling Houses was published and came into force on 1 July 2017. Volume 2 relates to individual dwellings, excluding flats.

In 2020, additional guidance to Technical Guidance Document B, 2006 was published to address, *inter alia*, means of escape requirements in open plan flats.

The design of buildings, in Ireland, has been evolving over recent years, as design teams learn from best practice around the world; buildings are becoming increasingly complex, with taller and larger buildings being designed. Within these buildings a complex arrangement of systems; for lighting, heating, ventilation, access, etc. for the safe and efficient use of the building can be found. The interactions of these systems, their effect on the paths to fire and smoke transfer in a building, as well the effect of increasing building size and complexity can have an impact on fire safety.

The manner in which buildings are being built now is different to those envisaged under earlier versions of Technical Guidance Document B, in particular, the use of new and innovative building systems, and materials. There are increased requirements being placed on buildings, in relation to energy efficiency and sustainability.

In addition, in the past decade, in other jurisdictions, there have been a number of instances of fire spread, both within, and along the face of buildings. Some of these incidents have tragically led to fatalities.

This review examined the requirements of the Building Regulations with respect to Fire Safety, as well as the technical provisions supporting the national requirements.

In carrying out the review, specific regard was given to

1. the holistic requirements of the Building Regulations in Ireland;
2. the framework of administration set out under the Building Control Regulations; Fire Safety; Planning, and Health and Safety Laws native to Ireland; and
3. policy documents outlining national strategy and objectives, such as
    a. Housing for All: A New Housing Plan for Ireland; and
    b. Fire Safety in Ireland – The Report of the Fire Safety Task Force 2018.

The review has also taken into account: common and emerging building trends, developments and events from a global perspective, matters relating to external fire spread, external fire resistance, internal fire resistance, cladding systems, sprinklers, and the ongoing review into the Grenfell fire.

Common methods of construction in Ireland, particulars of Irish and European Standards, Standard Operating Guidance for firefighting published by the National Directorate for Fire and Emergency Management, and documents relating to fire safety in existing and historic buildings were considered.

In developing the proposed guidance, standards, tests, and engineering approaches were considered. The national fire safety requirements in a number of jurisdictions, including England, Scotland, the United States of America, Canada, Australia, New Zealand, Denmark, Hong Kong, the United Arab Emirates, and Singapore, were also reviewed, as were the requirements of a number of British Standards relating to fire safety design.

Section 1: Context

1.1 Policy Context

The Department of Housing, Local Government and Heritage (DHLGH) has published a number of policy documents relating to fire safety and development of buildings in the urban environment generally. They are as follows:

- "Housing for All - a New Housing Plan for Ireland"
- "Fire Safety in Ireland" Report of the Fire Safety Task Force, 2018", and
- "Project Ireland 2040 - National Planning Framework"

1.1.1 Housing for All - a New Housing Plan for Ireland

Section 5.5 of Housing for All states that

> "Standards and quality are critically important to people in terms of the building of homes. Everyone should be able to trust that homes are built to the highest standards … Our housing system can be improved over the longer term through regulatory reform, particularly in the areas of construction compliance, competence and standards".

Housing Policy Objective 25 (Drive compliance and standards through regulatory reform) of Housing for All includes the Review of Building Regulations as a key action (Action 25.6)

1.1.2 Fire Safety in Ireland" Report of the Fire Safety Task Force, 2018

Section 8.2 of "Fire Safety in Ireland" Report of the Fire Safety Task Force, 2018 states that

> "In most buildings and circumstances, the safest approach and the default option for all occupants of the building is to evacuate in the event of fire or alarm. Special provisions (such as progressive horizontal evacuation) are necessary for buildings such as hospitals or nursing homes, where full evacuation of patients or residents may not be feasible or advisable".

The report concludes, under Section 8 that

> "the fire safety strategy for construction of multi-storey buildings containing flats places emphasis on three elements:

- Compartmentation of the building through fire resistant construction of floors and walls – to limit fire spread, and contain fire within the flat of origin.
- Protection of the stairway, to ensure it remains free of smoke and fire, and available for use by residents evacuating the building.
- Early detection and alarm in the event of fire, to give early warning to residents."

1.1.3 Project Ireland 2040 - National Planning Framework

National Policy Objective 13 of the National Planning Framework identifies that

> "In urban areas, planning and related standards, including in particular building height and car parking will be based on performance criteria that seek to achieve well-designed high quality outcomes in order to achieve targeted growth… provided **public safety** is not compromised and the environment is suitably protected".

1.1.4 What Policy Implementation Options Have Been Considered?

Two options have been considered for the purpose of this Preliminary Regulatory Impact Analysis, as follows:

Option (A) - Do nothing.

Do not introduce changes to the building regulations, and do not update Technical Guidance Document B.

Option (B) – Update Part B / TGD B.

Introduce amendments as proposed to the Building Regulations 2006 and significantly enhance Technical Guidance Document B – Fire Safety, updating provisions, and incorporating all relevant guidance to provide for the design of non-complex buildings (to a specific height) in Ireland.

1.2 Regulatory Context

The design and construction of buildings in Ireland is regulated under the Building Control Acts 1990 to 2020, in order to ensure the safety of people within the built environment.

1.2.1 Building Control Acts:

The Building Control Acts 1990 to 2020 sets out the statutory framework for the regulation and oversight of building activity based on:

a) The minimum requirements for the design and construction of buildings as set out in the Building Regulations 1997 to 2022.

b) Detailed Technical Guidance Documents, which outline how these requirements can, *prima facie*, be achieved in practice.

c) Clear administrative procedures for demonstrating compliance in respect of an individual building or works as set out in Building Control Regulations.

d) The responsibility for compliance with the Building Regulations resting first and foremost with building owners, developers/builders and designers.

e) The responsibility for enforcing compliance with the building regulations resting with the 31 local building control authorities.

1.2.2 Building Regulations

The Building Regulations 1997 to 2022 set out the legal requirements for the construction of new buildings (including houses), extensions to existing buildings as well as for material alterations and certain material changes of use to existing buildings and are divided in 12 parts (classified as Parts A to M).

Technical Guidance Documents (TGDs) are published to accompany each of the Parts and provide guidance indicating how the requirements of that Part can be achieved in practice. Where works are carried out in accordance with the relevant technical guidance such works are considered to be, *prima facie*, in compliance with the relevant regulation(s).

Primary responsibility for compliance with the requirements of the Building Regulations rests with the designers, builders and owners of buildings.

1.2.3 Building Control Regulations

Separate to requirements under the Building Regulations 1997 to 2022, the Building Control Regulations 1997 to 2021 require, in the case of commercial buildings and apartment blocks that a Fire Safety Certificate is obtained from the local building control authority.

A Fire Safety Certificate is a certificate, which specifies that the works or building to which the application relates will, if carried out in accordance with the plans and specifications submitted, comply with the requirements of Part B of the Second Schedule to the Building Regulations 1997. It is an offence to occupy or use a building without having a valid Fire Safety Certificate in place, where one is required.

1.3 Statement of Objectives

The proposed amendment aims to secure adequate standards of health, safety and welfare for persons in and about buildings without imposing disproportionate bureaucracy and costs.

The key objectives of the proposed amendments are as follows:

1. To drive compliance and standards through regulatory reform in accordance with Housing for All, Action 25.6.
2. To update Part B to meet societal requirements and needs, with respect to fire safety, in accordance with international practice.
3. To clarify and update TGD B in accordance with changes in standards and practice, and best international practice.
4. To ensure that new buildings meet adequate standards of fire safety.
5. To support and complement the aims of the Fire Safety Task Force set out in its report, Fire Safety in Ireland, 2018.
6. To provide additional clarity with respect to the application of Part B to existing buildings, to support the re-use of existing buildings.
7. To provide adequate up-to-date guidance within the Technical Guidance Document, for buildings containing flats, shopping centres, smoke control systems, and firefighter access.
8. To align the document with the common technical language to facilitate the effective functioning of the EU internal market.
9. To enhance readability, understanding and implementation of Part B of the Building Regulations.

1.4 Review of Part B – Fire Safety

Part B – Fire Safety of the Second Schedule to the Building Regulations sets out the legal requirements in relation to fire safety in respect of new buildings (including dwellings) and in respect of existing buildings undergoing works involving an extension, material alteration or certain material changes of use. The fire safety requirements under Part B represent the national statutory minimum standards applicable to the construction of new buildings, as well as material alterations, extensions, and material changes in use.

Where works are carried out in accordance with the national guidance provided in Technical Guidance Document B – Fire Safety, this will, *prima facie*, indicate compliance with the fire safety requirements set out in the Building Regulations.

Technical Guidance Document B was published in 2006, and was the subject of a minor update in 2020. The 2006 document introduced some alterations to the previous publication of 1997 – Technical Guidance Document B 1997, which was revoked in 2006.

In 2011, a review of Technical Guidance Document B was commenced, with a view to updating the then existing technical guidance relating to fire safety (TGD B, 2006). The process started with a public consultation in relation to the existing Technical Guidance Document B, 2006. In all, 44 submissions, containing c. 1100 individual comments were received. Further details in relation to the 2011 public consultation are contained in **Appendix 1.**

In 2015 a decision was made to split TGD B into two volumes; one volume for Dwelling houses, and another volume for non-dwelling houses. The Building Regulations (Part B Amendment) Regulations 2017 (S.I. No. 57 of 2017) and TGD B Fire Safety – Volume 2 – Dwelling Houses (2017) were published and came into force on 1 July 2017. Volume 2 applies to dwelling houses only.

In 2020, additional guidance to Technical Guidance Document B was published. This additional guidance provided clarity, within the TGD in respect of matters relating to: open plan flats; extended corridor travel distances; ventilation of common corridors; fire alarms in buildings containing flats; the default evacuation strategy for building containing flats; refuges in buildings containing flats; and firefighting shafts in buildings containing flats.

Following the publication of TGD B in 2020, the review of the entirety of the TGD was progressed. The review process is further detailed under **Appendix 2.**

In carrying out the review of TGD B, over 140 individual documents relating to fire safety design, fire safety systems, testing, and fire precautions in buildings were researched. A full list of documents, which were researched in carrying out the review is provided in **Appendix 3.**

As part of the review process, a statistical analysis of construction activity was carried out based on data entered into from the BCMS, between 2018 and 2021, i.e. 4 years of Commencement Notice data, constituting over 14,000 individual records, relating to over 17,000 buildings.

1.5 Overview of the Proposed Update to Part B of the Second Schedule to the Building Regulations / Technical Guidance Document B

The proposed amendments may be summarised as follows:

1. Part B of the Second Schedule to the Building Regulations – the minimum standards that apply to works, to ensure the health and safety of people in and around buildings, to drive compliance through regulatory reform (See 1.5.1).
2. Article 5 (definitions) of the S.I. 497 of 1997 has been updated to enhance readability, understanding and implementation of Part B of the Building Regulations (See 1.5.2).
3. Article 13 (2) (Material Change of Use) of S.I. 497 of 1997 has been updated to enhance application and implementation of the Building Regulations to certain changes in use (See 1.5.3).
4. Technical Guidance Document B has been updated to provide *prima facie* means of compliance to items (1) – (3) above to enhance readability, understanding and implementation of Part B of the Building Regulations (See 1.5.4).

The above changes are detailed in the flowing sub-sections.

1.5.1 Update to Part B of the Second Schedule to the Building Regulations

Part B of the Second Schedule to the Building Regulations 1997, in respect of non-dwelling house buildings, is split into 5 key 'functional requirements', (B1 – B5) *prima facie* compliance of which is achieved through the application of Technical Guidance Document B. The current version of TGD B was published in 2006, and re-published, with additional guidance for open plan flats, in 2020. The documents for which can be found at: https://www.gov.ie/en/publication/263ee-technical-guidance-document-b-fire-safety/

For Dwelling Houses, the functional requirements for fire safety are specified under Parts B6 – B11 of the Second Schedule to the Building Regulations 1997, *prima facie* compliance of which is achieved through the application of Technical Guidance Document B, 2017.

It is proposed to update the functional requirements, (B1 – B5), of the Building Regulations 1997 with respect to fire safety, to provide minimum performance requirements that are adequate, for the type and scale of buildings being built in Ireland. It is also proposed to add a new Regulation, B12, for the provision of information.

1.5.1.1 Regulation B1 – Means of Escape in Case of Fire

The current Regulation B1 (Means of escape in case of fire) specifies that

> "a building shall be designed so that there are adequate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used".

There is no provision within the current Regulation B1 to mandate means of warning in case of fire.

It is proposed that the provisions of Regulation B1 is modified to include a requirement to provide both warning and a means of escape in case of fire, as follows:

> B1 – Means of Warning and Escape in Case of Fire
>
> "A building shall be so designed and constructed that there are:
>
> (a) appropriate provisions for the early warning of fire, and
>
> (b) adequate means of escape in case of fire from the building to a place of safety outside the building, capable of being safely and effectively used".

This provision is being proposed, to provide a regulatory requirement to give early warning to occupants in a building of the outbreak of fire. *Prima facie* means by which this performance requirement can be achieved will be detailed in the provisions of the new draft Technical Guidance Document B.

1.5.1.2 Regulation B2 – Internal Fire Spread (Linings)

There is no proposal to amend Regulation B2. *Prima facie* means by which this performance requirement can be achieved will be detailed in the provisions of the new draft Technical Guidance Document B.

1.5.1.3 Regulation B3 - Internal Fire Spread (Structure)

It is proposed that Regulation B3 is modified to remove the existing sub-part (4), which reads

> "For the purposes of sub-paragraph 2(a), a house in a terrace and a semi-detached house are each to be treated as being a separate building."

This provision is specific to the design of dwelling houses.

Provisions relating to the fire safety design of dwelling houses are specified in Technical Guidance Document B 2017, Fire Safety – Volume 2 – Dwelling Houses.

1.5.1.4 Regulation B4 – External Fire Spread

The current Regulation B4 specifies that

> "the external walls and roof of a building shall be so designed and constructed that they afford adequate resistance to the spread of fire to and from neighbouring buildings."

There is no provision within the regulations to inhibit or prevent the spread of fire over the external face of a building.

Under the current TGD B, the spread of fire from one part of a building, to another part of the same building is been restricted by means of fire resisting internal walls and floors, and by means of interrupting concealed spaces (cavities) in the fabric of the building.

Changes in building technology, energy requirements, and methods of construction have resulted in the external wall configuration and build-up of new buildings being more susceptible to the fire spread from one part of a building to another part of the same building.

It is proposed that Regulation B4 is modified and updated to add an additional requirement for fire performance, with respect to the façade of a building, to prevent the spread of on the external face of the building.

Prima facie means by which this performance requirement can be achieved will be detailed in the provisions of the new draft Technical Guidance Document B

1.5.1.5 Regulation B5 – Access and Facilities for the Fire Service

There is no proposal to amend Regulation B5. *Prima facie* means by which this performance requirement can be achieved will be detailed in the provisions of the new draft Technical Guidance Document B.

1.5.1.6 Regulation B12

The current Building Regulations do not specify any requirement to provide a building owner with information relating to the fire safety systems installed in a building.

It is proposed that a new Regulation B12 '**Provision of Information**' is added to Part B of the Second Schedule, to provide a regulatory requirement for the transfer of information about systems installed in a building at the time of completion.

The information is required in order to enable the building to operate and maintain a building, in the manner in which it has been designed, in order to protect the health and safety of the building occupants. Such matters of management of information are relevant to legislation outside of the Building Control Act, but can be assisted by the provision of information at the time of completion of the building or works

Prima facie means by which this performance requirement can be achieved will be detailed in the provisions of the new draft Technical Guidance Document B.

1.5.1.7 Application of Draft Part B and Draft Technical Guidance Document B

It is proposed that the new Building Regulations (Part B), and any associated changes to TGD B would be applied, subject to transitional arrangements, to the following works:

- All new buildings except dwelling houses.
- Material alterations to buildings other than dwelling houses.
- Buildings that undergo a material change of use (except where a dwelling house becomes used).
- Extensions to buildings other than dwelling houses.

1.5.2 Update to Article 5 (Definitions) of the Building Regulations 1997 (S.I. No. 497 of 1997)

It is proposed that a number of definitions in S.I. No. 497 of 1997 are updated to aid clarity, understanding, and application of the Building Regulations. These definitions, or the principles surrounding the definitions are in regular use in the current Technical Guidance Document B. The proposed updates are as follows:

1. To add the definition of '**risk building (industrial)**' meaning a building –

(a) the contents of which, when ignited, are likely to cause the rapid spread of fire, smoke or fumes and which contents may be solid, liquid, or gaseous and may also be present as dust, spray, mist or vapour,

(b) in which there exists the presence of highly flammable or explosive materials,

(c) that contains areas which, due to their function, may present a greater risk of fire occurring and developing than elsewhere such as manufacturing processes handling highly flammable liquids, or

(d) for manufacturing, processing, repairing, cleaning, washing, breaking up or otherwise treating any hazardous substance;

2. To add the definition of '**industrial building - High Hazard**' as follows:

'industrial building - High Hazard' means an industrial building the contents, or use, of which constitutes a high fire risk building (industrial);

3. To add the definition of '**industrial building - Low Hazard**' as follows:

'industrial building – Low Hazard' means an industrial building other than an industrial building – High Hazard;

4. To add the definition of '**Storage building - High Hazard**' as follows:

'storage building - High Hazard' means a storage building the contents of which classifies the buildings as a high fire risk building (storage);

5. To add the definition of '**Storage building - Low Hazard**' as follows:

'storage building – Low Hazard' means any storage building other than a storage building – High Hazard, and includes a building used for parking vehicles, designed to admit or accommodate only passenger vehicles or other light goods vehicles, not more than 2,500 kilograms gross mass, and excludes a domestic garage ancillary to a dwelling;

6. To add the definition of '**risk building (storage)**' as follows:

‘risk building (storage)’ means the storage of –

(a) goods that, when ignited, are likely to cause the rapid spread of fire, smoke or fumes and which goods may be solid, liquid, or gaseous and may also be present as dust, spray, mist or vapour,

(b) highly flammable or explosive materials,

(c) hazardous goods or materials,

(d) vehicles containing hazardous goods or materials, or

(e) high-rack storage of significant height;”.

