OVER-ARCHING SUBMISSIONS ON BEHALF OF BINDMANS, HICKMAN & ROSE AND HODGE JONES & ALLEN

1.INQUIRY'S FUNCTIONS AND PURPOSE OF THESE SUBMISSIONS

1.1We entertain no doubt the Inquiry is acutely aware of the breadth and depth of its tasks. The Inquiry's function is not only to establish accountability for the Grenfell disaster, but also, given the role the regulatory regime played, to discharge the State's investigative functions under Arts 2 and 3 of the ECHR. Given the Inquiry's vital role in preventing recurrence[1], the Inquiry has conducted a penetrating investigation into all possible causes of the disaster and has exposed failings of Government to ensure a safe framework of regulations[2] a poor fire safety culture and attitude towards compliance across sectors of the construction industry, in many cases amounting to a contempt for safety, from manufacturers to designers/contractors and those managing and maintaining social housing. As part of the Inquiry's role, not only in preventing recurrence but also in restoring public confidence in Government and other public bodies, the Inquiry will inevitably need to make the clearest of recommendations to each of those entities. Given the background of a long succession of lessons not learned, not only by Government, but by those in industry, starting with the Summerland Inquiry in 1973[3],the recommendations concerning the regulatory regime and supporting testing regime, must necessarily be of a radical nature, not sticking plasters. In order to make effective and robust recommendations, it is necessary for the Inquiry to reach a conclusion on the primary effective causes of the disaster by reference to the roles played by the main protagonists. These submissions seek to assist the Inquiry in that task, including by identifying critical strands of the module 7 evidence. The identification of the primary causes in no way detracts from the Inquiry's wider obligations. The Inquiry's other functions demand that recommendations in the strongest terms are made to a wide range of bodies, even if the matters in question were not directly causative. For example, recommendations are required concerning the actions of manufacturers whose products the experts have concluded were not causative (polymeric insulation) because in the wider sense, their behaviours either contributed to the disregard for safety/wilful non-compliance, or are scandals in themselves which, if left unattended, might be causative in future.

2. CRITICAL STRANDS OF MODULE 7 EVIDENCE

2.1 Implications of an outcomes-based system.

---

[1] Public Inquires are regarded as *"the most valuable source of information to help prevent recurrence of disaster"* Toft and Reynolds 1999. p45

[2] T1 Module 6 submission s7**{BSR00000196/37}**

[3] **{FBU00000130}** and see T1 Module 1 submission paras 20.1-20.6 **{BSR00000061/47}**and T1 Module 6 submissions s2 **{BSR00000196/4}**

2.1.1**Critical role of the fire safety engineer.** The building as a whole, as opposed to the component products within it, must be demonstrated to be compliant in an outcomes-based system. Whether products conform to the test certificates/requirements set for them is merely one of many tools available to the competent professional in establishing overall compliance: the notion of *product compliance* is a legacy of the formerly prescriptive regime[4]. The burden therefore falls on the competent professional to demonstrate how the building and its component parts will ensure life safety[5], which s/he does by the fire safety strategy, partly dictated by the evacuation strategy. On a high-rise building **"HRB"** with a Stay Put Strategy **"SPS"** *"adequate"* resistance to flame spread means no external fire spread can be tolerated[6]. The guidance supporting outcomes-based systems necessarily leaves areas of ambiguity: It is the responsibility of the competent professional to define them, including the meaning of *"adequately"* in the context of external fire spread[7].

2.1.2 **Paramount importance of the Fire Safety Strategy "FSS".**

Given the outcomes-based nature of BR, which requires compliance of the building as a whole[8], the FSS (a concept implicit in although not unique to the BR) emerges as the blueprint by which compliance with BR and life safety for each building is demonstrated, by defining the outcomes required for the bespoke building under consideration including cladding system[9]. In particular in relation to B4 this equates to defining what *"adequately"* resisting flame means[10].The FSS should state the required performance metrics necessary to achieve the functional requirements **"FR"**[11]of Building Regulations. GT's FSS was not compliant because it failed to make clear the SPS was inconsistent with any external flame spread[12], and therefore GT was not compliant, because the walls did not adequately resist flame spread. This evidence reinforces our M1 submissions (s9.2)[13]as to Exova's seminal failure to produce an adequate FSS. Torero's criticism of failure to identify the parameters necessary to satisfy the FR should preface the list at s9.2, as a fundamental failing by Exova. Whilst Torero acknowledges the tendency of ADB users to assume the ADs equated to *"deemed to satisfy"* guidance[14]and the lack of express

