Grenfell Tower – fire safety investigation: The fire protection measures in place on the night of the fire, and conclusions as to:

the extent to which they failed to control the spread of fire and smoke; the extent to which they contributed to the speed at which the fire spread.

Phase 1 Report – Section 6

Investigating how this happened – the physical evidence at Grenfell Tower

REPORT OF

Dr Barbara Lane FREng FRSE CEng

Fire Safety Engineering

24th October 2018

Specialist Field	:	Fire Safety Engineering
Assisted by	:	Dr Susan Deeny, Dr Peter Woodburn, Dr Graeme Flint, Mr Tom Parker, Mrs Danielle Antonellis, Mr Alfie Chapman
On behalf of	:	Grenfell Tower Inquiry
On instructions of	:	Cathy Kennedy, Solicitor, Grenfell Tower Inquiry
Subject Matter		To examine the circumstances surrounding the fire at Grenfell Tower on 14th June 2017
Inspection Date(s)	:	6th October, 1st November, 7-9th November 2017

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6 Investigating how this happened – the physical evidence at Grenfell Tower

6.1 Role and overall approach

6.1.1 For this Phase 1, I am instructed to provide a preliminary report on the identification of the active and passive fire protection measures within Grenfell Tower on 14th June 2017, including preliminary conclusions (where possible) as to the extent to which they:

a) failed to control the spread of fire and smoke; and

b) contributed to the speed at which the fire spread.

6.1.2 In order to obtain the factual evidence, I needed to form my independent opinion and conclusions, I have split my work into two primary methods.

6.1.3 First, through on-site inspections, measurements and observations at Grenfell Tower (the method is explained here in Section 6). Second, I conducted detailed documentation reviews using the evidence provided to me in Relativity.

6.2 Conditions on site

6.2.1 I carried out my work in Grenfell Tower through (a) on-site inspections to find physical evidence of active and passive fire protection measures (b) on-site inspections of the as built construction detailing (c) any observable damage in flats, all common areas (the lobbies, the single staircase) as well as in the basement, the roof top plant room, and the surrounding external areas of the Grenfell Tower (d) on-site inspections of fire fighting access and facilities – as provided internally and externally around Grenfell Tower.

6.2.2 I was not allowed to take any samples away from site nor interfere in anyway with the contents of fabric of the Grenfell Tower, as it was at that time a crime scene under the control of the MPS.

6.2.3 I was allowed to operate freely at all times and took my own aide memoire photos of my own work. As did my team on site.

6.2.4 Selected records of observations are presented in detail in Appendix C. All of my photographic and video records made during these site inspections has been submitted to the Public Inquiry.

6.2.5 Grenfell Tower is classified as a dangerous structure and poses a high risk working environment. I relied on the mitigation measures in place as designed by the Royal Borough of Kensington and Chelsea in conjunction with the HSE.

6.3 Sequencing of the work, and the team

6.3.1 I attended site on 6th October 2017 for a familiarisation visit and was escorted by staff from the Building Research Establishment and the MPS.

6.3.2 Prolonged access to the Grenfell Tower was not possible due to the ongoing identification and recovery works.

6.3.3 Therefore, I decided to mobilise a team of staff from Arup, to assist me, such that I could maximise the work possible in the time frames available to me. These time frames were specifically the 1st November 2017 and 7-9th November 2017.

6.3.4 Based on my own observations on the 6th October, I set up the following process for the inspection works:

a) Stairs and lobbies – damage mapping all levels

b) Stairs and lobbies – mapping the smoke control provision

c) Also mapping the smoke control provisions within plant rooms and following all associated smoke control systems and equipment along the full route from basement/ground level to roof as applied

d) Identifying and then walking through from basement, ground and to roof top plant, and to any relevant floor:

e) Gas supply - including within flats and lobbies

f) Other pipes/risers [dry riser, refuse chute, bathroom vent risers, etc.]

g) Observing any structural damage in all areas – flats, lobbies, stairs

h) Fire door inspection – to the flats on every floor, and to the stairs at all levels including damage and compliance measurements [unfortunately this work was interrupted and will be completed shortly]

i) Detailed cladding inspection - all parts in Flat 16

j) Detailed external cladding inspection – from specific external locations on the scaffolding system around the Grenfell Tower – as agreed with the MPS [for safety reasons]

k) Detailed cladding inspections from internal locations – all floors

l) Fire safety compliance inspection all levels including basement area [all aspects of Building Regulations B1 – B5 inclusive]

m) Fire fighting access and facilities – external areas, and throughout the Grenfell Tower – including measurements, and following routes for water supply.

6.4 How I have done my work on site

6.4.1 A team of qualified fire safety engineers supported me on site. They acted under my direction, and their role was to make observations and record them through notes and photographic evidence.

6.4.2 I provided site inspection checklists, compliance check lists, and critical issues I wanted to be investigated fully, for all areas. I supervised the team throughout their work.

6.4.3 The work was carried out in a very challenging environment, and we held regular discussions throughout each day about progress and methods. I attended any area of concern in person as required every day.

6.4.4 I took my own measurements for fire doors, and for the cladding in Flat 16. I spent a substantial period of time making observations on the damage to stairs and lobbies as well as trying to ascertain where firefighting had occurred.

6.4.5 I spent substantial time inspecting the smoke extract ductwork runs, openable vents in the lobbies and the fans at roof level. I also inspected the fans at Level 2, but my inspection of these fans was limited in comparison to my inspection of the fans at roof level.

6.4.6 The team had specific duties:

a) Mr Joe Wade and Mr Conor Hoey walked with me through the systems with a particular emphasis on the gas supply routes and locations.

b) Onsite logistics, MPS liaison and site specific safety procedures - Roy Little.

c) Fire damage mapping in the stairs and lobbies - Dr P Woodburn

d) All systems routes, equipment, fixtures and fittings – all areas Mr Joe Wade, Dr Peter Woodburn, and Mr Conor Hoey (in part only)

e) Flat 16 cladding inspection - Mr Marc Pawson

f) Cladding inspections all other areas - Mr Marc Pawson, Dr Deeny and Dr Flint

g) Structural damage all areas [this work was unfortunately interrupted and will be continued at a later stage] - Dr Deeny, Dr Flint

h) Fire door inspection – Dr P Woodburn, Mr A Voet, and Mr Angus Elliott

i) External firefighting access and facilities – Mr A Voet and Mr Angus Elliott

j) Compliance inspections all levels (unfortunately this work was interrupted and will be continued at a later stage) - Mr Roy Little and Mrs Danielle Antonellis –.

6.4.7 Selected records are presented in Appendix C.