7. To modify the definition of a “**place of assembly**” (modified text highlighted in **bold**) to

“includes—

(a) a theatre, public library, hall or other building of public resort used for social or recreational purposes,

(b) a non-residential school or other educational establishment,

(c) a place of public worship,

(d) a public house, restaurant or similar premises used for the sale to members of the public of food or drink for consumption on the premises,

(e) a sports pavilion, stadium, grandstand, or other spectator accommodation.

(f) a terminus, station or other facility for air, rail, road or sea travel”.

1.5.3 Modification of Article 13(2) (Material Change of Use) of the Building Regulations 1997 (S.I. No. 497 of 1997)

It is proposed that the provisions of the Building Regulations, relating to the application of the Building Regulations to a Material Change of Use, as set out under Article 13(2) are amended to account for the new Article 5 definitions, as set out under Para 1.5.2 above, and to ensure that the provisions of the Building Regulations are applied where the risk classification of industrial or storage buildings changes.

The proposed new text of Article 13(2) (changes highlighted as **bold text**) is as follows:

(2) A material change of use as regards a building shall be deemed to take place if—

(a) a change of use, deemed by Section 3(3) of the Act to be a material change of use, takes place, or

(b) a building which was not being used as—

(i) a day centre, becomes so used, or

(ii) a hotel, hostel or guest building, becomes so used, or

(iii) an industrial building – Low Hazard becomes so used, or

(iv) an institutional building, becomes so used, or

(v) an office (which is not ancillary to the primary use of the building), becomes so used, or

(vi) a place of assembly, becomes so used, or

(vii) a shop (which is not ancillary to the primary use of the building), becomes so used, or

(viii) a shopping centre, becomes so used, or

(ix) an industrial building – High Hazard becomes so used, or

(x) a storage building - Low Hazard becomes so used, or

(xi) a storage building – High Hazard becomes so used.".

1.5.4 Update to Technical Guidance Document B

The principle objectives of the review of Part B of the Building Regulations were:

> "the need to drive compliance and standards through regulatory reform, as national policy set out under Housing for All, Action 25.6, and to enhance readability, understanding and implementation of Part B of the Building Regulations."

The proposed re-structuring of TGD B, and the associated enhancements to TGD B by means of the provision of additional content, similar to that presented in a variety of cited documents are necessary to achieve the objective of

> "to enhance readability, understanding and implementation of Part B of the Building Regulations".

1.5.4.1 Re-structuring of TGD B

The fundamental review has resulted in the re-structure of the document, modifying existing provisions, re-structuring the document, and adding new provisions to aid in understanding and application. New diagrams have been added, and some existing diagrams enhanced to provide greater clarity to the relevant provisions. In developing the draft proposals for Part B, the opportunity has been taken;

1. To drive compliance and standards through regulatory reform in accordance with Housing for All, Action 25.6
2. To clarify and update TGD B in accordance with changes in standards and practice and best international practice;
3. To update Part B to meet societal requirements and needs, with respect to fire safety, in accordance with international practice
4. To ensure that works to buildings meet adequate standards of fire safety;
5. To support and complement the aims of the Fire Safety Task Force set out in its report, Fire Safety in Ireland, 2018
6. To support the re-use of existing buildings
7. To align the document with the common technical language to facilitate the effective functioning of the EU internal market
8. To take into account comments received from users and other interested parties through the initial public consultation process (2011) and to take into account

comments and views of stakeholders received as part of the consultative committee process, to expand on the guidance given;

9. To enhance readability, understanding and implementation of Part B of the Building Regulations, and to make certain editorial changes in the interests of clarity.

New sub-sections have been added to the document, to provide guidance for specific building uses (Purpose Groups - See **Table 1**); buildings containing flats, shopping centres, and small premises, as follows:

1. Subsection 1.6 Buildings Containing Flats
2. Subsection 1.7 Shopping Centres, and
3. Subsection 1.8 Small Premises (Shops and Offices)

Two new sections have been added to provide clarity and guidance in respect of:

1. Section 6 Smoke control systems in buildings; and
2. Section 7 Existing buildings.

The document has been changed from a 6 section Technical Guidance Document, to an 8 section Technical Guidance Document, as shown in **Table 2**.

Table 1 New Draft TGD B Purpose Groups			
Use	**Group**	**Purpose for which a building or compartment of a building is used**	
Residential (Dwellings) – Dwelling House	1(a) 1(b) 1(d)	Dwelling House < 4.5m Dwelling House > 4.5m Community Dwelling House	See Technical Guidance Document B Fire Safety – Volume 2 – Dwelling Houses
Residential (Dwellings) - Flat	1(c)	Separate and self-contained premises constructed or adapted for residential use and forming part of a building from some other part of which it is divided horizontally, (4)	
Residential (Institutional)	2(a)	Hospital, nursing home, home for old people or for children, school or other similar establishment used as living accommodation or for the treatment, care or maintenanceof persons suffering from illness or mental or physical disability, where such persons sleep on the premises.	
Residential (Other)	2(b)	Hotel, hostel, guest building, residential college, hall of residence, student accommodation, and any other residential purpose not described above.	
Office	3	Premises used for the purpose of administration, clerical work (including writing, bookkeeping, sorting papers, filing, typing, duplicating, machine calculating, drawing and the editorial preparation of matter for publication; handling money (including banking and building society work), telephone system operation).	
Shop	4(a)	Premises used for a retail or wholesale trade or business (including retail sales by auction, self-selection and over-the-counter wholesale trading, the business of lendingbooks or periodicals for gain and the business of a barber or hairdresser,) and premises to which the public is invited to deliver or to collect goods in connection with their hire, repair or other treatment, or where they themselves may carry out such repairs or other treatments.	
Shopping Centre	4(b)	A building which comprises a number of individually occupied premises to which common access is provided principally for the benefit of shoppers.	
Assembly and Recreation (1)	5(a)	“place of assembly” includes— (a) a theatre, public library, hall or other building of public resort used for social orrecreational purposes. (b) a non-residential school or other educational establishment. (c) a place of public worship. (d) a public house, restaurant or similar premises used for the sale to members of thepublic of food or drink for consumption on the premises. (e) a sports pavilion, stadium, grandstand, or other spectator accommodation. (f) a terminus, station or other facility for air, rail, road or sea travel.	
Day Centre (2)	5(b)	A building used for the provision of treatment or care to persons where such persons do not stay overnight and includes a day care centre, a pre-school, a crèche, and a day nursery;	
Industrial Class 1(3)	6(a)	Factories and other premises of normal risk, used for manufacturing, altering, repairing, cleaning, washing, breaking-up, adapting or processing any article, generating power or slaughtering livestock.	
Industrial Class 2 (3)	6(b)	Factories and other premises of high risk, used for manufacturing, altering, repairing, cleaning,washing, breaking-up, adapting or processing any article, generating power or slaughtering livestock.	
Storage Class 1 (3)	7(a)	Place for storage or deposit of goods or materials of normal risk other than those described under 7(c)	

Storage Class 2 [3]	7(b)	Place for storage or deposit of goods or materials of high risk other than those described under 7(c)
Car Park	7(c)	Car parks designed to admit and accommodate only cars, motorcycles, and passengeror light goods vehicles that have a design gross vehicle weight of less than 3500kg.
Other non-residential	8	Any other non-residential purpose not included in any other purpose group

Table 2 Correlation of Structure of the Current and New Draft TGD B

Current TGD B 2006		**Proposed TGD B 2023**	
Section No.	**Section Title**	**Section No.**	**Section Title**
	Introduction		Introduction
Section 0	Fire Safety	Section 0	Use of the Guidance
Section 1	Means of escape in case of fire	Section 1	Means of warning and escape in case of fire
Section 2	Internal fire spread (linings)	Section 2	Internal fire spread (linings)
Section 3	Internal fire spread (structure)	Section 3	Internal fire spread (structure)
Section 4	External fire spread	Section 4	External fire spread
Section 5	Access and facilities for the fire service	Section 5	Access and facilities for the fire service
		Section 6	Smoke control systems
		Section 7	Existing Buildings
Appendix A	Fire performance of Material and Structures	Appendix A	Fire performance of Material and Structures
Appendix B	Fire Doors	Appendix B	Fire Doors
Appendix C	Methods of Measurement	Appendix C	Methods of Measurement
Appendix D	Definitions	Appendix D	Sprinkler Systems
Appendix E	Assessment of Risk in Industrial and Storage Buildings	Appendix E	Assessment of Risk in Industrial and Storage Buildings
Appendix F	Reference Standards	Appendix F	Standards and Publications
Appendix G	Reference Publications	Appendix G	Other Publications
		Appendix H	Other Design Documents
		Appendix I	Summary of requirements at height

The most significant changes are summarised as follows:

1. Inclusion of a more specific scope;
2. Requirement for a sprinkler system in multi-storey Residential (Institutional) buildings;
3. Requirement for a second stairs (irrespective of travel distance) or a sprinkler system in buildings containing flats with a topmost floor > 30 m;
4. Reduction in sprinklered compartment sizes of shops from 4000 m^2 to 2000 m^2;
5. Reduction in risk where a high-risk storage is sprinklered, from 'high' risk' to 'normal' risk. The effect of this change is to allow an increase in compartment sizes in a sprinklered 'high' risk storage building, from 2000 m^2 to 14000 m^2,
6. Requirement for either; a fire resisting spandrel of 900 mm, or a fire resisting projection of 500 mm, or a sprinkler system, where a compartment floor meets an external wall;
7. Requirement for a fire resisting flanking wall, where a compartment wall meets an external wall;
8. Removal of the option of Diagram 17 for new buildings/extensions.[1]
9. Changes to the fire performance of external walls to inhibit fire spread;
10. Additional provisions for elements attached to the building, outside the thermal envelope;
11. New provisions for enhanced internal firefighter access to buildings, with a topmost floor height > 11 m, but < 20 m;
12. Creation of a new Section 6 for smoke control systems;
13. Creation of a new Section 7 for existing buildings;
14. Inclusion of high-rack storage > 7 m, as 'High Hazard' under Appendix E;
15. Change in requirement relating to the ventilation of protected escape stairways;
16. Additional requirements relating to the provision of additional materials to the external walls of existing buildings;
17. Additional requirement to provide insulated doors/shutters, where a door/shutter forms more than 25% of a compartment wall.

[1] **Note:** The provision is to be retained for existing buildings (Section 7);

Section 2: Cost Benefit Analysis

2.1 Identification and Description of Options

The Department has considered two options for this Regulatory Impact Analysis.

2.1.1 Option (A) – Do Nothing

Do not introduce changes to the building regulations, and do not update Technical Guidance Document B.

2.1.2 Option (B) – Update Part B/TGD B

Introduce amendments as proposed to the Building Regulations and enhance Technical Guidance Document B – Fire Safety, updating provisions, and incorporating all relevant guidance to provide for the design of common non-complex buildings in Ireland.

2.2 Impact Analysis

2.2.1 Option (A) – Do Nothing

Option (A) represents a 'standstill' approach which may ultimately result in the following negative impacts:

1. The current Part B (Fire Safety) of the Building Regulations and associated TGD B 2006 will not be updated in accordance with technical advancement of CEN standards, EU internal market common technical language and international practice, leaving ambiguity in respect of the application of documents cited in TGD B 2006 that have been withdrawn;
2. Inaction could result in less safe buildings than were envisaged when TGD B/ Part B 2006 was published due to the changes in the manner of how buildings are built, and changes in the configuration of buildings e.g. increased heights, larger, more complex structures, etc.
3. There will be no further clarity with respect to the application of Part B to existing buildings, to support the re-use of existing buildings;
4. There will be no enhancements to readability, understanding and implementation of Part B of the Building Regulations; and
5. Failure to update TGD B 2006 may result in local and regional variations in fire safety design for buildings in Ireland, with no clear guidance on national requirements leading to increased costs and maintaining the current status quo with respect to uncertainty.

2.2.2 Option (B) – Update Part B / TGD B

Updating Part B/TGD B will ensure that new buildings and existing buildings when altered, will meet adequate standards of fire safety. It will also reflect the outcome of detailed consideration of the submissions received in the preliminary public consultation process in 2011.

By introducing the additional provisions within Technical Guidance Document B for buildings containing flats, small premises, shopping centres, atria, places of assembly, and firefighting shafts, as well as updating the existing provisions of TGD B, the *prima facie* guidance to compliance with Part B of the Building Regulations will be enhanced as follows:

1. All relevant performance requirements for the design of buildings will be contained in one document. With the exception of hospitals and spectator accommodation at sports grounds, the necessary provisions will be included in TGD B. There should be no need to refer to other document for the principle fire safety design, of common non-complex buildings.

2. The provisions will be designed to work together, holistically, within the Technical Guidance Document, and with other Technical Guidance Documents to ensure that inconsistencies, and contradictions between documents are reduced.

3. The provisions will align with Irish policies and practices, such as evacuation policy, and, the objectives of the Building Regulations with respect to the design of buildings (as opposed to management of buildings after the completion of works)

4. The provisions take into account modern methods of construction and will ensure that the necessary safeguards and redundancies are built into buildings to ensure a reasonable level of safety.

5. The provisions will be responsive to past fire safety incidents that have occurred worldwide in, but not limited to, high-rise buildings containing flats, nursing homes, other residential (institutional) buildings, warehouses, shops and large deep basements.

6. The provisions will ensure that a large degree of flexibility can be utilised by providing options for owners and designers of buildings.

7. The provisions will work seamlessly with the BCAR system, by adhering to simple, straightforward means to compliance

8. The provisions will assist in the re-use of existing buildings, by means of the consolidation of provisions into a single section, with enhanced provisions for the conversion of uses to flats, or offices,

9. The provisions provide clarity, and interact seamlessly with other statutory provisions that come into effect after the completion of works, and after the building comes into use, e.g. management provisions under the Fire Services Act.

2.2.3 Impact of key Changes

The impacts of the key changes included in the new Draft Technical Guidance Document B are detailed hereunder

2.2.3.1 Inclusion of a Specific Scope to TGD B

Current Provision: The current provisions of TGD B specify that the document is aimed at common, non-complex buildings

Proposal: The proposed text of the new Draft TGD B provides a more prescriptive scope, and states that the Draft TGD B will apply to:

1. Buildings (excluding residential (institutional)) with a topmost floor height of 60 m.

2. Residential (institutional) buildings with a topmost floor height of 30 m.

Impact: Previous versions of TGD B specified that the document's use was limited to common, non-complex buildings. This provision will detail, in a more prescriptive manner, the building types that can be designed under TGD B to demonstrate *prima facie* compliance with Part B.

The impact of the new scope should be minimal; the vast majority of works (> 99%) when compared with works commenced 2018 – 2021 should be capable of being designed under the provisions and scope of the new draft TGD B.

2.2.3.2 Simplification and Consolidation of Provisions within TGD B

Current Provision: The current TGD B:

1. Utilises relevant provisions from a suite of British Standards and other documents (BS 5588 *suite*, Building Bulletin 7) for the design of means of escape, internal fire spread and access and facilities for the fire services.

2. Includes provisions located throughout the document, and through the suite of standards referenced above, for the design of smoke control systems.

3. Includes provisions located throughout the document relevant to the application

of Part B to existing buildings.

Proposal: It is proposed in the new Draft TGD B to:

1. Adopt relevant provisions equivalent to the currently cited documents into the Technical Guidance Document, creating new Subsections to Section 1, and introducing equivalent provisions to Sections 3 and 5 for the design of means of escape, compartmentation and access and facilities for the fire services.

2. Adopt relevant provisions equivalent to the currently cited documents into the Technical Guidance Document, creating a new Section 6 ‘Smoke Control Systems’.

3. Re-configure and enhance the provisions within the current document, with respect to existing buildings, into a new Section 7 ‘Existing Buildings’.

Impact: The impact of the inclusion of the additional provisions, as well as the creation of Sections 6 and 7 should be minimal. Any provisions added to the TGD will be broadly similar to those already applied in the built environment.

The inclusion of the new provisions, as well as the creation of Sections 6 and 7 should support the comprehension, interpretation and application of Part B of the Second Schedule to the Building Regulations.

The impact of the limited changes for Smoke Control Systems are as follows:

1. For all buildings; requiring the installation of an automatic vent, instead of manual vent in all common protected stairways,

2. For buildings with an atrium; the provisions represent a simple and straightforward approach to compliance with the Building Regulations that are in keeping with current provisions contained in cited documents.