[4] Torero Adequacy of the testing regime paras **"Adequacy report"** 2.0.44 and 4.2.4**{JTOR00000006/14}{/29}**
[5] Torero Adequacy Report para 2.0.83 **{JTOR00000006/19}**
[6] Torero Adequacy Report par 2.0.68, and s6.2 **{JTOR00000006/17}[/37}**
[7] Torero Adequacy Report par 5.0.4 **{JTOR00000006/31}**
[8] Torero Adequacy Report par 4.2.4-4.2.10 **{JTOR00000006/29}**
[9] Torero Adequacy Report par 6.0.1 and Fn 34 **{JTOR00000006/33}**
[10] Torero Adequacy Report 2.0.54; 2.0.66 **{JTOR00000006/15} {/17}**
[11] Namely the potential for ignition, fire spread rate and tendency to extinction. Torero Adequacy of the testing regime paras 2.0.55,2.0.66, s6.3 and 7.01**{JTOR00000006/15}{/17}{/39}{41}**
[12] Torero Adequacy Report 6.1.4-6.1.15 **{JTOR00000006/34}**
[13] T1 Module 1 Closing Submissions **{BSR00000073/36}**
[14] Torero Adequacy Report par 5.0.8 **{JTOR00000006/32}**

guidance on what an FSS should contain, fire engineers such as Exova should have appreciated it was their role to analyse what *"adequately"* meant, given the outcomes-based regime meant different interpretations of the FR were possible[15]and that fire safety is highly building specific as is recognised in the FR B4. Clearly one size could not fit all. The Inquiry will need to make a finding about the extent to which fire engineers who simply referenced BR/ADB in their FSS without any analysis of whether the ADB routes to compliance would achieve the FR for the building in question represented a responsible body of opinion, or whether this fell below the standard of care required of them[16].Certain sectors of industry are fiercely peddling the narrative that a totally different standard of care existed at the time of GT, and that it is by definition wrong to compare what was known then to what is known now. That may be true in some respects, but it was never the case that slavish adherence to ADB routes to compliance was a safe or permissible approach. Especially given the injunctions within BR/ADB warning ADB was not a guarantee of compliance. Furthermore, as ultimate responsibility for fire safety rests with the fire engineer, and the physics of fire engineering have not changed, nor suddenly been revealed post GT, it is no defence for fire engineers to say they relied on ADB without troubling to apply the fundamental principles in which they had been trained.

2.1.3 **Designers/contractors** are also obliged to consider whether the ADB routes to compliance are suitable for their building. The BBA certificate, which many treated as a sacred cow, is not a *"guarantee"* of, or *"passport"* to compliance[17].

2.2. **Desktops** Given the outcomes-based regime, competently executed desktops are permissible, however the increase in façade desktops (extending BR135) prior to GT was primarily due to industry not Government. A distinction must be made between appropriate analysis carried out by a qualified fire engineer/other suitably qualified specialist (such as those preparing a valid FSS to show compliance with the FR of BR) as against the practice introduced and popularized by BCA's TGN 18 **"TGN18 Desktops".** TGN18 stated a third route to compliance with ADB an undefined/unexplained desktop for the façade (by extension of the BR135 route). By TGN18's June 2015 revision, it was stated that this might be done by a *"suitably qualified fire specialist"* (an undefined term therefore a potentially unskilled person[18]). Given the lack of definition/explanation of the nature and purpose of the desktop,

---

[15] Torero Adequacy Report par 6.1.25**{JTOR00000006/37}**

[16] **Bolitho v City and Hackney Health Authority [1998]** A.C.232 at 243D-F: the body of opinion relied upon in defence of a practice must be reasonable and logical

[17] **Martlet Homes Ltd v Mulalley & Co Ltd [2022]** EWHC 1813(TCC) at [147]

[18] Bisby considers this a significant change to TGN18 which eroded competence Desktop Assessment report paras 275-277**"DAR" {LBYP20000004/37}**

