



***Fire Engineering Consultants***

**Appeal Against Conditions attached to  
Fire Safety Certificate (FS/17/8)**

**Appeal Ref: ABP-303008-18**

Project	<b>Inishowen Engineering, Shandrum, Drumfries, County Donegal</b>
Local Authority	<b>Donegal County Council</b>
Date	<b>31<sup>st</sup> January 2019</b>

# **Contents**

## **1.0 INTRODUCTION**

## **2.0 INFORMATION REVIEWED**

## **3.0 DISCUSSION**

## **4.0 RECOMMENDATIONS**

## 1.0 INTRODUCTION

The project involves the construction of a workshop, offices, treatment plant and all associated site works at Shandrum, Drumfries, County Donegal.

A Fire Safety Certificate application for the works was granted by Donegal County Council on the 19<sup>th</sup> October 2018. The following conditions were attached: -

### Condition 1

All travel distances within the two-storey office accommodation referred to as "Office Block" on Dwg. No. 325-14-1545-FD-001 Rev. 04 should comply with the limits set out in Table 1 of BS 5588 Part 11:1997 Fire Precautions in the Design, Construction and Use of Buildings – Code of Practice for Shops, Offices, Industrial, Storage and Other Similar Buildings.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

### Condition 2

Protected escape Stairway 2 should be provided with a direct exit to external at Ground Floor level or the Entrance Foyer at Ground Floor level should be limited to a maximum of 10m<sup>2</sup> fire loading in accordance with Clause 9.2 of BS 5588 Part 11:1997 Fire Precautions in the Design, Construction and Use of Buildings – Code of Practice for Shops, Offices, Industrial, Storage and Other Similar buildings.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

### Condition 3

The Entrance Foyer at Ground Floor level shall be fully enclosed in minimum 30-minute fire resisting construction incorporating minimum FD30S fire door sets in accordance with Table B1 Appendix B of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

### Condition 4

All doors on escape routes should not be fitted with lock latch or bolt fastening or should only be fitted with simple fastenings that can be readily operated in the direction of escape without the use of a key in accordance with Clause 1.4.3.2 of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

### Condition 5

The gas heating installation should be designed and installed in accordance with I.S. 820:2010 Non-Domestic Gas Installations (Edition 2). A Certificate of Conformity for all works associated with the design and installation of the gas heating installation should be obtained by the applicant on completion of the works.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

**Condition 6**

The bulk Propane tank should be located and installed in accordance with I.S. 3210:2016 Code of Practice – Bulk Storage of Liquefied Petroleum Gas (LPG) (Edition 2). A Certificate of Conformity for all associated works with the location and installation of the bulk Propane tank should be obtained by the applicant on completion of the works.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

**Condition 7**

The bulk Liquid Nitrogen tank and the bulk Liquid Oxygen tank should be located and installed in accordance with recommendations from tank suppliers. A Certificate of Conformity for all associated works with the location and installation of the bulk Liquid Nitrogen tank and the bulk Liquid Oxygen tank should be obtained by the applicant on completion of the works.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B1: Means of Escape in Case of Fire.

**Condition 8**

The two-storey office accommodation referred to as “Office Block” on Dwg. No. 325-14-1545-FD-001 Rev.04 should be fully compartmented from the remainder of the building in accordance with Table 3.1 of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B3: Internal Fire Spread (Structure).

**Condition 9**

The construction of all compartment walls should comply with Clause Table 3.2.5 of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B3: Internal Fire Spread (Structure).

**Condition 10**

Fire-stopping for pipes, wiring, conduits and services etc. where they pass between compartments and at joints between elements which serve as a barrier to the passage of fire including protected stair enclosures, shall be provided in accordance with Section 3.4 of TGD B 2006. Every joint or imperfection of fit, or opening to allow services or roof structures pass through any element of fire separation shall be adequately protected by sealing or fire-stopping so that the fire resistance of the element is not impaired and all fire-stopping shall be provided in accordance with Section 3.4 of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B3: Internal Fire Spread (Structure).

**Condition 11**

The powered smoke and heat venting system shall be in accordance with I.S. EN 12101-3:2015.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B5: Access and Facilities for the Fire Service.