3. For large undivided and windowless spaces, the requirement to ventilate a shop with a compartment floor > 4000 m^2 has been removed, as such a building is required to have a sprinkler system for compartments > 2000 m^2.

The impact of the limited changes for Existing Buildings are as follows:

1. Adding provisions specific to the change of use to buildings containing flats in support the re-use of existing buildings.

2. Adding provisions specific to the change of use to offices

This provision of ventilation, and the application of specific technical guidance to existing buildings is a function of the design of the building, therefore it is difficult to quantify the impact of the changes, however owing to the broad retention of current provisions; the impact should be minimal.

2.2.3.3 Clarification of Provisions Relating to Alternative Design Approaches

Current Provision: The current provisions of TGD B give guidance with respect to the application of alternative solutions and alternative approaches, including engineered solutions.

Proposal: It is proposed to modify the text of TGD B to clarify that alternative approaches may continue to be used, but such approaches are not considered to be a *prima facie* means of compliance. This modification clarifies the status of the guidance provided in the TGD B and aligns with the current legislative application of TGD B.

Impact: There should be no impact as a result of this simplification. The regulatory position of the Technical Guidance Document, and of the application of Articles 7(2) [2] and 7(3) [3] of the Building Regulations will not change.

In 2021, a survey, of all Building Control Authorities, in relation to the basis of design of commenced works, (which were the subject of a Fire Safety Certificate), was carried out. The commenced works were selected at random, from the BCMS.

Of the 424 works, 83% of works were based on Technical Guidance Document B, of which 5% included an alternative solution (a limited departure from the prescriptive requirements of TGD B). 17% of designs were based on an alternative approach.

The impact of the new provisions, with respect to alternative approaches, should be minimal as no regulatory changed is proposed.

2.2.3.4 Residential (Institutional) Buildings

Current Provision: Current provisions relating to the design of means of escape in residential (institutional) buildings are contained under Section 1.2.5. They rely heavily on the principle of progressive horizontal evacuation (the progressive movement of at-risk individuals from one part of the building to the next). The respective parts of the building are required to be protected by fire resisting construction.

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[2] Article 7(2) of the Building Regulations 1997 – 2022 states 'Subject to the provisions of sub-article (3), where works or a building to which these Regulations apply is or are designed and constructed in accordance with any guidance contained in a technical guidance document, this shall, prima facie, indicate compliance with the relevant requirements of these Regulations,'

[3] Article 7(3) of the Building Regulations 1997 – 2022 states 'The provisions of any guidance contained in a technical guidance document published under sub-article (1) concerning the use of a particular material, method of construction or specification, shall not be construed as prohibiting compliance with a requirement of these Regulations by the use of any other suitable material, method of construction or specification'.

These principles are reflective of similar principles applied in other jurisdictions. However, there have been a number of incidents internationally, in previous years where there has been loss of life owing to fire and smoke spread in such buildings[4].

In addition, an analysis of fire trends 2000 to 2020 show that the vast majority of structural fires have reduced in the last 20 years, as shown in Figure 1. An exception to this trend is a rise in fire incidents recorded in 'other institutional'[5] buildings, over the past 20 years, as shown in Figure 2.

Figure 1 - Total Structural Fires 2000 to 2020

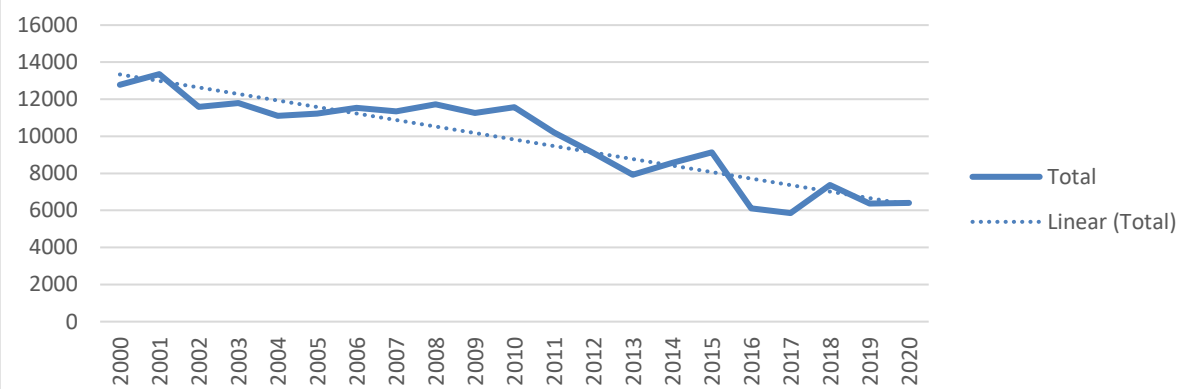
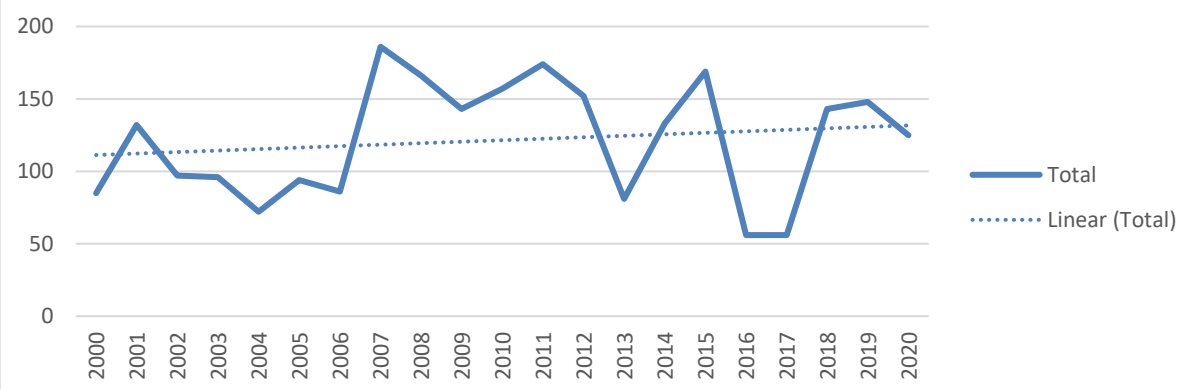


Figure 2 - Other Institutional Structural Fires 2000 to 2020



[4] Valencia, Spain, 2022. 6 fatalities
Quebec, Canada, 2014. 5 Fatalities
Sydney, Australia, 2011. 11 Fatalities
Royak, Bulgaria, 2021. 9 Fatalities
Rosepark, Scotland, 14 Fatalities
Russia, 2021. 11 Fatalities

[5] As distinct to 'hospitals', which are categorised separately.

Proposal: It is proposed to enhance the provisions relating to fire precautions in residential (institutional) buildings, having regard to the risk of the occupants, both by fire and smoke spread, and to the nature of the evacuation, i.e. progressive horizontal evacuation. It is proposed that the enhanced provisions will require the provision of a sprinkler system in new buildings with more than one storey, where sleeping accommodation is provided on any level other than ground level, and in any extension to a residential (institutional) building of more than 400 m^2 where sleeping accommodation is provided on any level other than ground level.

Impact: This change will require the installation of a sprinkler system in all new Residential (Institutional) buildings with more than one storey, where sleeping accommodation is provided on any level other than ground level. Currently, there is no mandatory requirement for the installation of a sprinkler system in such buildings.

The requirement for a sprinkler system would have impacted on 51.7% of all new residential (institutional) buildings, and 38% of all extensions built in the last 4 years if the new provisions were applicable to those works.

2.2.3.5 Single Escape Stairways

Current Provision: Currently, single escape stairways are permitted in buildings, of limited height, depending on use, and whether a single escape route is permitted, having regard to the provisions of horizontal means of escape.

The current provisions require more than one stairway where:

1. A school or a residential (Institutional) building has an upper floor,
2. A place of assembly has a floor height greater than 5 m,
3. A shop or office building of more than one storey, except a small premises,
4. Any other building has a floor height greater than 10 m.

Buildings containing flats have no specific height limitation requiring a second stairs.

Proposal: It is proposed that more than one stairway is required in:

1. A residential (Institutional) building where there is an upper floor,
2. A place of assembly or day centre which has a floor height greater than 5m,
3. A building containing flats, where the floor level is >30m, unless the building is fitted with a sprinkler system,
4. Any other building with a floor > 11 m,
5. Any basement with a depth > 3 m.

Impact: This change will require the provision of 2 escape stairways in all buildings containing flats with a topmost floor height > 30 m, or will require the provision of a sprinkler system throughout the building.

Currently, a building containing flats is permitted to have a single stairs[6], provided that travel distances are adhered to. Provision of sprinklers is dependent of corridor travel distances, and / or open plan layouts. In comparison, all other building types are required to have a second stairs where the topmost floor is > 11 m. In some cases (Residential (Institutional) buildings, and shopping centres), all floors above the ground floor are required to have a second stairs.

The vast majority of buildings containing flats commenced in the past 4 years were under 30 m. The requirement for a second stairs, or a sprinkler system would not have impacted on 98% of all such buildings commenced in the past 4 years (based on Commencement Notices lodged between 2018 and 2021).

2.2.3.6 Modification of Table 3.1

Current Provision: Table 3.1 specifies the 'Maximum area and cubic capacity of a building or compartment' in a tabular format. Shops are permitted to have an unsprinklered compartment size of 4000 m^2, and a sprinklered compartment size of 8000 m^2. High risk storage buildings are permitted to have a maximum unsprinklered compartment size of 1000 m^2, and a maximum sprinklered compartment size of 2000 m^2.

Proposal: It is proposed to introduce two changes to the current Table 3.1 as follows:

1) The maximum unsprinklered area for a shop will reduce from 4000 m^2 to 2000 m^2 (the maximum sprinklered area will be unchanged).

2) Where a high-risk storage area is sprinklered, it may be treated as a normal risk storage area, i.e. the maximum floor area may increase from 1000 m^2 to 14000 m^2.

Impact: For shops, this change will require the installation of sprinklers in buildings with a single compartment floor area of between 2000 m^2 and 4000 m^2. Buildings under this floor area (<2000 m^2) will not require the installation of sprinklers, and buildings >4000 m^2 already require the installation of sprinklers. Alternatively, a shop could be designed to have individual compartments of <2000 m^2 each, and would therefore not require the installation of a sprinkler system.

[6] Within the general scope of TGDB e.g. common building situations

Where a sprinkler system is installed, the maximum compartment size permitted is 8000 m^2, which is no change from current requirements.

For storage buildings, there is no change to the maximum unsprinklered size of a storage compartment. However, the provisions of the current Table 3.1 is proposed to be altered, such that upon installation of a sprinkler system, the maximum storage compartment size may increase from 2000 m^2 to 14000 m^2.

This change is being introduced due to the risk of rapid fire growth in shops, the variety of materials that can be stored and sold in shops, and the nature of the occupants of shops – members of the public who may be unfamiliar with the shops' escape routes. The provision is in keeping with requirements in Approved Document B (UK), the Scottish Technical Handbook (Scotland), and BS 9999 (UK).

The provisions relating to storage buildings will increase the flexibility and applicability of the prescriptive provisions of TGD B, in the design of larger storage facilities.

Based on Commencement Notices lodged between 2018 and 2021, the provisions would not have impacted on 80% of new shops, or 82.4% of all works to shops (excluding material alterations) with a floor area > 2000 m^2, or < 4000 m^2.

2.2.3.7 Additional Provisions Relating To a Compartment Floor / External Wall Junction

Current Provision: Currently, under Section 3, external walls which are loadbearing are required to have a fire resistance, as specified under Appendix A. In addition, where a compartment floor forms a junction with an external wall (with a cavity), TGD B specifies that such a junction is protected with a cavity barrier.

Where an external wall is not loadbearing, the requirements of fire resistance (EI) of the wall are determined by the provisions of Section 4 of TGD B. Where an external wall does not achieve the required fire resistance, then the wall is considered as an 'unprotected area'. The amount of unprotected area permitted is determined by the distance to the site or notional boundary, i.e. the greater the distance to the boundary, the more the external wall is permitted to be unprotected.

This can result in a narrow band of fire resisting material, the thickness of the floor, separating one compartment from the next compartment immediately above. This could result in the spread of fire from one compartment to the next, by means of the exterior of the building, bypassing all internal compartmentation.

The requirement for such a 'gap' of fire resisting construction between windows, often called a spandrel, can be found in the national fire safety requirements of Australia, New Zealand, Singapore, Hong Kong, and the United Arab Emirates.

In most cases the option of a projection, ranging from 500 mm to 760 mm, or a sprinkler system, can be used in place of the spandrel.

Proposal: In this change, it is proposed to include new provisions in Section 3 to strengthen compartmentation at the external wall/compartment floor junction.

The provisions of the new draft TGD B are as follows, and are supported by a proposed new diagram:

> Where a compartment floor meets an external wall, the compartmentation should be maintained by providing:

1. At the wall/floor junction a 0.9 m fire-resisting zone having the same fire resistance as the floor (from each side).
2. At compartment floor level an imperforate horizontal projection (which may incorporate a balcony) of not less than 0.5 m having the same fire resistance as the compartment floor (from the underside).
3. At compartment floor level a recess of not less than 0.5 m having the same fire resistance as the compartment floor (from the underside).
4. In all buildings, except residential (institutional) buildings (Purpose Group 2(a)), an appropriate sprinkler system, in accordance with Appendix D.
5. A fire sterile area, no less than 6 m high, provided directly inside the external wall. (Such an area should be separated by compartmentation, and may incorporate a protected shaft, common protected corridor, or other fire sterile area.)

This change will impact primarily on buildings containing flats (Purpose Group 1(c)), Residential (Institutional) buildings (Purpose Group 2(a)), and Residential (Other) buildings (Purpose Group 2(b)), buildings of any height as each floor in buildings of these types are required to be compartment floors.

This provision will not have an impact upon other non-residential buildings (Purpose Group 3 to 8) with a topmost floor height > 30 m as all such buildings are required to have a sprinkler system.

There may be an impact on non-residential buildings (Purpose Group 3 to 8), where a compartment floor is required by virtue of compartment volumes being exceeded.

Shopping Centres are already required to be sprinklered, and therefore will not require such a spandrel. Other buildings that are required to have a sprinkler system, by virtue of size or design configuration will equally not require a spandrel.

Based on Commencement Notices lodged between 2018 and 2021, the provision would have impacted on 38.63% of buildings built in the last 4 years. The provisions may have impacted on a number of the 50.48% of buildings that do not automatically require compartment floors, but may have such floors owing to the scale or nature of the building.

This provision can be achieved through current construction methods, such as twin-leaf masonry, timber frame external walls, and light gauge steel external wall systems with a fire performance from each side. The provision of a sprinkler system due to the nature of the building (height, use, etc.) will also satisfy these requirements.

2.2.3.8 Provision of Additional Requirements In Relation To the Junction of a Compartment Wall and an External Wall

Current Provision: Similar to the provisions of Change No. 54 which is designed to address vulnerabilities between compartments in external walls from vertical fire spread, there can exist similar vulnerabilities in external walls, between compartments, by means of lateral fire spread. This can occur where external walls form a re-entrant angle (typically where the angle is <180^{o}). Currently, specific provisions to address these vulnerabilities are specified under Section 3.5 for Residential (Institutional) buildings.

Proposal: It is proposed in the new Draft TGD B to require lateral protection where a compartment wall meets an external wall. The amount of protection required is specific to the use of the building, and the proposed external angle, as follows:

> For all buildings, excluding Residential (Institutional) (PG2(a)) buildings, a distance of:
>
> (a) 0.5 m, where the internal angle is between 90^{o} and 135^{o}, or
>
> (b) 1.0 m, where the internal angle is <90^{o}.
>
> For Residential (Institutional) (buildings), a distance of:
>
> (a) 1.0 m, where the internal angle is >135^{o}, or
>
> (b) 1.8 m, where the internal angle is <135^{o}.

This provision will not apply to: offices with an open atrium, or buildings where a sprinkler system has been installed throughout the building or compartment, on each side of the compartment wall serving accommodation.

Impact: This change will require the provision of lateral fire protection at the compartment wall/external wall junction. Such protection is not required in any building that is provided with a sprinkler system, and is not required in any non-Residential (Institutional) building that has an angle of > 135^{o}.

The provision will require lateral protection in all Residential (Institutional) buildings, and as such, can be subject to a cost impact and a benefit assessment.
In all other non-sprinklered buildings, it is a function of the design of the building, however, as the provision only impacts on external wall/ compartment wall junctions of < 135^{o}, the impact should be limited.

This provision is a function of the design of the building, therefore its impact is difficult to quantify. It will occur where a compartment wall meets an external wall.

2.2.3.9 Removal of Diagram 17

Current Provision: Currently, the provisions of Section 3.3, specify the requirements for protection of cavities in buildings, including requirements for external walls with cavities. Either:

(a) cavity barriers of a specified fire performance are required at the at the junction of a compartment wall or floor and an external wall; or

(b) Cavities are required to be closed by window or door frames (no specified fire performance) of an external wall. The means to comply is indicated in Diagram 17. Such a wall must be constructed of twin-leaf masonry

Where external walls are not constructed of twin leaf masonry, only (a) above is applicable. The protection of the cavity by means of (b) above can be affected, post-completion, by any additional openings being created in the external wall. This provision was removed from TGD B 2017 for dwellings, in preference of the protection at the separating wall/external wall junction.