and the lack of defined skillset required, these were carried out by untrained people in ignorance of appropriate methodology and of risks inherent in the task. TGN18 Desktops have proved dangerous and have become synonymous with poor practice[19]. Many buildings now being re-clad were the subject of such assessments of the type both Bisby and Torero have found to be of generally poor quality[20]. Desktops, if carried out by the appropriate discipline (fire safety engineer and façade designer/architect and ultimately led by the fire safety engineer[21]) to support the FSS, may be a valid tool for analysis. Whereas the poor desktop practice induced by TGN18 is clearly reprehensible and has likely contributed to widespread use of ACMPE. This route was not, as Professor Bisby accepts[22], an expressly specified route to compliance of the façade contained in ADB (as the linear and test routes were). Bisby considers a desktop is a means of achieving the FR by "*some other way*[23]"than those stipulated in ADB[24].However, TGN18 describes the options including option 3 desktops as one of four *"options for showing compliance with paragraph 12.7 of ADB2*[25]*"*thereby elevating it to a route to compliance, as opposed to being *"some other way"* of complying with FR. Of course, if complying with the FR by some means other than those postulated by ADB, desktop analyses might be carried out, but the whole point of ADB was to give people a *safe harbour*/benchmark[26]by which they might comply. As Bisby recognizes, knowledge of how to carry out façade desktops is not generally available and he personally would not wish to carry one out as he would not be competent to[27](consistent with NHBC Lewis' evidence, who authored option 3[28]).Accordingly, TGN18 created the illusion that desktops were an automatic safe route to compliance: a fateful tick-box as it transpired. There was no regulation of desktops, despite it being an issue about which Martin was on notice and uncomfortable[29].Despite the initial post GT ban on façade desktops[30]the situation has not improved, in that BS 9414 creates a mechanistic means of

---

[19] Torero Adequacy Report par 2.0.52 **{JTOR00000006/15}**
[20] Bisby DAR par 525 **{LBYP20000004/72}** and Bisby T/291/77:1-8. Torero T/292/93:15-94:22
[21] Torero T/292/89:10-91:1
[22] Bisby T/291/80:1-15
[23] 4th par ADB 2006 inc 2013 amendments **{CLG00000224/7}** cited by Bisby at par18 **{LBYP20000004/17}**
[24] ADB recognises the need for subjective judgments /desktops in the broadest sense: Bisby DAR paras 3 & 287 **{LBYP20000004/2}{/39}** but ADB App A excludes desktops: Bisby T/291/79:3-80:18
[25] BCA TGN18 Issue 1 June 2015 **{BCA00000043/2}**
[26] See DCLG Briefing Note on ADs 3.5.15 *"To provide 'safe harbour' guidance on which both industry and building control bodies can rely as being 'reasonable' in meeting the [FRs] set out in the regulations"* **{CLG10007044/1}.** Martin's email to Harral 4.6.15 *"[AD's] can either be followed to demonstrate compliance or used as a benchmark or starting point for alternative technical solutions"* **{CLG10007048/1}**
[27] Bisby T/291/76:21-77:8
[28] J. Lewis T/224/199:7-11
[29] Email Martin to Evans 20.6.16 **{NHB00001325/4-6}** Martin T/255/119:6-121:5; T/255/120:2-121:5 and 122:23-123:17
[30] **{NHB00001831}**

assessing what is a highly complex problem. It substitutes assumption for competence and is in addition error laden. It makes unjustified assumptions and is based on BS8414 which is in itself a flawed test[31].

2.3 **Contribution of products/materials to fire growth/spread**

2.3.1 **Primacy of ACMPE.** The findings from Work Package 1 **"WP1"** and Work Package 2 **"WP2"** testing confirmed the Phase 1 findings that Reynobond ACMPE 55 **"RBPE"** was primarily responsible for the fire becoming rapidly uncontrollable and identified the mechanism by which that occurred. WP1 confirmed RBPE was likely to have contributed the greatest potential energy[32]of all products by a considerable margin[33]; namely as much as 59% of the total potentially available energy from combustion of refurbishment cladding products on any single floor of GT[34].RBPE also released heat faster than any other product, which is directly relevant to rate/extent of external spread[35].The RBPE comprising the crown, which played a critical role in promoting horizontal and downward fire spread[36],yielded the largest potential energy contribution of any materials, representing 88% of all the available fuel[37].The crown contained approximately 111% of the available energy from any one floor of GT[38]. ACMPE is a volatile[39] and dangerous product which presents an *"extreme fire hazard"* [40].

2.3.2 **Mechanism of ACMPE's burning behaviour.**

(1) **Criticality of mechanical separation of the inner aluminium skin.**WP2 established deformation/separation of the ACMPE panel's inner aluminium skin as the trigger for rapid and irreversible fire growth. Separation results in rapid energy release, promoting fire growth[41]and

---

[31] Torero Adequacy Report 14.0.27 **{JTOR00000006/175}** and Torero T/292/94:23-101:15

[32] Ascertained by analyzing the heat of combustion (max energy a material can release in burning conditions) Bisby WP1 Report (15.3.20 updated 1.6.20) par 345 **{LBYWP100000002/60}**.

[33] WP1 Report, par 362 **{LBYWP100000002/66}.**

[34] WP1 Report, par 19 **{LBYWP100000002/4}**. The most accurate comparison is the total area of product per floor. A heat of combustion comparison between products is inappropriate, given the different densities and thicknesses of the polymers installed on GT.WP1 Report, paras 361-363 **{LBYWP100000002/65}**.