**Condition 12**

The powered extract vents shall be linked to the fire detection and alarm system and shall commence extraction upon activation of the system. The system shall provide an extract rate of 65.1 m<sup>3</sup>/second to account for variations to the fire loading within the building.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B5: Access and Facilities for the Fire Service.

**Condition 13**

The inlet air for the powered extract system shall be available automatically upon the activation of the fire detection and alarm system. A minimum inlet supply area of 13.02 m<sup>2</sup> shall be provided.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B5: Access and Facilities for the Fire Service.

**Condition 14**

The fire hydrants must be capable of providing a fire-fighting water supply of 2,000 litres per minute sustainable for 60 minutes in conjunction with peak daily demand or static water storage should be provided on site, with quantity and location to be agreed in advance in writing with the Chief Fire Officer. Static storage tanks should be installed in accordance with Donegal Fire Service specification for static storage tanks for fire-fighting supply (Revision 2018)

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B5: Access and Facilities for the Fire Service.

**Condition 15**

Except as modified by the conditions above the proposed works to be carried out in accordance with the particulars submitted under cover letters dated 05<sup>th</sup> October 2017, 13<sup>th</sup> March 2018, 21<sup>st</sup> March 2018, and 22<sup>nd</sup> May 2018, received on the 12<sup>th</sup> October 2017, 15<sup>th</sup> March 2018, 23<sup>rd</sup> March 2018 and 24<sup>th</sup> May 2018 and email dated and received 13<sup>th</sup> September 2018 from Doherty Building Services.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006.

Conditions 8 and 12 are the subject of this appeal.

## 2.0 INFORMATION REVIEWED

In assessing this appeal, the following information was considered: -

- Fire safety certificate application including Drawings received: -
  - Plants/Elevations
  - Floor Plans/Section
  - Site Layout
  - Site Location Map
- Additional Information submissions dated 05<sup>th</sup> October 2017, 13<sup>th</sup> March 2018, 21<sup>st</sup> March 2018, and 22<sup>nd</sup> May 2018.
- Doherty Building Surveying submitted Memorandum authored by RPS via Clarke Engineering to Donegal County Council dated 07<sup>th</sup> June 2018.
- Clarke Engineering submitted Memorandum authored by RPS to Donegal County Council dated 19<sup>th</sup> July 2018.
- Doherty Building Surveying submitted CFD Technical Report authored by RPS to Donegal County Council dated 13<sup>th</sup> September 2018.
- Fire Safety Certificate grant dated 19<sup>th</sup> October 2018.
- Appeal submission from Inishowen Engineering Limited c/o Doherty Building Surveying (Appellants' Agents) dated 15<sup>th</sup> November 2018.
- Fire Officers Report on Fire Safety Certificate appeal dated 30<sup>th</sup> November 2018.
- Response to Fire Officers Report from Inishowen Engineering Ltd. c/o Doherty Building Surveying authored by Clarke Engineering dated 21<sup>st</sup> January 2019.

## 3.0 DISCUSSION

### 3.1 Condition No. 8

#### Condition

The two-storey office accommodation referred to as "Office Block" on Dwg. No. 325-14-1545-FD-001 Rev.04 should be fully compartmented from the remainder of the building in accordance with Table 3.1 of Technical Guidance Document Part B 2006.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B3: Internal Fire Spread (Structure).

#### BCA's Case

The BCA considered that due to the workshop area exceeding the maximum permitted compartment size (7,500m<sup>2</sup>) for an industrial building with more than one storey, compartmentation must be provided between the workshop and the office block in order to consider the workshop as a single storey compartment which would then comply with the maximum compartment size (93,000m<sup>2</sup>) as per Table 3.1 of TGD-B. The BCA do not consider the offices to be a gallery.

#### Appellant's Case

DBS note that there are no limits on compartment size in BS9999 for a multi-storey building up to 30m above ground level with an A1, A2, A3, and B1 Risk Profile. DBS also notes that BS9999 makes recommendations regarding compartmentation based on risk profiles which are more specific to building usage than the purpose group classification in TGD-B. DBS also notes that the first floor could be considered a gallery as its floor area is less than one-half of the area of the space into which it projects as defined in Appendix D of TGD-B.