Proposal: It is proposed in the new draft TGD B to remove the Diagram 17 for new buildings, and to require cavity barriers as per Table 3.2, at the junction of a compartment wall or floor and an external wall.

Impact: This change will impact on the provision of cavity barriers within masonry cavity wall construction, by requiring cavity barriers at the junction of compartment walls / floors and external walls.

This provision is a function of the design of the building, therefore its impact is difficult to quantify. It will apply only in the new case of masonry cavity construction. The provisions of Diagram 17 have been incorporated into Section 7 and will continue to be applicable for existing buildings.

2.2.3.10 Changes to requirements with respect to external walls fire spread

Current Provision: Currently, provisions for 'External Surfaces, and External wall construction', are set out under Para's 4.1.4, 4.1.5, and Table 4.1.

Para 4.1.4 requires that 'external surfaces of walls should meet the reaction to fire classifications set out under Table 4.1'.

Para 4.1.5 requires that 'In the case of the outer cladding of a wall with a drained and/or ventilated cavity, the surface of the outer cladding which faces the cavity should also meet the classifications of Table 4.1. In a building more than 18m high, (see Diagram 37, Appendix C) insulation material used in drained and/or ventilated cavities in the external wall construction should be of limited combustibility (see Appendix A). This restriction does not apply to masonry cavity wall construction which complies with Diagram 17. Advice on the use of thermal insulation material is given in the BRE Report Fire performance of external thermal insulation for walls of multi-storey buildings (BR 135, 1988).'

The provisions for external walls relate to the outermost face, or to surfaces facing a cavity, but not to the wall as a whole.

In the aftermath of Grenfell and other incidents, which have occurred worldwide, involving the spread of fire up the face of a building, many national regulatory provisions have been updated, to strengthen requirements.

Proposal: It is proposed in the new draft TGD B to:

(a) Create a new definition of an 'external wall', to include all elements of the external wall from the innermost to the outermost face;

(b) Require that all elements forming the external wall build-up (excluding exempted elements), for buildings with a topmost storey height > 15 m to either:
   (i) meet the requirements of Table 20 (below); or

   (ii) Meet the performance requirements set out under BR 135:2003, when tested to BS 8414.

(c) Maintain the current provisions for external walls, for buildings with a topmost floor height of <15 m, but to also include a provision that, irrespective of building use or height,

> "Appropriate consideration should be given in the selection of materials or systems used for the external wall, or elements fixed to the external wall, to reduce the risk of fire spread over the face of the wall".

Table 20 Reaction-to-fire Classification for all Materials in External Walls			
Purpose Group	**Height of topmost floor**	**Less than 1m to relevant boundary(5)**	**More than 1m to relevant boundary(5)**
2a, 2b, 3, 4, 5, 6, 7, 8	Single storey	Class B-s3,d2 (2)	No requirement
2a	More than one storey, < 15 m	Class B-s3,d2 (2)	Class B-s3,d2 (1) (2)
3, 4, 6, 7, 8	More than one storey, < 15 m	Class B-s3,d2 (2)	Class C-s3,d2 (1) (2)
3, 4, 6, 7, 8	More than one storey, > 15 m	Class B-s3,d2(3) (4)	Class B-s3,d2 (3) (4)
1c, 2b, 5	More than one storey, < 15 m	Class B-s3,d0 (2)	Class C-s3,d0 (1) (2)
1c, 2a, 2b, 5	More than one storey, > 15 m	Class A2-s1,d0(3) (4)	Class A2-s1,d0 (3) (4)

Notes:

(1) Timber cladding at least 9mm thick is also appropriate where fixed directly to a substrate composed of materials with a reaction-to-fire classification achieving A1.
(2) Applicable only to the outermost wall element.
(3) Applicable to the whole wall build-up, and to external attachments
(4) Balcony floors should achieve a 'fl' classification under I.S. EN 13501-1.
(5) For buildings of any height or use, appropriate consideration should be given in the selection of materials or systems used for the external wall, or elements fixed to the external wall, to reduce the risk of fire spread over the face of the wall.

Figure 3: Table 20 of the New Draft TGD B

The components excluded from the requirements of Table 20 of the New Draft TGD B, for buildings with a topmost floor height of > 15m are as follows:

(a) the innermost lining of the external wall, provided that the lining conforms to Section 2;

(b) cavity trays, or insulating material when used between two leaves of masonry or concrete of at least 75 mm;

(c) timber frame walls with an external masonry leaf designed and constructed in accordance with I.S. 440;

(d) any part of a roof that is pitched at an angle of 70º or more to the horizontal adjoining an area to which people have access (excluding access solely for the purposes of repair and maintenance);

(e) door frames and doors;

(f) paint applied to the outermost face of the wall;

(g) pipes and cables used to distribute power or services;

(h) insulation and water proofing materials used at or below DPC level;

(i) roof flashings and any roof membranes designed to prevent water ingress to the roof;

(j) intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B;

(k) membranes;

(l) seals, gaskets, fixings, sealants and backer rods;

(m) thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L;

(n) window frames and glass (including laminated glass); and

(o) vents penetrating the external wall.

Impact:

The new provisions aim to:

- Specify provisions for buildings, related to their use and height, emphasising the performance requirements with respect to external walls,
- Require increasing performance with height, in relation to classification,
- Require increasing performance with height, in relation to the production of smoke and flaming droplets

This change will require that all materials forming part of the external wall build-up (excluding the elements listed a – o above) achieve a specific reaction to fire performance (RtF) in buildings with a sleeping risk, and which has a topmost floor height of 15m (equivalent to a building height (façade) of 18 m). The RtF performance of the wall elements in respect of such a building is Class A2 - s1,d0, or better. This is comparable to the approach and performance permitted in other jurisdictions.

Alternatively, where a whole wall system has been tested to BS 8414-1, or BS 8414-2, and has achieved the performance of BR 135, such a system may be used in place of wall elements achieving the required RtF.

This provision, coupled with the provision for protection at the compartment floor / external wall junction (Change 54), and the provision for elements external to the thermal envelope (Change 66) will substantially support and strengthen the construction of external walls, reducing the likelihood of external wall fire spread. In buildings with a topmost floor height of >15 m.

The requirement for external walls to achieve classification of A2-s1,d0, or to have a

BS 8414 test would not have impacted on 94% of all such new buildings commenced in the past 4 years.

2.2.3.11 Inclusion of additional provisions relating to 'elements external to the thermal envelope of the building'

Current Provision: Currently, there are no provisions within TGD B relating to the reaction to fire classification of elements external to the thermal envelope of the building, such as balconies, green walls, solar shading, etc. Nor are there any provisions or performance specifications relating to their contribution to fire spread up the face of the building.

Proposal: It is proposed to include in the draft TGD B, provisions relating to elements external to the thermal envelope for buildings with a topmost floor height of >15 m. Elements such as open balcony, a device for reducing heat gain, a solar panel, etc., are also required to meet the provisions of Table 20.

Impact: This change will require that elements external to the thermal envelope such as open balcony, a device for reducing heat gain, a solar panel, etc., achieve a specific reaction to fire performance (RtF). Any building with a sleeping risk, and which has a topmost floor height of 15 m (equivalent to a building height (façade) of 18 m) must have an external elements constructed of materials achieving Class A2-s1do, or better. This is comparable to the approach and performance permitted in other jurisdictions.

This provision is a function of the design of the building, therefore its impact is difficult to quantify.

2.2.3.12 Requirements for Firefighter access and Fire Mains (Dry or Wet Risers)

Current Provision: The current TGD B specifies 2 means for firefighting access and facilities in buildings, which are distinctly different, depending on whether the topmost floor of the building is below, or above 20 m.

For buildings with a topmost floor level below 20 m, access is provided by means of a combination of (a) external fire service access, depending on the volume of the building, to a specific % of the perimeter, and (b) internal firefighter access via protected stairs.

The proportion of external access is dependent on the volume of the building, with the height defining the vehicle access requirements – pump or high reach. As shown on Table 5.1 of the current TGD B, shown in Figure 4, a building with a topmost floor over 10m, with a volume up to 56,000 m^3, would require access to 50% of the perimeter of the building, i.e., half of the building.

Proposal: It is proposed to require internal fire mains in buildings with a sleeping risk, and in shopping centres, with a topmost floor level of > 11 m, located within a protected stairway, which has a fire resistance of 60 minutes. In addition, it is proposed that 'For such buildings with a floor area of greater than 900 m^2 there should be a minimum of 2 such protected stairways,' and that 'All points on the floor should be no more than 45 m from the entrance door to the stairway containing the fire main, measured on a route suitable for laying hose'.

Concurrently, it is proposed that the current provisions relating to vehicle access to a building with a topmost floor > 11 m would be changed, from a percentage of perimeter of the building; to within 18 m, and within sight of the inlet.

It is proposed to provide similar enhanced firefighter access to basements with two or more floors > 900 m^2.

Table 5.1 **Vehicle access to buildings**

Volume of building (m^3)	Height of top storey above ground (m)	Provide vehicle access	Type of appliance
up to 7,000	under 10	at rate of 2.4 m in length for every 90 m^2 of ground floor area	pump
	over 10	to 15% of perimeter	high reach
7,000-28,000	up to 10	to 15% of perimeter	pump
	over 10	to 50% of perimeter	high reach
28,500-56,000	up to 10	to 50% of perimeter	pump
	over 10	to 50% of perimeter	high reach
56,000-85,000	up to 10	to 75% of perimeter	pump
	over 10	to 75% of perimeter	high reach
over 85,000	up to 10	to 100% of perimeter	pump
	over 10	to 100% of perimeter	high reach

Figure 4 Table 5.1 of the current TGD B

Impact: For buildings with a topmost floor height < 11 m, or >20m, there will be no change in requirement. Nor will there be a change in requirement for buildings with a topmost floor height between 11 m and 20 m, which are not sleeping risk buildings, and for those which are not a shopping centre.

The provision will require the installation of a dry riser in the stairway, for sleeping risk buildings, and for shopping centres with a topmost floor height > 11 m, but < 20 m. The perimeter access provision will not apply in such buildings.

Based on Commencement Notices lodged between 2018 and 2021, the provisions would not have impacted on 89.2% of new relevant buildings.

2.2.3.13 Appendix E

Current Provision: Currently, there are no provisions within TGD B relating to the risk of fire spread presented by high-rack storage.

Proposal: It is proposed that any racking over 7 m is considered to be high risk, as such, any building containing such high-rack storage would be required to either a) limit individual compartment sizes to 1000 m^2, or b) provide a sprinkler system. Where a sprinkler system is provided, the maximum compartment size is permitted to be 14,000 m^2.

This change has been introduced, as high-rack storage has been recognised as having an ultra-fast fire growth rate. This fire growth rate, coupled with the variable nature of materials that can be stored can present a difficulty for building regulatory compliance. As such, the inclusion of high-rack storage into Appendix E will ensure that storage buildings are either designed for normal risk, i.e. will not have racking with a storage height > 7 m, or are designed for high risk, i.e. could have racking > 7 m.

Where a building is designed for high risk storage, two design options are provided – substantial compartmentation, or the provision of a sprinkler system.

Impact: This provision will require either the provision of compartments of no more than 1000 m^2, or a sprinkler system, in storage buildings with high-rack storage.

Based on Commencement Notices lodged between 2018 and 2021, the provisions would not have impacted on 89.2% of all relevant buildings / works commenced.

2.3 Cost

2.3.1 Option (A) – No Change

While the cost of the ‘do nothing’ option cannot be quantified, there will be a substantial unquantifiable cost increase associated with this option, leading to an increase in cost of development due to:

1. Uncertainty at the outset of the design process, potential delays to the approvals process (the Fire Safety Certificate applications) as Building Control Officers assess designs in the absence of national guidance.
2. Variations in application of building regulations at local, regional, and national level due to the absence of updated national guidance, and differences in interpretation and application of Building Regulations with respect to fire safety. Developers, designers, and regulators may have to:
    a. utilise the ‘best practice’ guidance, perhaps in an ad-hoc manner, or
    b. Look at other international guidance as alternative approaches to compliance, to determine the minimum requirements for safety.
3. No further alignment of the document with the common technical language to facilitate the effective functioning of the EU internal market.
4. No further alignment with other TGD’s that have been published since 2006.
5. No further clarity with respect to the application of Part B to existing buildings, to support the re-use of existing buildings.
6. No update with respect to changes in standards and practice.
7. No enhancements to readability, understanding and implementation of Part B of the Building Regulations.

2.3.2 Option (B) – Update Part B / TGD B

There are additional costs associated with this option. Additional cost estimates for the changes to Part B / Technical Guidance Document B, as outlined in Section 1 are as set out below.

Cost data was provided by a private sector Quantity Surveying practice, with estimated costs independently assessed, to market values in June/July 2022. Outline details relating to the costs methodology is outlined in Appendix 5.

Many of the changes to TGD B will result in a cost saving, as a result of the inclusion of options in design choices, and the application, in the built environment, of a holistic document for the design of fire safety.

Design and market choices can often have a cost impact or benefit. In many cases, current building designs have performances in addition to those of the current TGD B, or which are in alignment to the new Draft TGD B, e.g. insulation materials with a Reaction to Fire classification of A2-s3,d2 or better in sleeping risk or assembly buildings with a topmost floor height of > 15 m, or sprinklers in certain uses.

However, for the purposes of this RIA, changes to the performance requirements of the TGD which have a cost increase have been examined. It is also noted that the new Draft TGD B represents, with the exception of the Additional Guidance published in 2020, and other minor variations in preceding years, the first substantial change to the requirements for fire safety in buildings other than dwelling houses, since 2006.

A summary of the estimated costs are included in **Error! Reference source not found.** Detailed breakdowns of each building type are provided in Appendix 5.

The typical average estimated extra over (EO) cost increases (%), for new buildings, as a result of the new and modified provisions, when compared to the provisions of the current TGD B, are as follows:

1) Buildings containing flats:

   a) Duplex (Flat type 1):
      i) Estimated impact on the sample building: 0.0 % - 0.25%

   b) 5 storey building, 2 stairs, 34 units (Flat Type 2)
      i) Estimated impact on the sample building: 0.9 % - 1.35%

   c) 12 storey building, 3 single stair ‘blocks’, 229 units (Flat Type 3)
      i) Estimated impact on the sample building: 0. 4 % - 0.7%

2) Residential (Institutional) buildings:
   i) Estimated impact on the sample building: 5.6%

3) Residential (Other) buildings:
   i) Estimated impact on the sample building: 0. 8 % - 1.1%

4) Residential (Other) buildings – Student Accommodation
   i) Estimated impact on the sample building: 1. 2 % - 1.4%

5) Shop buildings
   i) Estimated impact on the sample building: 0.0 % - 0.6%

6) Storage buildings
   i) Estimated impact on the sample building: 0.0 % - 11.95%

7) Office buildings
   a) 7 storey over 2 storey basement (Office Type 1)
      i) Estimated impact on the sample building – range depending on the particular solution[7] selected: 0.2 % - 8.0%

   b) 9 storey over 2 storey basement (Office type 2)
      i) The sample building could be constructed under the provisions of the new draft TGD B with little variation. Minimal cost impact.[8]

[7] 6 options were examined for this building type:

- 1) spandrel at first floor level, separating the non-office ground floor from the upper floor offices forming a single compartment
- 2) 500 mm projection at first floor level, separating the non-office ground floor from the upper floor offices forming a single compartment
- 3) 900 mm spandrel at each upper floor, each office floor a separate compartment
- 4) 500 mm projection at each upper floor, each office floor a separate compartment
- 5) sprinklers at ground floor level
- 6) sprinklers throughout

[8] The proposed design includes a sprinkler system and an atrium. The provision of a sprinkler system or an atrium satisfies the requirements in respect of the compartment floor/external wall junction. Stairs are sized to facilitate a simultaneous evacuation of the building.

Table 3 Summary of Average Cost Impact on the Selected Sample Buildings, as a Result of the Changes of TGD B					
Sample Building	**No. of units (sample building)**	**Floor area (m^2) (sample building)**	**Average no. of buildings of this type commenced per annum (2018 to 2021)[9]**	**Estimated cost increase (sample building)**	**Notes**
Flats (1c): Duplex	2	212	168	0.0% - 0.25%	Estimated range in cost increase due to a) designs having cavity barriers at cavity wall / compartment floor junctions or b) cavity barriers being required at cavity wall / compartment floor junctions in place of current Diagram 17 provisions. Probable cost saving due to clarity of requirement with respect to cavity fire spread.
Flats (1c): 5 storeys[10],	34	3141	416[11]	0.9% – 1.4%	Flexibility in design choice, area of glazing etc. results in the estimated range in cost increase.
Flats (1c): 11 storeys	229	19386	47[12]	0.4% – 0.7%	Flexibility in design choice; external wall build-up, area of glazing, provision of suppression systems etc. results in the estimated range in cost increase.
Residential (Institutional)	1	10000	11	5.6%	Estimated range in cost increase due to a) fixed costs associated with the suppression system and variable costs. Estimated cost increase will be proportional to the overall building size
Residential (Other) – Hotel	1	3623	42.85	0. 8% - 1.1%	Flexibility in design choice; external wall build-up, area of glazing etc. results in the estimated range in cost increase.
Residential (Other) – Student accommodation Option A (Hall of Residence)	296 bed spaces	9840	9.5	1.2%	Flexibility in design choice; external wall build-up, provision of fire resisting projection, area of glazing etc. results in the estimated range in cost increase.
Residential (Other) – Student accommodation Option B	53 units, 286 bed spaces			1.4%	Flexibility in design choice; external wall build-up, provision of fire resisting projection, area of glazing etc. results in the estimated range in cost increase.
Shop	1	2506	9	0.0% - 11.6%	Flexibility in design choice, i.e. provision of fire resisting subdivisions, to maintain each floor area < 2000 m^2 or the provision of a sprinkler system to undivided floor areas 2000 m^2 – 400 0m^2 results in the estimated range in cost increase.
High-fire risk Storage	1	5941	20	0.0 - 11.9%	Estimated range in cost increase due to fixed and variable costs associated with the suppression system. Estimated cost increase will be proportional to the overall building size, and to the specific suppression system selected. No impact on normal risk buildings. Probable cost saving due to substantially increased compartment size – from 2000m^2 to 14000m^2
Offices: 7 storey over basement	1	11600	65[13]	0.2% - 8.0%	Flexibility in design choice, in the provision of a spandrel, etc. where a compartment floor meets an external wall, in external wall build-up.
Offices: 10 storey over basement	1	27650	5[14]	0%	Flexibility in design choice, in the provision of a spandrel, etc. where a compartment floor meets an external wall, in external wall build-up, options related to the provision of atria.

[9] Based on BCMS Commencement Data 2018 - 2021
[10] Excluding duplexes
[11] Buildings containing flats 2 to 5 storeys
[12] Buildings containing flats 6+ storeys
[13] 1 to 7 storey buildings
[14] 8+ storey buildings

2.4 Benefits

2.4.1 Option (A) – No Change

With the ‘do nothing’ option, no benefits are expected. The consequences of the ‘do nothing’ option includes all of the following:

1. Uncertainty at the outset of the design process, potential delays to the approvals process (the Fire Safety Certificate applications) as Building Control Officers / Fire Officers assess designs in the absence of national guidance.
2. Variations in application of building regulations at local, regional, and national level due to the absence of updated national guidance, and differences in interpretation and application of Building Regulations with respect to fire safety. Developers, designers, and regulators may have to
    a) utilise the ‘best practice’ guidance, perhaps in an ad-hoc manner, or
    b) Look at other international guidance as alternative approaches to compliance, to determine the minimum requirements for safety.
3. No further alignment of the document with the common technical language to facilitate the effective functioning of the EU internal market.
4. No further alignment with other TGD’s that have been updated since 2006.
5. No further clarity with respect to the application of Part B to existing buildings, to support the re-use of existing buildings.
6. No update with respect to changes in standards and practice.
7. No enhancements to readability, understanding and implementation of Part B of the Building Regulations.

2.4.2 Option (B) – Update Part B / TGD B

The benefits of Option B are as follows:

1) **Enhancement of readability, understanding and implementation of Part B of the Building Regulations:**
    a) The new draft TGD B consolidates the necessary provisions for compliance with Part B of the Building Regulations into a single document. This consolidation should provide any user of TGD B with sufficient information to design a building, to specific holistic performance requirements in accordance with the Building Regulations, without having need to reference any other document for design guidance.

The flexibility built into the TGD should allow designers considerable scope and latitude in designing buildings.

b) The technical guidance document would be updated, re-formatted and re-configured to promote ease of use, understanding and interpretation.

c) All relevant performance requirements for the design of buildings will be contained in one document. With the exception of hospitals and spectator accommodation at sports grounds, the necessary provisions will be included in TGD B. There should be no need to refer to other document for fire safety design of simple non-complex buildings.

d) The new provisions will be designed to work together, holistically, within the Technical Guidance Document, and with other Technical Guidance Documents to ensure that inconsistencies and contradictions between documents are reduced.

e) The provisions will align with Irish policies and practices, with national legislation and societal needs, specific to bespoke Irish requirements.

f) The provisions will account for modern methods of construction and will ensure that the necessary safeguards and redundancies are built into buildings to ensure a reasonable level of safety.

g) The provisions will ensure that a large degree of flexibility can be utilised by providing options for designers.

h) The provisions will work seamlessly with the BCAR system, by adhering to simple, straightforward means to compliance.

2) Emphasis on existing buildings:

a) The creation of Section 7, specific to existing buildings, should provide clarity with respect to the requirements for such buildings.

b) The provisions will support the re-use of existing buildings, by means of the consolidation of provisions into a single section

c) The provisions of Section 7 have been enhanced to support the conversion of non-dwellings to dwellings (to flats).

3) Driving compliance and standards through regulatory reform:

a) The provisions will be consistent with the broad application of the Building Control Act, insofar as it relates to the design of buildings to ensure the health and safety of people in and around such buildings.

b) Improvements in the health and safety of people in and around buildings by adding provisions which are responsive to past incidents that have occurred worldwide in, but not limited to, high-rise buildings containing flats, nursing homes, other residential (institutional) buildings, warehouses, shops and large deep basements. The additional provisions are specific and targeted at buildings with the highest risk to occupants.

c) The provisions will be consistent with, and interact seamlessly with other statutory provisions that come into effect after the completion of works, and after the building comes into use, e.g. management provisions under the Fire Services Act.

2.4.3 Cost / Benefit analysis (Option B) per building type

Buildings Containing Flats

There is a cost associated with this building type. The estimated increase-in-cost range for the sample buildings is expected to be in the range of 0.25% - 1.4 % when current requirements are compared with new requirements for the sample buildings.

The range of assessed cost increases is dependent on the building design, height, configuration, the provision of spandrels or projections in non-sprinklered buildings, and the provision of enhanced facilities for firefighting.

The cost study identified considerable flexibility and range in costs, owing to external wall build-ups in buildings with a topmost storey height > 15 m. The new Draft TGD B requires a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), or a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or having insulation of any RtF in an external wall of twin leaf masonry.

The interventions resulting in cost increases are as essential provisions, to protect people sleeping in buildings they are not familiar with, by preventing fire spread up the face of the building.

Residential (Institutional) Buildings

There is a cost associated with this building type. The estimated increase-in-cost for the sample building is 5.60% when current requirements are compared with new requirements for the sample building.

The cost increases are a result of the requirement for a sprinkler system to multi-story care facilities. Single storey facilities are not affected.

This is seen as an essential provision, to protect those most at risk - older persons in their care setting by inhibiting fire growth and spread.

Residential (Other) Buildings – Excluding Student Accommodation

There is a cost associated with this building type. The estimated increase-in-cost range for the sample buildings is 0.4% - 1.05% when current requirements are compared with new requirements for the sample building.

The range of assessed cost increases is dependent on the building height, configuration, external wall build-up, provision of suppression systems, etc.

The range of assessed cost increases is dependent on the building design, height, configuration, the provision of spandrels or projections in non-sprinklered buildings, and the provision of enhanced facilities for firefighting.

The cost study identified considerable flexibility and range in costs, owing to external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), or a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or having insulation of any RtF in an external wall of twin leaf masonry.

The interventions resulting in cost increases are as essential provisions, to protect people sleeping in buildings they are not familiar with, by preventing fire spread up the face of the building.

Residential (Other) Buildings – Student Accommodation

There is a cost associated with this building type. The estimated increase-in-cost range for the sample buildings is 1.05% - 1.8% when current requirements are compared with new requirements for the sample building.

In addition costs were assessed in respect of the provision of the new TGD B requirements to current industry standards in the provision of student accommodation.

The range of assessed cost increases is dependent on the building design, height, configuration, the provision of spandrels or projections in non-sprinklered buildings, and the provision of enhanced facilities for firefighting.

The cost study identified considerable flexibility and range in costs, owing to external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), or a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or having insulation of any RtF in an external wall of twin leaf masonry.

The interventions resulting in cost increases are as essential provisions, to protect people sleeping in buildings by preventing fire spread up the face of the building.

Shop Buildings

There is a cost associated with this building type. The increase-in-cost for the sample building is 11.6% when current requirements are compared with new requirements for the sample building.

The estimated cost increase is a result of the provision of a sprinkler system in shops with a floor area of between 2000 m^2 and 4000 m^2. The provision of such a sprinkler system, in place of additional compartmentation, to keep individual compartments to a size under 2000 m^2 is a design choice.

The provisions of the New Draft TGD B offer a design choice for such buildings, while maintaining resilience in buildings that could have a medium to fast fire growth rate. The provisions of ventilation for such buildings have also been removed, as a result of the inclusion of sprinklers for such designs.

Storage Buildings

There is a cost associated with this building type, where the building is designed to store high fire risk products, or products that may be stored in a high-fire risk configuration. The provisions of the new Draft TGD B specify that high-rack storage, with a racking height >7 m represents a high risk, and therefore, compartment for such unsprinklered buildings is limited to 1000 m^2, or where a sprinkler system is provided, such a building may have a maximum compartment size of 14,000 m^2.

This 14000 m^2 compartment size has been increased, for all storage buildings, from the current 2000 m^2.

The increase-in-cost for the sample building is 11.95% when current requirements are compared with new requirements for the sample building.

Office Buildings

There is a cost associated with this building type, however, the application of additional costs are dependent on the building design – height, occupancy characteristics, inclusion of an atrium, separation into distinct uses, provision of a sprinkler system, etc.

For buildings with no sprinkler system, or no atrium, the increase-in-cost for the sample buildings, depending on the particular configuration, is 0.2% - 8% when current requirements are compared with new requirements for the sample building.

The range of cost increases is dependent on internal subdivision by compartment floors[15], overall building size, the provision of atria in the building, the provision of sprinkler systems in the building, etc. For contiguous office buildings, with an atrium or a sprinkler system, there should be little cost impact when compared with the provisions of the current TGD B.

2.5 Other Impacts

2.5.1 Competition Assessment

There are no significant areas where issues of competition, restriction or imbalance have been identified. The Department of Housing, Local Government and Heritage considers that the proposal would have no significant effect on competition in any markets. The Department also considers that the proposals apply in a proportional and equitable way.

2.5.2 Consultation

2.5.2.1 Stakeholder Engagement

In December 2020, the Department of Housing, Local Government and Heritage established a Consultative Committee to examine the most significant proposed changes to TGD B. The following organisations are represented on the Working Group:

1. Royal Institute of the Architects of Ireland,
2. Engineers Ireland,
3. Society of Chartered Surveyors of Ireland,
4. Chief Fire Officers Association,
5. Construction Industry Federation,
6. Property Industry Ireland,
7. Building Materials Federation,
8. Irish Building Control Institute,
9. National Building Control Office,
10. National Standards Authority of Ireland,
11. Institution of Fire Engineers – Republic of Ireland,
12. Dublin Fire Brigade,
13. Cork City Fire Brigade,
14. Office of Public Works,
15. National Disability Authority,
16. Health Service Executive – Estates,

[15] This is often a design choice and not driven by the minimum standards set out in the Technical Guidance Document to the Building Regulations.

17. Department of Education and Skills,
18. Department of Housing, Local Government and Heritage.

The Consultative Committee met nine times. In addition, a number of meetings of a costs group, formed of members of the consultative committee were held.

The Department of Housing, Local Government and Heritage sincerely thank the Working Group for their huge personal effort and contribution to the process.

2.5.2.2 Public Consultation

The draft documentation including DRAFT Building Regulations (Part B Amendment) Regulations 2023, DRAFT Technical Guidance Document B 2023 – Fire Safety – Volume 1 – Buildings Other than Dwellings, and this DRAFT Preliminary Regulatory Impact Analysis, were published to support a public consultation on the matter.

2.5.2.3 Consultation with the European Commission

In accordance with the notification requirements of Directive (EU) 2015/1535[16], the European Commission were notified of the DRAFT regulations/Technical Guidance Document and this Preliminary Regulatory Impact Analysis. The notification will allow the European Commission and the Member States of the EU to examine the technical regulations before their adoption.

2.5.2 Regulatory Burden

There will be a requirement for additional training of Building Control Officers. This will be included as part of ongoing training delivered by the National Building Control Office.

As the norm is to allow for a transitional lead in period, building designers will have a period of time to adapt to the proposed revisions. It is proposed that the regulations will come into effect approximately 12 months from the date of signing of the final version of the modifications to The Building Regulations, to Part B, and to Technical Guidance Document B, taking into account any assessment received as part of the public consultation, subject to transitional periods. It is generally accepted in the industry that Building Standards and Codes of Practice evolve over time. This should not have any major impact on design and supervision fees.

[16] Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

2.5.3 Enforcement and Compliance

The primary responsibility for compliance with the requirements of the Building Regulations rests with the designers, builders and owners of buildings.

Enforcement of the Building Regulations is delegated under the Building Control Act 1990 to 2020 to the local building control authorities (i.e. the 31 local authorities) who are independent in the exercise of their statutory powers.

Building Control Authorities who have a broad range of powers under the Act to investigate and, where appropriate, take action in the event that non-compliances are identified in buildings.

The **Building Control Regulations 1997 to 2021** set out the system of administrative controls to support compliance with the Building Regulations by requiring, inter alia, the submission of Commencement Notices, Fire Safety Certificates, Disability Access Certificates and Certificates of Compliance on Completion.

2.5.4 Sectors and Groups That Would Be Affected Include:

1. Building users who would benefit from the enhanced provisions of safety as specified in the new Part B / TGD B;
2. Building owners/developers who need to consider the additional cost, as well as the benefit of the provisions;
3. Public bodies, who occupy, manage or control a building, or that part of a building;
4. Building operators of certain buildings that may be required to maintain new systems;
5. Building designers/constructors involved with building design, construction and compliance certification would need to familiarise themselves with the new regulations and technical guidance; and
6. Building Control Authorities responsible for, inter alia, approvals of Fire Safety Certificates and enforcement for compliance with Part B of the Building Regulations would need to familiarise themselves with the new regulations and technical guidance.

Section 3: Summary and Recommendations

Option (A) – No Change

This option is not recommended as the selection of Option (A) will invariably result in an unquantified increase in cost, complexity and regulatory burden owing to the lack of change and modernisation of Part B / TGD B.

- Part B/TGD B would be regarded as being outdated in comparison with international practice.
- The TGD will not account for new practices, policies and risks inherent in modern construction.
- The TGD will not be aligned with the common technical language to facilitate the effective functioning of the EU internal market;
- The TGD will not be enhanced to improve readability, understanding and implementation of Part B of the Building Regulations.

Option (B) – Update Part B/ TGD B

Option B is the recommended course of action to adopt**.**

- This option supports Government policies with regard to fire safety, as set out in:
    - Housing for All, Action 25.6
    - Fire Safety Task Force, Report of Fire Safety in Ireland, 2018
    - Project Ireland 2040 National Policy Objective 13
- Irish Building Regulations regarding fire safety will be updated to further enhance the safety of people in and around buildings, in a manner that is consistent with national policy
- The revision to TGD B will further promote and improve readability, understanding and implementation of Part B of the Building Regulations.
- The option will allow TGD B to be read and applied in a holistic manner, incorporating relevant design guidance for simple non-complex buildings within the body of the document;
- The revision to TGD B will provide additional clarity with respect to the application of Part B to existing buildings, to support the re-use of existing buildings; and

- The estimated benefits of the enhanced fire safety provisions to society will balance the extra costs, particularly in relation to sleeping risk buildings (buildings containing flats), residential (institutional), and Residential (other) buildings.

Appendix 1 Part B Public Consultation (December 2011 – March 2012)

The public were invited to provide their observations on the then current TGD B/ Part B:

In 2011, a public consultation was carried out in relation to the existing Technical Guidance Document B. The consultation ran for three months from December 2011 to March 2012.

The Department received observations from 44 organisations and individuals, as follows:

- 6 Fire / Local Authorities
- 8 Fire Engineering companies
- 12 Representative bodies
- 10 State or Semi-state bodies
- 8 Others.

In all, the 44 contributors provided over 1,100 individual observations, as follows:

- Introduction: 45
- Section 0: 60
- Section 1: 508
- Section 2: 37
- Section 3: 184
- Section 4: 45
- Section 5: 102
- Appendices: 120
- Other: 3

Appendix 2 Review of Technical Guidance Document Part B (Fire Safety)

In February 2011 the Chair of the Building Regulations Advisory Body (BRAB) requested a review of Technical Guidance Document B, 2006, as

> "a comprehensive review of TGD-B has not been carried out since the publication of TGD B in 1997. While TGD-B was revised in 2006, this was to cater for the implementation of the new fire performance standards under the EU Construction Products Directive. Construction methods and designs have advanced since 1997 and risks, which may not have been foreseen at that time, now need to be addressed".

In response, the then Minister commenced a public consultation process in 2011 to identify the views held on the current provisions for fire safety in Part B of the Building Regulations and Technical Guidance Document (TGD) B. More than 40 detailed submissions were received as part of the public consultation. A steering group was then established to assist in the ongoing development of TGD B. The steering group was made up of key stakeholders.