#### Discussion

The Fire Safety Certificate application for the building has been based on the guidance in TGD-B, therefore any reference to BS9999 is deemed not relevant.

The primary argument of the appellant is that the office accommodation is a gallery, and as such the building is deemed single storey and therefore, within the maximum compartment sizes.

TGD-B defines a gallery as *"A floor, including a raised storage area, which is less than one-half of the area of the space into which it projects"*. Based on the drawings provided, the office accommodation appears to be within these limits. However, it appears to be separated from the workshop area and therefore does not project into this space. It is therefore would considered it as a separate part of the building and not just a gallery floor. This arrangement is common in single storey industrial buildings with a two-storey office adjacent.

In order to comply with the recommendations of table 3.1 of TGD-B for maximum compartment sizes, the workshop must be considered as a single storey. To be considered as single storey the offices should be compartmented from the industrial areas. Therefore, the condition should remain on the granted Fire Safety Certificate.

## 3.2 Condition No. 12

### Condition

The powered extract vents shall be linked to the fire detection and alarm system and shall commence extraction upon activation of the system. The system shall provide an extract rate of 65.1 m<sup>3</sup>/second to account for variations to the fire loading within the building.

**Reason:** To demonstrate compliance with Part B of the Second Schedule of the Building Regulations 1997-2006 Section B5: Access and Facilities for the Fire Service.

### BCA's Case

BCA considered that due to a slow fire growth rate being used, the smoke extract capacity is one third of what they would consider appropriate based on their calculations which utilised a medium fire growth rate.

### Appellant's Case

DBS note that their proposed extract rate of 42.3m<sup>3</sup>/s was based on design parameters which had been discussed and agreed with Donegal Fire Service prior to undertaking a Computational Fluid Dynamics study. DBS also notes that the use of a slow fire growth rate is acceptable as the photos provided from an existing engineering workshop owned by the same operator showing typical floor arrangements, shows predominantly metalwork with a minimal combustible content over large areas of the floorplate. Therefore, the potential for continuous fire spread post ignition is considered to be relatively low confirming the appropriate use of a slow fire growth rate for the design of the smoke control system.

### Discussion

Ventilation of heat and smoke is provided to assist in firefighting, i.e. Part B5 of the Second Schedule to the Building Regulations. It is noted that TGD-B Section 5.4.3.3 states that the accumulation of heat and smoke in a fire may prevent access to these areas and limit the potential for rescue and effective firefighting from within the building smoke control in escape stairways is of assistance at the later stages in development of a fire and will assist fire brigade operations. Simplified, its main purpose is to release smoke and heat from the building and to improve accessibility for firefighting personnel.

Ventilation facilities include roof mounted exhaust ventilators of suitable size and distribution and adequate inlet air provisions. It should be noted that facilities for the ventilation of heat and smoke for firefighting purposes are not generally required to operate automatically, however the proposed system will do so.

Guidance on the design of ventilation systems appropriate for these purposes are contained in Section 3, Chapter 9 of the Society of Fire Protection Engineers "Handbook of Fire Protection Engineering, National Fire Protection Association Fire Code 204M "Guide for Smoke and Heat Venting, and BRE 368 "Design Methodologies for smoke and heat exhaust ventilation".

The CFD study presented (IBF2127.SCSR.21.05.18) demonstrates a standard of safety which is at least as good as, if not better, than that of a TGD-B compliant layout.

The design fire size for this CDF study has been determined by two parameters, the fire brigade response time and the fire growth rate up to that point. Based on a



review of the information provided and relevant guidelines, we would consider the parameters used for the CFD study to be appropriate for the proposed smoke control system. Based on the photos provided of the typical layout of the fire load density on the floorplate, the potential for fire spread would be low. Therefore, the use of a slow fire growth rate to determine the fire size at the time of arrival of the fire service, is considered reasonable. It is unnecessary to increase the proposed extract rate of 42.3m<sup>3</sup>/s. Therefore, the condition should be removed from the granted Fire Safety Certificate.



## **RECOMMENDATIONS**

Condition 8 should remain on the granted Fire Safety Certificate.

The BCA should be directed to remove Condition 12 from the granted Fire Safety Certificate.

Signed.....  
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Date: 31<sup>st</sup> January 2019