- Mr John Barry, DHLGH (Chair)
- Mr. Peter Bluett, Bluett O'Donoghue Architects
- Ms. Maria Melia, CFO, Wexford County Council
- Mr. John A. McCarthy, Coll and McCarthy Architects
- Ms. Marion Kiernan, ABBS, DoECLG
- Mr. Michael Raftery, CFO, Galway County Council
- Mr. Philip O'Brien, ACFO, Louth County Council
- Mr. Michael Stattery, Michael Slattery Associates
- Ms. Mary O'Brien, SExFPO, Dublin Fire Brigade
- Mr. John Wickham, Building Standards Adviser, DHLGH
- Mr Chris Barry, NDFEM, DHLGH
- Ms. Martha Doyle, NDFFEM, DHLGH
- Mr. Leo Crehan, Collen Construction
- Ms. Siobhán O'Dwyer, O'Dwyer Property Management

It met from Nov 2011 to Nov 2014 and reviewed the comments received. The Steering group recommended a two volume approach: Vol1 for Buildings other than dwellings and Vol 2 Dwelling houses. It was agreed that Vol 2 Dwelling Houses would be prioritised for completion. As part of the development of TGD B Vol 2 an additional companion guidance document: Fire Safety in Community Dwelling Houses was developed and published in 2017.

In January 2012 a national information workshop was held in Dublin Castle which attracted a wide range of stakeholders. This resulted in 134 additional recommendations for consideration.

In 2015, TGD B and Part B were split into two distinct elements; one for dwelling houses and another for non-dwelling houses. Parts B6 – B11, were created in 2017, to give effect to new regulatory requirements for fire safety in dwelling houses. Technical Guidance Document B, 2017 – Fire Safety – Volume 2 – Dwelling Houses was published to give prima facie guidance to compliance with the Building Regulations.

In 2019 a public consultation was held on the provision of Additional Guidance to Technical Guidance Document B, 2006. This Technical Guidance was created to provide guidance with respect to fire safety matters in buildings containing flats, including: provisions for open plan flats, provisions for fire alarms in buildings, provisions for refuges, and provisions for firefighting shafts. The Additional Guidance came into effect on 1 July 2020.

Following the publication of the 2020 additional guidance, a decision to re-examine the TGD from first principles (a fundamental review) was commenced. In carrying out the review of Technical Guidance Document B, it was established that:

- The current document would benefit from a review of the assumptions underpinning the prescriptive requirements;
- Under Section 1, the document cites a number of other documents for guidance on the design of horizontal and vertical means of escape, all of which have been withdrawn and replaced, as follows:
    - BS 5588-1, replaced by BS 9991;
    - BS 5588-6, replaced by BS 9999;
    - BS 5588-10, replaced by BS 9999;
    - BS 5588-11, Replaced by BS 9999;
    - BB 7, replaced by BB 100; and
    - HTM 81, Replaced by HTM 05/02;

- Under Section 1, the document cites BS 5588-8 for the design of means of escape for persons with disabilities, which has been withdrawn;
- Under Section 1 and 3, the document cites BS 5588-9 for the design of ventilation systems, with respect to fire safety, which has been withdrawn;
- Under Section 3, the document cites BS 5588-10 and BS 5588-7 for the design of compartmentation in shopping centres, and buildings containing atria, respectively, both of which have been withdrawn;
- Under Section 5, the document cites BS 5588-5 for the design of firefighting shafts, which has been withdrawn;
- The BS 5588 “suite” has been replaced by BS 9991 and BS 9999, an ‘advanced approach’ to fire safety. BS 9991 and BS 9999 are designed to be used as contiguous documents. The documents do not advocate a ‘pick and mix’ approach to fire safety;
- TGD B cites both BS 476 “suite” and EN 13501 “suite” for the classification for fire resistance and reaction to fire. For the purpose of new construction products placed on the market, the declared performance for fire resistance must be the EN 13501 “suite”;
- There is a need to align the document with the common technical language to facilitate the effective functioning of the EU internal market;
- The document cites Irish and British Standards for the design and installation of fire alarm, emergency lighting systems, sprinkler systems, etc. all of which have been updated, and for many of which there are now available EN standards;
- The document does not contain performance criteria for the design of fire detection and alarm systems, with the exception of Residential (Institutional) buildings, buildings containing flats, and mixed occupancy buildings;
- The document cites ET 101 with respect to electrical installations which has been withdrawn, and replaced by IS 10101. In addition, the current TGD does not contain any guidance on the fire safety precautions for PV installations;
- The provisions of the current TGD B, with respect to the design of facades, to inhibit fire spread up the face of the building require updating; and
- The text, structure and layout of the current TGD B require revision to aid in interpretation and clarity of the document.

In addition to the above, in carrying out the review, the conclusions and recommendation of the Independent Review of Building Regulations and Fire Safety being carried out in the UK by Dame Hackitt DBE FREng, in the aftermath of the Grenfell Tower fire, were considered.

In December 2020, a Consultative Committee on the review of Part B was convened, to assist in the process of the development of a new draft TGD B. The committee met 10 times between December 2020 and January 2023. A Costs group was established from members of the Consultative Committee. The costs group met 4 times from May 2021 to November 2021.

The Consultative committee was made up of representatives from:

- Royal Institute of the Architects of Ireland,
- Engineers Ireland,
- Society of Chartered Surveyors of Ireland,
- Chief Fire Officers Association,
- Construction Industry Federation,
- Property Industry Ireland,
- Building Materials Federation,
- Irish Building Control Institute,
- National Building Control Office,
- National Standards Authority of Ireland,
- Institution of Fire Engineers – Republic of Ireland,
- Dublin Fire Brigade,
- Cork City Fire Brigade,
- Office of Public Works,
- National Disability Authority,
- Health Service Executive – Estates,
- Department of Education and Skills,
- Department of Housing, Local Government and Heritage.

The committee's aim was to: a) Review draft legislation and supporting guidance to Part B of the Second Schedule to the Building Regulations, b) make comments or observations, having regard to particular area of expertise, in relation to the draft documentation, and c) Evaluate the impact of changes on common building types by means of a cost comparison study.

The first meeting involved scoping the work of the committee. At each subsequent meeting, a draft proposal in respect of the high level changes for each section of the Draft Technical Guidance Document was presented to the committee. The comments and observations of the committee in respect of each item was considered, and modifications as appropriate were made to the Draft Technical Guidance Document.

In 2022, an Application and Implementation review of the proposed Technical Guidance Document was carried out. The purpose of this review was to allow a high level examination and discussion of the technical proposals contained in the Technical Guidance Document, with a view to informing any issues with respect to implementation to the changes. Participants to this review included representatives from:

- Dublin Fire Brigade
- Cork City Fire Service
- Galway Fire Service
- Limerick Fire Service
- Waterford Fire Service

We sincerely thank all participants to all established groups for their huge effort and contribution during the review process.

Appendix 3 Documentary Research

In updating the provisions of TGD B, the following documents were reviewed:

Section 0

- Technical Guidance Document B, 2006 (Reprint 2020), Department of Housing, Local Government and Heritage
- Technical Guidance Document B, 2017, Department of Housing, Local Government and Heritage
- Approved Document B, Ministry of Housing, Communities and Local Government, England
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- C/AS2 Acceptable solution for buildings other than risk group SH, Ministry of Business, Innovation and Employment, New Zealand
- National Construction Code Volume 1, National Construction Code Volume 2 Australian Building Codes Board, Australia

Section 1.1 Introduction to the Provisions, Section 1.2 Use of the Document for the Design of Means of Escape

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- HTM 81: 1996 Fire precautions in new hospitals
- HTM 05-02: 2007 “Guidance in support of functional provisions for Healthcare Premises”
- “Code of Practice for Safety at Sports Grounds”, Department of Education
- “The Guide to Safety at Sports Grounds ‘Green Guide’”, Sports Grounds Safety Authority

Section 1.3 Methods of Measurement

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- International Building Code, International Code Council,
- National Building Code of Canada, National Research Council, Canada
- Code of Practice for Fire Safety in Buildings, Buildings Department, Hong Kong
- Code of Practice for fire precautions in buildings, Singapore Civil Defence Force, Singapore
- UAE Fire and Life Safety Code of Practice, Ministry of Interior, United Arab Emirates

- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution

Section 1.4 Horizontal Means of Escape

- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- Building Bulletin 7, Fire and the design of educational buildings– Sixth Edition, Department of Education and Science
- Building Bulletin 100: Design for fire safety in schools, Department for children, schools and families, England
- BS 5588-6 Fire precautions in the design, construction and use of buildings — Part 6: Code of practice for places of assembly, British Standards Institution
- BS 5588-11: 1997, Fire precautions in the design, construction and use of buildings — Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings, British Standards Institution
- Guidance Manual to the Building Regulations, 1984
- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- C/AS2 Acceptable solution for buildings other than risk group SH, Ministry of Business, Innovation and Employment, New Zealand
- National Construction Code Volume 1, National Construction Code Volume 2 Australian Building Codes Board, Australia
- International Building Code, International Code Council,
- National Building Code of Canada, National Research Council, Canada
- Code of Practice for Fire Safety in Buildings, Buildings Department, Hong Kong
- Code of Practice for fire precautions in buildings, Singapore Civil Defence Force, Singapore
- UAE Fire and Life Safety Code of Practice, Ministry of Interior, United Arab Emirates
- Guide to fire safety in pre-school premises, Department of Housing, Local Government and Heritage
- Fire Safety in Buildings, BRE, 1986
- Post War Building Studies No. 29 Fire Grading of Buildings Part III Personal Safety
- Technical Guidance Document K, Department of Housing, Local Government and Heritage

Section 1.5 Design for Vertical Escape

- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- Building Bulletin 7, Fire and the design of educational buildings– Sixth Edition, Department of Education and Science
- Building Bulletin 100: Design for fire safety in schools, Department for children, schools and families, England
- BS 5588-6 Fire precautions in the design, construction and use of buildings — Part 6: Code of practice for places of assembly, British Standards Institution
- BS 5588-11: 1997, Fire precautions in the design, construction and use of buildings — Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings, British Standards Institution
- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- C/AS2 Acceptable solution for buildings other than risk group SH, Ministry of Business, Innovation and Employment, New Zealand
- National Construction Code Volume 1, National Construction Code Volume 2 Australian Building Codes Board, Australia
- International Building Code, International Code Council,
- National Building Code of Canada, National Research Council, Canada
- Code of Practice for Fire Safety in Buildings, Buildings Department, Hong Kong
- Code of Practice for fire precautions in buildings, Singapore Civil Defence Force, Singapore
- UAE Fire and Life Safety Code of Practice, Ministry of Interior, United Arab Emirates
- Guide to fire safety in pre-school premises, Department of Housing, Local Government and Heritage
- Fire Safety in Buildings, British Research Establishment, 1986
- Post War Building Studies No. 29 Fire Grading of Buildings, Part III, Personal Safety

Section 1.6 Means of Escape from Flats

- BS 5588-1:1990 Fire precautions in the design, construction and use of buildings — Part 1: Code of practice for residential buildings, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- Technical Guidance Document B 2006 (Reprint 2020), Department of Housing, Local Government and Heritage

- BS 8579:2020 Guide to the design of balconies and terraces, British Standards Institution

Section 1.7 Means of Escape from Shopping Centres

- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 5588-10:1991 Fire precautions in the design, construction and use of buildings — Part 10: Code of practice for shopping complexes, British Standards Institution
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- Technical Guidance Document K, Department of Housing, Local Government and Heritage

Section 1.8 Small Premises

- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 5588-11: 1997, Fire precautions in the design, construction and use of buildings — Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings, British Standards Institution

Section 1.9 General Provisions of Means of Escape

- HTM 05-02: 2007 “Guidance in support of functional provisions for Healthcare Premises”
- IS EN 179, Building Hardware - Emergency Exit Devices Operated By A Lever Handle Or Push Pad, For Use On Escape Routes - Requirements And Test Methods
- IS EN 1125, Building Hardware - Panic Exit Devices Operated By A Horizontal Bar, For Use On Escape Routes - Requirements And Test Methods, National Standards Authority of Ireland
- IS EN 1155:1998, Building Hardware - Electrically Powered Hold-Open Devices For Swing Doors - Requirements And Test Methods, National Standards Authority of Ireland
- IS EN 13637, Building Hardware - Electrically Controlled Exit Systems For Use On Escape Routes - Requirements And Test Methods
- IS EN 16005 Power Operated Pedestrian Doorsets - Safety In Use - Requirements And Test Methods
- BS 5395-2: 1984, Stairs, Ladders and Walkways. Code Of Practice For The Design Of Helical And Spiral Stairs
- BS 5395-3: 1985, Stairs, Ladders and Walkways. Code Of Practice For The Design Of Industrial Type Stairs, Permanent Ladders And Walkways

- IS 3217:2013, Emergency Lighting, National Standards Authority of Ireland
- IS EN 81-20, Safety Rules For The Construction And Installation Of Lifts - Lifts For The Transport Of Persons And Goods - Part 20: Passenger And Goods Passenger Lifts
- IS EN 81-70, Safety Rules For The Construction And Installation Of Lifts - Particular Applications For Passenger And Goods Passenger Lift - Part 70: Accessibility To Lifts For Persons Including Persons With Disability
- IS 10101, National Rules For Electrical Installation, National Standards Authority of Ireland
- BS 5906, Waste Management In Buildings - Code Of Practice
- IS EN ISO 7010, Graphical Symbols - Safety Colours And Safety Signs - Registered Safety Signs
- BS 5839-6, Fire detection and fire alarm systems for buildings — Part 6: Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings
- HTM 05/03 Health Technical Memorandum 05-03: Operational provisions Part B: Fire detection and alarm systems
- IS 3218:2013, Fire Detection And Alarm Systems For Buildings - System Design, Installation, Commissioning, Servicing And Maintenance, National Standards Authority of Ireland
- I.S. CEN/TS 54-14:2004. Fire Detection and Alarm Systems – part 14: Guidelines for Design, Installation, Commissioning, Use and Maintenance
- BS 5839-9:2011, Fire Detection and Fire Alarm Systems for Buildings. Code Of Practice For The Design, Installation, Commissioning And Maintenance Of Emergency Voice Communication Systems
- IS EN 671-1, Fixed Firefighting Systems - Hose Systems - Part 1: Hose Reels With Semi-Rigid Hose
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 5588-8: 1999, Fire precautions in the design, construction and use of buildings — Part 8: Code of practice for means of escape for disabled people, British Standards Institution
- IS EN 17210: 2021. Accessibility and usability of the built environment – Functional requirements
- Building for Everyone: A Universal Design Approach. Booklets 1 – 10. National Disability Authority.
- Technical Guidance Document M, 2010, Department of Housing, Local Government and Heritage
- Technical Guidance Document J, 2014, Department of Housing, Local Government and Heritage

- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- Fire and Solar PV Systems- investigations and evidence BRE P100874-1004 2017
- Research Project to Review the Cost Effectiveness of Sprinklers in Residential Properties Final Report , Scottish Government Building Standards May 2015 www.scotland.gov.uk/bsd
- Sprinkler effectiveness in care homes Final Research Report: BD 2546 August 2007 Department for Communities and Local Government: London

Section 2 Internal Fire Spread (Linings)

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- Fire Safety in Buildings, BRE, 1986
- BS 7157: “Method of test for ignitability of fabrics used in the construction of large tented structures”, British Standards Institution
- BR 274: “Fire Safety of PTFE-based materials used in buildings”
- IS EN 13501-1, Fire Classification Of Construction Products And Building Elements - Part 1: Classification Using Data From Reaction To Fire Tests, National Standards Authority of Ireland
- I.S. EN ISO 1182: “Reaction to fire tests for building products - Non combustibility test”;
- I.S. EN ISO 1716: “Reaction to fire tests for building products - Determination of the gross heat of combustion (calorific value)”;
- I.S. EN 13823: “Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item”;
- I.S. EN ISO 11925-2: “Reaction to fire tests for building products, Part 2 - Ignitability when subjected to direct impingement of flame”.

Section 3.3 Loadbearing Elements of Structure

- Technical Guidance Document B 2006 (Reprint 2020), Department of Housing, Local Government and Heritage
- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- Guidance Manual to the Building Regulations, 1984
- Post War Building Studies No. 20 Fire Grading of Buildings, Part I – General principles and structural precautions
- Fire Safety in Buildings, BRE, 1986

Section 3.4 Compartmentation

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- Post War Building Studies No. 20 Fire Grading of Buildings, Part I – General principles and structural precautions
- BS 5588-10:1991 Fire precautions in the design, construction and use of buildings — Part 10: Code of practice for shopping complexes, British Standards Institution
- Fire Safety in Buildings, BRE, 1986
- Guidance Manual to the Building Regulations, 1984
- BS 5588-1:1990 Fire precautions in the design, construction and use of buildings — Part 1: Code of practice for residential buildings, British Standards Institution
- BS 5588-11: 1997, Fire precautions in the design, construction and use of buildings — Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings, British Standards Institution
- HTM 05-02: 2007 “Guidance in support of functional provisions for Healthcare Premises”
- BS 5588-6 Fire precautions in the design, construction and use of buildings — Part 6: Code of practice for places of assembly, British Standards Institution
- Building Bulletin 7, Fire and the design of educational buildings– Sixth Edition, Department of Education and Science
- Building Bulletin 100: Design for fire safety in schools, Department for Children, Schools and Families, England
- I.S. EN 13501-2:2016 Fire Classification of Construction Products And Building Elements - Part 2: Classification Using Data From Fire Resistance Tests (Excluding Ventilation Services, National Standards Authority of Ireland

Section 3.5 Construction of Compartment Walls and Floors

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- Post War Building Studies No. 20 Fire Grading of Buildings, Part I – General principles and structural precautions
- C/AS2 Acceptable solution for buildings other than risk group SH, Ministry of Business, Innovation and Employment, New Zealand

- National Construction Code Volume 1, National Construction Code Volume 2 Australian Building Codes Board, Australia
- International Building Code, International Code Council,
- National Building Code of Canada, National Research Council, Canada
- Code of Practice for Fire Safety in Buildings, Buildings Department, Hong Kong
- Code of Practice for fire precautions in buildings, Singapore Civil Defence Force, Singapore
- UAE Fire and Life Safety Code of Practice, Ministry of Interior, United Arab Emirates
- Fire Safety in Buildings, BRE, 1986
- Guidance Manual to the Building Regulations, 1984

Section 3.6 Concealed Spaces

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards InstitutionBS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- Guidance Manual to the Building Regulations, 1984
- IS EN 13501-1, Fire Classification Of Construction Products And Building Elements - Part 1: Classification Using Data From Reaction To Fire Tests, National Standards Authority of Ireland
- BS 4514: 2001, Unplasticized Pvc Soil And Ventilating Pipes Of 82.4 Mm Minimum Mean Outside Diameter, And Fittings And Accessories Of 82.4 Mm And Of Other Sizes. Specification
- BS 5255: 1989, Specification For Thermoplastics Waste Pipe And Fittings
- I.S. EN 1329-1, Plastics Piping Systems For Soil And Waste Discharge (Low And High Temperature) Within The Building Structure - Unplasticized Poly(Vinyl Chloride) (Pvc-U) - Part 1: Specifications For Pipes, Fittings And The System

Section 3.7 Protection of Openings and Fire Stopping

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution

- BS 5588-9:1999, Fire precautions in the design, construction and use of buildings — Part 9: Code of practice for ventilation and air conditioning ductwork, British Standards Institution
- Technical Guidance Document F, 2019, Department of Housing, Local Government and Heritage
- Fire Safety in Buildings, BRE, 1986
- I.S. EN 15423: “Ventilation for buildings – Fire precautions for air distribution systems in buildings”.
- I.S. EN 15650, Ventilation For Buildings - Fire Dampers
- I.S. EN 13501-3, Fire Classification Of Construction Products And Building Elements - Part 3: Classification Using Data From Fire Resistance Tests On Products And Elements Used In Building Service Installations: Fire Resisting Ducts And Dampers

Section 3.8 Special Provisions

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 5588-7:1997, Fire precautions in the design, construction and use of buildings - Part 7: Code of practice for the incorporation of atria in buildings, British Standards Institution
- I.S. EN 12101-1, Smoke And Heat Control Systems- Part 1: Specification For Smoke Barriers
- Modern Vehicle Hazards in Parking Structures and Vehicle Carriers. NFPA. July 2020.
- Evaluation of fire in Stavanger airport car park 7 January 2020. RISE FIRE RESEARCH, Sweden. 2020.
- BRE, “Fire spread in car parks. BD2552”, Department for Communities and Local Government, London, UK, Dec, 2010

Section 4 – External Wall Build-Up

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- BR 187:2014. External fire spread. Building separation and boundary distances

- BR 187: 1991. External fire spread. Building separation and boundary distances
- BS 8414-1:2020, Fire Performance of External Cladding Systems - Test Method For Non-Loadbearing External Cladding Systems Fixed To, And Supported By, A Masonry Substrate
- BS 8414-2:2020, Fire Performance of External Cladding Systems. Test Method For Non-Loadbearing External Cladding Systems Fixed To And Supported By A Structural Steel Frame
- BR 135:2013, Fire Performance of External Thermal Insulation For Walls Of Multistorey Buildings
- BS 9414: 2019, Fire performance of external cladding systems. The application of results from BS 8414-1 and BS 8414-2 tests
- IS EN 13501-1, Fire Classification Of Construction Products And Building Elements - Part 1: Classification Using Data From Reaction To Fire Tests, National Standards Authority of Ireland
- I.S. EN 13501-5: Fire classification of construction products and building elements, Part 5 – Classification using test data from external fire exposure to roof tests
- I.S. 440, Timber Frame Construction, Dwellings And Other Buildings
- Fire Safety in Buildings, BRE, 1986
- Fire Hazards of Exterior Wall Assemblies Containing Combustible Components. NFPA 2014
- Technical Guidance Document L – Buildings other than dwellings, Department of Housing, Local Government and Heritage
- Single storey steel framed buildings in fire boundary conditions. Steel Construction Institute
- BS 5588-7:1997, Fire precautions in the design, construction and use of buildings - Part 7: Code of practice for the incorporation of atria in buildings, British Standards Institution

Section 5 Access and Facilities for the Fire Service

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- BS 9990: 2015. Non-automatic fire-fighting systems in buildings – Code of practice, British Standards Institution

- BS 5588-5:2004, Fire precautions in the design, construction and use of buildings — Part 5: Access and facilities for fire-fighting, British Standards Institution
- BS 5588-5: 1991, Fire precautions in the design, construction and use of buildings — Part 5: Code of practice for firefighting stairs and lifts, British Standards Institution
- BS 5588-10:1991 Fire precautions in the design, construction and use of buildings — Part 10: Code of practice for shopping complexes, British Standards Institution
- IS 391:2020 Fire Mains For Buildings - Installation, Commissioning, Maintenance And Testing, National Standards Authority of Ireland
- IS 10101:2020, National Rules For Electrical Installation, National Standards Authority of Ireland
- IS 3217:2013 , Emergency Lighting, National Standards Authority of Ireland
- Fire Safety in Buildings, BRE, 1986
- Post War Building Studies No. 29 Fire Grading of Buildings Part II Fire Fighting Equipment
- BS 3251 “Specification of indicator plates for fire hydrants and emergency water supplies”, British Standards Institution
- BS 5234-2:1992. Partitions (including matching linings). Specification for performance requirements for strength and robustness including methods of test, British Standards Institution.
- I.S. EN 81-20, Safety Rules For The Construction And Installation Of Lifts - Lifts For The Transport Of Persons And Goods - Part 20: Passenger And Goods Passenger Lifts
- I.S. EN 81-72, Safety Rules For The Construction And Installation Of Lifts - Particular Applications For Passenger And Goods Passenger Lifts - Part 72: Firefighters Lifts
- I.S. EN ISO 7010, Graphical Symbols - Safety Colours And Safety Signs - Registered Safety Signs
- BS 5410-2: 2018, Code Of Practice For Liquid Fuel Firing - Non-Domestic Installations
- Technical Guidance Document J, 2014
- I.S. EN 60669-2-6, Switches For Household And Similar Fixed Electrical Installations - Part 2-6: Particular Requirements - Fireman'S Switches For Exterior And Interior Signs And Luminaires
- I.S. EN 60947-3, Low-Voltage Switchgear And Control gear - Part 3: Switches, Disconnectors, Switch disconnectors And Fuse-Combination Units

Section 6 Smoke Control Systems

- Approved Document B, Ministry of Housing, Communities and Local Government
- Technical Handbook - 2020 - Non-domestic, Scottish Government
- BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice, British Standards Institution
- BS 5588-1:1990 Fire precautions in the design, construction and use of buildings — Part 1: Code of practice for residential buildings, British Standards Institution
- BS 9991:2015 Fire safety in the design, management and use of residential buildings – Code of practice, British Standards Institution
- BS 5588-6. Fire precautions in the design, construction and use of buildings — Part 6: Code of practice for places of assembly, British Standards Institution
- BS 5588-5:2004, Fire precautions in the design, construction and use of buildings — Part 5: Access and facilities for fire-fighting, British Standards Institution
- BS 5588-10:1991 Fire precautions in the design, construction and use of buildings — Part 10: Code of practice for shopping complexes, British Standards Institution
- BS 5588-11: 1997, Fire precautions in the design, construction and use of buildings — Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings, British Standards Institution
- BS 5588-7:1997, Fire precautions in the design, construction and use of buildings - Part 7: Code of practice for the incorporation of atria in buildings, British Standards Institution
- BR 368: 1999, Design Methodologies For Smoke And Heat Exhaust Ventilation
- BS 7346-4: 2003, Components For Smoke And Heat Control Systems - Functional Recommendations And Calculation Methods For Smoke And Heat Exhaust Ventilation Systems, Employing Steady-State Design Fires. Code Of Practice
- BR 186: 1990, Design Principles For Smoke Ventilation In Enclosed Shopping Centres
- BRE 97204. Smoke Shafts protecting fire-fighting shafts: their performance and design. BRE, 2002
- IS EN 12101-3:2015 Smoke and heat control systems Part 3: Specification for powered smoke and heat control ventilators (Fans)
- I.S. CEN/TR 12101-5:2005, Smoke and heat control systems - Part 5: Guidelines on functional recommendations and calculation methods for smoke and heat exhaust ventilation systems

Section 7 Existing Buildings

- Approved Document B, Ministry of Housing, Communities and Local GovernmentTechnical Handbook - 2020 - Non-domestic, Scottish Government
- Guide to fire safety in flats, Department of Housing, Local Government and Heritage
- Guide to fire safety in existing hotels, Department of Housing, Local Government and Heritage
- Guide to fire safety in nursing homes, Department of Housing, Local Government and Heritage
- Guide to fire safety in pre-school premises, Department of Housing, Local Government and Heritage
- Fire Safety in Buildings, BRE, 1986
- Guidance Manual to the Building Regulations, 1984Architectural Heritage Protection Guidelines for Planning Authorities, DoECLG, 2005;
- Fire protection measures for the Royal Palaces, Department of National Heritage, London;
- Heritage under fire, a guide to the protection of historic buildings by the United Kingdom Working Party on Fire Safety in historic buildings; and
- Guide for Practitioners 6: Conversion of Traditional Buildings by Historic Scotland.
- *BR 128 "*Guidelines for the construction of fire-resisting structural elements"
- Building Research Digest number 208 "Increasing the fire resistance of existing timber floors (revised 1988)*"*
- BS 5588-5:2004, Fire precautions in the design, construction and use of buildings — Part 5: Access and facilities for fire-fighting, British Standards Institution
- Building Bulletin 7, Fire and the design of educational buildings– Sixth Edition, Department of Education and Science
- Building Bulletin 100: Design for fire safety in schools, Department for children, schools and families, England

Appendix A Fire Resistance and Reaction to Fire

- IS EN 13501-1, Fire Classification Of Construction Products And Building Elements - Part 1: Classification Using Data From Reaction To Fire Tests, National Standards Authority of Ireland
- IS EN 13501-2, Fire Classification Of Construction Products And Building Elements - Part 2: Classification Using Data From Fire Resistance Tests (Excluding Ventilation Services

- IS EN 13501-5, Fire Classification Of Construction Products And Building Elements - Part 5: Classification Using Data From External Fire Exposure To Roofs Tests
- BS 476-20: 1987, Fire Tests On Building Materials And Structures - Method For Determination Of The Fire Resistance Of Elements Of Construction (General Principles)
- BS 476-21:1987, Fire Tests On Building Materials And Structures - Methods For Determination Of The Fire Resistance Of Loadbearing Elements Of Construction
- BS 476-22: Fire Tests On Building Materials And Structures - Method For Determination Of The Fire Resistance Of Non-Loadbearing Elements Of Construction
- BS 476-23: 1987, Fire Tests On Building Materials And Structures - Methods For Determination Of The Contribution Of Components To The Fire Resistance Of A Structure
- BS 476-4: 1970, Fire Tests On Building Materials And Structures - Non-Combustibility Test For Materials
- BS 476-6:1989+A1:2009, Fire Tests On Building Materials And Structures - Method Of Test For Fire Propagation For Products
- BS 476-7:1997, Fire Tests On Building Materials And Structures - Method Of Test To Determine The Classification Of The Surface Spread Of Flame Of Products
- BS 476-11:1982, Fire Tests On Building Materials And Structures - Method For Assessing The Heat Emission From Building Materials
- I.S. EN 1991-1-2: 2002, Eurocode 1: Actions On Structures - Part 1-2: General Actions - Actions On Structures Exposed To Fire
- I.S. EN 1992-1-2: 2004, Eurocode 2: Design Of Concrete Structures - Part 1-2: General Rules - Structural Fire Design
  I.S. EN 1993-1-2: 2005, Eurocode 3: Design Of Steel Structures - Part 1-2: General Rules Structural Fire Design
- I.S. EN 1994-1-2: 2005, Eurocode 4 - Design Of Composite Steel And Concrete Structures - Part 1-2: General Rules - Structural Fire Design
- I.S. EN 1995-1-2: 2004, Eurocode 5: Design Of Timber Structures - Part 1-2: General - Structural Fire Design
- I.S. EN 1996-1-2: 2005, Eurocode 6 - Design Of Masonry Structures - Part 1-2: General Rules - Structural Fire Design
- I.S. EN 1999-1-2: 2007, Eurocode 9 - Design Of Aluminium Structures - Part 1-2: Structural Fire Design

Appendix B Fire Doors

- I.S. EN 1634- 1: Fire resistance tests for door and shutter assemblies, Part 1 - Fire doors and shutters;
- I.S. EN 1634-2: Fire resistance tests for door and shutter assemblies, Part 2 - Fire door hardware;
- I.S. EN 1634-3: Fire resistance tests for door and shutter assemblies, Part 3 - Smoke control doors and shutters.
- BS 476-22:1987, Fire Tests On Building Materials And Structures - Method For Determination Of The Fire Resistance Of Non-Loadbearing Elements Of Construction
- BS 476-31-1: 1983, Fire Tests On Building Materials And Structures. Methods For Measuring Smoke Penetration Through Doorsets And Shutter Assemblies. Method Of Measurement Under Ambient Temperature Conditions
- ISO 3864-1:2011, Graphical Symbols - Safety Colours And Safety Signs - Part 1: Design Principles For Safety Signs And Safety Markings
- I.S. EN 16034, Pedestrian Doorsets, Industrial, Commercial, Garage Doors And Openable Windows - Product Standard, Performance Characteristics - Fire Resisting And/Or Smoke Control Characteristics

Appendix C Methods of Measurement

- Approved Document B, Ministry of Housing, Communities and Local Government
- Guidance Manual to the Building Regulations, 1984

Appendix D Sprinkler Systems

- BS 9251:2021, Fire Sprinkler Systems for Domestic and Residential Occupancies. Code Of Practice
- IS EN 12845, Fixed Firefighting Systems - Automatic Sprinkler Systems - Design, Installation And Maintenance
- I.S. EN 16925, Fixed Firefighting Systems - Automatic Residential Sprinkler Systems - Design, Installation And Maintenance

Appendix 4 Construction Trends 2018 – 2021[17]

Table 4 Basis of Design of Works (Random Selection of Fire Safety Certificates) 2018 To 2021		
	Count	**%**
TGD B	328	77
TGD B + Alternative Solutions	23	5
Holistic Alternative Approach, BS 9991 (i.e. whole document approach)	33	8
Holistic Alternative Approach, BS 9999 (i.e. whole document approach)	31	7
Holistic Alternative Approach, BS 9991 and BS 9999 (i.e. whole document approach)	9	2
Engineered Solution, e.g. BS 7974	0	0
Other	0	0

Table 5 Commencement Notice Data 2018 to 2021 – Overall Building Height			
All Works			
	Total Commenced	**Topmost floor <60m**	**Topmost floor >60m**
Value	11627[18]	11503	124
%	100	98.93%	1.07%
New Buildings			
	Total Commenced	**Topmost floor <60m**	**Topmost floor >60m**
Value	5667[19]	5592	75
%	100	98.67%	1.32%

[17] Percentages may not sum to 100 due to rounding
[18] Buildings listed on the BCMS dataset, commended 2018 – 2021, with topmost floor height data, CN & 7DN only
[19] Buildings listed on the BCMS dataset, commended 2018 – 2021, with topmost floor height data, CN & 7DN only

Table 6 Commencement Notice Data 2018 to 2021			
		Height of Topmost Floor	
All Works			
	Total	**<15m**	**>15m**
Value	11627	10819	808
%	100	93.05%%	6.95
New Buildings			
	Total Commenced	**<15m**	**>15m**
Value	5667	5207	460
%	100	91.88%	8.12%

Table 7 Commencement Notice Data 2018 to 2021 - New Buildings (all types) 2018 to 2021: Compartment Floor Provision				
		Buildings with a Compartment Floor		Buildings that may have a Compartment Floor
	Total	**Residential buildings, shopping centre, any height**	**Non-residential buildings, topmost floor >30m**	**Non-residential buildings, topmost floor <30m**
Count	5667	2740	54	2873
%	100	48.35%	0.95%	50.70%

Table 8 Commencement Notice Data 2018 to 2021 – Residential (Institutional Buildings) No. of Storeys						
New Buildings Commenced (excluding hospitals) (2018 to 2021)						
	Total	**1 Storey**	**2 Storey**	**3 Storey**	**4 Storey**	**5 Storey**
Value	60	29	17	4	6	4
%	100	48.3%	28.3%	6.6%	10%	6.6%
Extensions to Buildings Commenced (excluding hospitals) (2018 to 2021)						
	Total	**1 Storey**	**2 Storey**	**3 Storey**	**4 Storey**	**No Data**
Value	100	62	21	12	2	3
%	100	62%	21%	12%	2%	3%

Table 9 Commencement Notice Data 2018 to 2021: Buildings Containing Flats – Heights (all works commenced, excluding material alteration)								
		Height (m)						
	Total	**<5**	**5 - 10**	**10-15**	**15-20**	**20-25**	**25-30**	**30+**
Count	3348	1372	1453	219	177	39	12	86
%	100	40.97	43.40	6.54	5.29	1.16	0.35	2.56

Table 10 BCMS Commencement Notice Data 2018 to 2021: Shops – Floor Area								
Shops (New)								
	Total	**<500m²**	**500 – 1000**	**1000 – 2000**	**2000 - 3000**	**3000 – 4000**	**4000+**	**No data**
Count	185[20]	78	19	34	32	5	7	10
%	100	42.16	10.27	18.37	17.29	2.7	3.78	5.4
Shops (all works, excluding material alteration)								
	Total	**<500m²**	**500 – 1000**	**1000 – 2000**	**2000 - 3000**	**3000 – 4000**	**4000+**	**No data**
Value	646[21]	401	77	52	43	7	9	58
%	100	62.07	11.91	8.05	6.66	1.08	1.39	8.98

Table 11 Commencement Notice Data 2018 to 2021: Sleeping Risk Buildings and Shopping Centres (all works, excluding material alterations)					
	Total commenced	**<11m**	**11 – 20m**	**>20m**	**No data**
Value	2971	2404	321	125	121
%	100	80.9	10.8	4.2	4.0

[20] 6 Buildings commenced have no value for floor area. These represent 3.97% of buildings commenced.

[21] 42 Buildings commenced have no value for floor area. These represent 3.97% of buildings commenced.

Table 12 Commencement Notice Data 2018 to 2021: New Single Storey Storage Buildings			
		Floor area (m^2)	
Total	**Height (m)**	**<1000**	**>1000**
776	<8[22]	650 (83.8%)	16 (2%)

[22] A buildings of >8m high is taken to be the appropriate minimum height of building to incorporate racking >7m

Appendix 5 Estimated Costs Analysis

Section 2.3 of this RIA outlines the estimated costs of proposed changes to Part B / Technical Guidance Document B.

This appendix outlines in further detail the process that led to the establishment of estimated costs.

In 2021, members of the Consultative Committee on the Review of Part B / TGD B were invited to put forward nominees to participate in a costs committee. That costs committee met 4 times between June and December 2021.

Through the meetings of that committee, the following outcomes were noted:

1. Relevant building types to be the subject of a cost analysis were identified
2. Drawings of relevant buildings were sought and presented, with comments invited
3. Cost elements were identified
4. Detailed costs spreadsheet (specifying elements to be costed, per each building type), and supporting documents (specifying building particulars, including drawings, and specifications) were circulated, with comments invited.

Building Types

A number of building types were selected for the costs analysis. These building types were identified having regard to the high level changes discussed in the consultative committee process. The buildings were selected as indicative buildings which have both planning permission and a commencement notice, and which could be impacted by the changes to TGD B. For each building, the relevant change was identified, and applied to the building, as if the building was designed and built to the performance requirements of the new draft TGD B. The building types (and sub-types where relevant) subject to the costs analysis were:

1. Buildings containing Flats
    a. Three storey, 2-unit duplex building (Flat Type 1)
    b. 5 storey, 34 unit building (Flat Type 2)
    c. 12 storey, 229 unit (in 3 ‘blocks’ over a common ground floor) building (Flat Type 3)
2. Residential (Institutional) Building – 2 storeys
3. Residential (Other) building
    a. 7 storey hotel
    b. 7 storey student accommodation

4. Shop – Single Storey

5. Storage – Single Storey

6. Office building
    a. 7 storey non-atrium building (Office 1)
    b. 9 storey atrium building (Office 2)

Estimated Costs

Once the appropriate building types were identified, relevant drawings of such buildings, that were the subject of approved planning permission, and which were the subject of a commencement notice were sourced. The designs were then assessed, in respect of the proposed changes to the New Draft TGD B. A schedule of alterations were created in respect of each specific building. These alterations were noted to the costs group.

For each building, the schedule of alterations, including relevant measurements of elements (e.g. length of cavity barrier, or compartment wall, surface area of wall elements, floor area of buildings for sprinkler provisions) were documented in a costs spreadsheet, prepared by the Housing Advisory Unit (Quantity Surveying) of the DHLGH.

Through public procurement processes, the DHLGH procured the services of a private sector quantity surveying practice, operating in the construction sector, to provide quantitates in respect of the identified elements, to current market value. The details for each building, including drawings, specifications and assumptions were provided to this practice. Best estimate valuations of the proposed works of the sample building, along with the estimated additional costs were provided in this respect.

The additional provisions of the new Draft TGDB should offer substantial flexibility in achieving the performances set out, and that within the provisions of the prescriptive *prima facie* document, there are many design choices and variations in design options permitted.

Building Specifications and Cost Elements

The cost impact for each building type, was assessed on the basis of the provision of additional specific elements, relevant to the identified building. The specifications and additional elements costed are set out in Table 13.

Table 13 Table of Building Specifications and Cost Elements				
Building Type/ Sub-Type	**Outline Building Details**	**Elements the Subject of an Estimated Cost Analysis[23]**	**Technical Change**	**Notes**
Duplex (Flat Type 1)	3 storey residential duplex building consisting of a ground floor flat with two storey maisonette over. Ground floor flat 93 m^2, First floor maisonette 119 m^2 Cavity wall masonry construction.	• Provision of a cavity barrier at first floor level.	• Removal of Diagram 17 for new buildings and extensions	The estimated cost increase is based on assumptions with respect to the provision of cavity barriers in the existing design. The option to provide cavity barriers at compartment floor / external wall junctions is being retained. The option to close cavity openings per the current Diagram 17 is being removed for new works. The estimated cost impact applies to twin leaf masonry construction only. Other forms of construction are not affected.
5 storey building containing flats (Flat Type 2)	5 storey building (ground plus 4 storeys over) with 34 units. Total area of flats 2,345 m^2, total common area 506 m^2, total ancillary area 290 m^2	• Additional 9m^2 of wall elements to form a spandrel in specific locations • 28.3 m^2 of 300mm deep reinforced concrete • 2 No. 1 m2 AOV's • 2 No. Dry Risers	• Provision of a spandrel, projection, recess, sprinkler system, or 6m sterile area. • Provision of dry risers. • Provision of AOV's to protected stairways	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for both traditional build (twin leaf masonry with cavity barriers) and system build. In both cases, additional wall and balcony elements with an appropriate fire resistance, to provide the appropriate fire separation at compartment floor / external wall junctions, were included in the cost estimates. Considerable flexibility is afforded to designers, for external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires (i) a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), (ii) a whole wall build-up of materials not achieving a RtF of A2,

[23] Where a change has not been costed, it is assumed, as a result of an analysis of the original building design, that other changes are either (a) not applicable in respect of the design and use, or have been satisfied owing to the design.

				but having passed a test to BS 8414, or (iii) having insulation of any RtF in an external wall of twin leaf masonry. Options (ii) and (iii) do not represent a change. Dry Risers, AOV's and elements attached to the external wall were all modified to be in accordance with the New Draft TGD B.
12 storey building containing flats (Flat Type 3)	Twelve storey building sprinklered building (Ground + 11). Ground floor consists of retail, assembly uses, as well as serving as an access point to the residential uses above. The residential uses are divided into 3 main 'blocks' with a single stairway in each. The development consists of 229 individual units. Flats: 13,807 m^2, common area: 3,146 m^2, ancillary area: 265 m^2, non-residential area: 2,168 m^2	Proposed RtF A2, Fire resisting LGS construction (Elemental U value 0.18) (11,437.55 m^2 surface area) with various outer cladding options, in place of equivalent area LGS construction, or non-A2 construction with a BS 8414 test, or twin leaf masonry construction 820 m^2 RtF A2 Balcony deck	Whole wall build up RtF requirements Provisions for elements attached to the external wall	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for both traditional build (twin leaf masonry with cavity barriers) and system build (LGS achieving a Class A2-s1, d0 RTF). Considerable flexibility is afforded to designers, for external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires (i) a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), (ii) a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or (iii) having insulation of any RtF in an external wall of twin leaf masonry. Options (ii) and (iii) do not represent a change. The original building design was sprinklered throughout. Stairway ventilation and elements attached to the external wall were all modified to be in accordance with the New Draft TGD B.
Residential Institutional	Community Nursing Unit; total floor area of 10,091 m^2 (GF 6,921 m^2 and FF 3,170 m^2). Floor to ceiling height of 3.8 m @ GFL, 3.7m @ FFL	Provision of a sprinkler system, in a Residential (Institutional) occupancy of 10,090 m^2.	Provision of sprinklers to a two storey Residential (Institutional) building	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for a sprinkler system, both fixed and variable costs, throughout the building.

Residential (Other) - Hotel	Seven storey building (ground + 6 storeys over). The ground floor (657 m^2) consists of a restaurant, main reception and other ancillary uses. The upper 6 floors (2,966 m^2) consists of bedrooms.	Proposed RtF A2, Fire resisting LGS construction (Elemental U value 0.18) (2760 m^2 surface area), with various outer cladding options, in place of equivalent area LGS construction, or non-A2 construction with a BS 8414 test, or twin leaf masonry construction 2 No. 1 m^2 AOV's 2 No. Dry Risers	Whole wall build up RtF requirements Provisions for elements attached to the external wall Provision of dry risers. Provision of AOV's to protected stairways	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for both traditional build (twin leaf masonry with cavity barriers) and system build (LGS achieving a Class A2-s1,d0 RTF). Dry Risers, and AOV's were included, in accordance with the New Draft TGD B. Considerable flexibility is afforded to designers, for external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires (i) a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials), (ii) a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or (iii) having insulation of any RtF in an external wall of twin leaf masonry. Options (ii) and (iii) do not represent a change.
Residential (Other) – Student Accommodation	7 Storey student accommodation consisting of: ancillary areas: 2367 m^2, Common areas: 780 m^2, Sleeping areas 6693 m^2. Original design and layout similar to provisions of new Draft TGD B – Para 1.4.9.	<u>Option A</u> External LGS wall construction of (2759.82 m^2 surface area) with various outer cladding options, in place of equivalent area LGS construction, or non-A2 construction with a BS 8414 test, or twin leaf masonry construction Internal configurations and layouts of student accommodation designed as a 'hall of residence' (L1 Fire Detection and Alarm System, compartment walls, fire resisting walls, protected stairs and lifts as appropriate) Additional 285m length of 500mm wide, 300mm deep steel reinforced concrete 3 dry risers	Provision of a spandrel, projection, recess, sprinkler system, or 6m sterile area. Whole wall build up RtF requirements Provisions for elements attached to the external wall Provision of dry risers.	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for both traditional build (twin leaf masonry with cavity barriers) and system build (LGS achieving a Class A2-s1,d0 RTF). Dry Risers, and AOV's were included in accordance with the New Draft TGD B. Estimated costs were provided for a 'hall of residence' style layout, and a 'student accommodation' layout. In both cases, additional wall and balcony elements with an appropriate fire resistance, to provide the appropriate fire separation at compartment floor / external wall junctions, were included in the cost estimates. Considerable flexibility is afforded to designers, for external wall build-ups in buildings with a topmost storey height >15m. The new Draft TGD B requires (i) a whole wall build-up of materials achieving a RtF of A2 or better (excluding exempted materials),

		<u>Option B</u> External LGS wall construction of (2759.82 m^2 surface area) with various outer cladding options, in place of equivalent area LGS construction, or non-A2 construction with a BS 8414 test, or twin leaf masonry construction Internal configurations and layouts of student accommodation designed as 'Student Accommodation to Para 1.4.9' (L3X, Grade D LD 2 Fire Detection and Alarm System, compartment walls, fire resisting walls, protected stairs and lifts as appropriate) Additional 285m length of 500mm wide, 300mm deep steel reinforced concrete 4 dry risers Mechanical ventilation to common lobbies	Student Accommodation layouts Provision of a spandrel, projection, recess, sprinkler system, or 6m sterile area. Whole wall build up RtF requirements provisions for elements attached to the external wall Provision of dry risers.	(ii) a whole wall build-up of materials not achieving a RtF of A2, but having passed a test to BS 8414, or (iii) having insulation of any RtF in an external wall of twin leaf masonry. Options (ii) and (iii) do not represent a change.
Shop	Retail building - floor area of 2,506 m^2, floor to ceiling height 8.6 m (average)	Provision of a sprinkler system, to IS EN 12845 in a shop occupancy of 2506 m^2.	Modification of Table 3.1, reduction of unsprinklered floor area in a shop from 4000 m^2 to 2000 m^2	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for a sprinkler system, both fixed and variable costs, throughout the building Alternatively, the building could have been subdivided into two unequal parts, with each having a floor area of less than 2000 m^2 with the division achieving 60 minutes fire resistance. In this case, the cost increase would be minimal, in respect of the design as no sprinkler system would be required.

Storage	High-rack single storey storage occupancy, warehouse floor area 5,941 m^2 and floor to ceiling height 12.61 m	Provision of a sprinkler system, to IS EN 12845 in a high-rack storage occupancy of 5941m^2.	Modification of Table 3.1, increase of sprinklered floor area from 2000 m^2 to 14000 m^2 Modification of Appendix E, inclusion of racking > 7 m as 'High Risk'	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for a sprinkler system, both fixed and variable costs, throughout the building In so doing, the total uncompartmented floor area may increase from 2000 m^2 (current TGD B) to 14,000 m^2 (New Draft TGD B). The requirement for sprinklers in a storage facility are derived from the assessment of the fire-risk of the building's contents. If the building, at a design stage, is classified as appropriate for 'normal' risk storage, then sprinklers would not be required as the maximum floor area of any one compartment in such a building is 14000 m^2
Office 1[24]	7 storeys over 2 basement storeys. Ground Floor is retail / Assembly. Floors 1 – 5 are offices. Office area 7,150 m^2, retail area 1,430 m^2, basement area 2,782 m^2, 6th Floor (ancillary accommodation) 238 m^2	**Design Option A – contiguous office compartment.** Provision of spandrel to compartment floor at first floor level, separating the non-office and office occupancies. Additional 130 m length of 900 mm high spandrel **Design Option B – contiguous office compartment.** Provision of projection to compartment floor at first floor level, separating the non-office and office occupancies. Additional 130 m^2 length[25] of 500mm wide x 300mm deep steel reinforced concrete floor **Design Option C – Individual office compartments – divided by compartment floors.** Provision of spandrel to compartment floor at each floor level, separating each floor.	Provision of a spandrel, projection, recess, sprinkler system, or 6m sterile area. Whole wall build up RtF requirements	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. Estimated costs were provided for a number of scenarios; subdivision of the building by compartment floors, by a number of applicable means. These different means included the provision of a 900mm spandrel, a 500 mm projection or a sprinkler system. Dry Risers, and AOV's were included in accordance with the New Draft TGD B.

[24] It is noted that where an alternative approach (such as a BS 7974 Engineered Solution, or BS 9999) is applied to the design of an office building, different cost estimates may be applied. However such an approach is building-specific, and outside the scope of prima facie compliance provided under TGD B. Such approach continues to be applicable under the provisions of Article 7(3) of the Building Regulations, in a manner equivalent to all Technical Guidance Documents.

[25] 20 x 6.5m long sections per floor x 1 floors

		650m length of 900 mm high spandrel **Design Option D – Individual office compartments – divided by compartment floors.** Provision of projection to compartment floor at each floor level, separating each floor. 650m length of 500mm wide x 300mm deep steel reinforced concrete floor **Design Option E – Contiguous office compartment.** Provision of sprinkler system to ground floor level **Design Option F – Variable office compartments.** Provision of sprinkler system to all floors		
Office 2	10 storeys of office space over 2 basement storeys. Office area 20,302 m^2, basement area 7,384 m^2. Atrium throughout all upper storeys, sprinkler protected.	Provision of a TGD B compliant design as a base case. Atrium design as per the current TGD B provisions[26]. Sprinklers throughout owing to the original building design.	An assessment of the TGD B-compliant base case design, and of the design requirements of the New Draft TGD B has shown that there would be minimal differences in the design requirements, and therefore minimal additional costs. [27]	The estimated cost increase is based on a comparison of a current design, to the provisions of the New Draft TGD B. The original building design was sprinklered throughout, and was designed with an atrium passing through all floors. Stairway ventilation and external wall elements were assumed to be in accordance with the New Draft TGD, due to the height of the building.

[26] The current TGD B provisions for the design of atria cite the use of BS 5588-7 ‘Fire precautions in the design, construction and use of buildings - Part 7: Code of practice for the incorporation of atria in buildings’. Equivalent provisions have been incorporated into the new Draft TGD B

[27] It is noted that where an alternative approach (such as a BS 7974 Engineered Solution, or BS 9999) is applied to the design of an office building, different cost estimates may be applied. However such an approach is building-specific, and outside the scope of prima facie compliance provided under TGD B. Such approach continues to be applicable under the provisions of Article 7(3) of the Building Regulations, in a manner equivalent to all Technical Guidance Documents.

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