[35] WP1 Report, par 22 **{LBYWP100000002/4}**. Heat release rate **"HRR"** is central to evaluating fire hazard: it determines the amount of available energy released from a material to be transferred back to the fuel via convection/radiation, thereby creating a positive feedback loop resulting in fire growth and/or spread WP1 Report par 421**{LBYWP100000002/78}**.

[36] WP1 Report, par 365 **{LBYWP100000002/67}**.

[37] WP1 Report, par 367 **{LBYWP100000002/69}.**

[38] WP 1 Report, par 368 **{LBYWP100000002/69}.**

[39] In that the product appears not terrible but then suddenly and profoundly degenerates: Bisby T/290/35:10-20

[40] Bisby Presentation T/289/185:15-22. *"Every time we ran an experiment that escalated to full involvement of the ACM, I was surprised and alarmed."*

[41] WP2 Report paras 42-49**{LBYWP200000001/8}**

self-sustained fire spread by PE melting and dripping downwards resulting in pool fires at the panel's base causing further breach of encapsulation of the PE[42].

(2) **Role of insulation in ACM's burning behaviour**. Without the presence of insulation (combustible or otherwise) ACM will not become fully involved[43].The critical factor influencing fire growth of a rainscreen cladding system incorporating ACMPE is the extent to which the insulation retains heat within the system to pre-heat the ACMPE remote from the burning at its base[44].Insulation's primary significance is its contribution to radiative/convective heat exchange or *"thermal feedback"* between it and the ACM, which is critical to causing the separation/delamination of the aluminium faces of the panel (as opposed to the insulation releasing additional energy by burning[45]).Even using non-combustible[46]insulation, the insulating opposing face to the ACM retained sufficient energy within the cladding system to heat ACMPE beyond its "*tipping point*[47]*"*resulting in growth to full involvement of the ACM PE, leading to eventual local burnout of the panel[48].

2.3.3 **Relevance of fixing method of cladding panels: riveting vs cassette.** Cassette fixed ACMPE systems perform worse than rivet fixed systems when tested in BS EN 13823 SBI tests, or in large-scale BS8414 cladding tests. WP2 testing examined 4 different fixing types[49],to seek to explain the poorer performance of cassettes (in part attributable to exposed PE core material[50]) and the fact that the cassette (and any horizontally protruding cavity barriers within the cavity[51]) act as a collection tray[52]to collect molten PE resulting in pool fires and facilitating upward spread. Riveting ACMPE panels improves their performance in most (but not all) scenarios, compared to a cassette system[53]. Even riveting does not prevent the PE eventually becoming fully involved, rather it delays that process[54].However, due to the volatile

---

[42] Torero Adequacy Report paras 9.3.1-9.3.4**{JTOR00000006/76}** Bisby WP1 Report paras 481-490**{LBYWP100000002/92}**

[43] Torero Adequacy Report par 9.3.5 **{JTOR00000006/76}** Bisby WP2 Report Par 449 **{LBYWP200000001/79}** Bisby T291/38:21-39:5

[44] WP2 Report Par 696 **{LBYWP200000001/129}**

[45] Bisby T/290/72:17-74:25

[46] Albeit mineral wool is not physically non-combustible as it has a heat of combustion, but it is treated as non-combustible from a regulatory perspective: Bisby T/290/10:11-19

[47] The point at which the ACMPE's performance suddenly and profoundly degenerates: Bisby T/290/35:10-20

[48] WP2 Report paras 50-51 **{LBYWP200000001/9}.** By which Bisby means until there is no PE/cladding burning anymore T/290/70:1-10

[49] Shown diagrammatically at **{LBYWP200000001/47}**

[50] The tests showed routing of ACMPE cored panels is likely to worsen their overall fire performance in most scenarios: WP2 Report, paras 581- 582 **{LBYWP200000001/111}**

[51] Bisby T/290/55:15-25

[52] Bisby T/290/45:9-15

[53] WP2 Report, paras 583-584 **{LBYWP200000001/112}**

[54] Bisby T/290/34:20-24

("*tipping point*"[55]) nature of ACMPE, a short-term benefit from riveting may result in more severe burning at a later stage[56]. Even fixing case (c) (involving the installation of nine aluminium rivets along both faces of the ACM panel over its lower third (thereby preventing delamination/PE leakage at the base of the panel[57]) would eventually have permitted the ACMPE to reach full involvement[58].Accordingly, the use of ACMPE in any of the fixing cases, including (c), could never comply with functional requirement B4 under the BRs[59].Riveted ACMPE's relatively better performance does not justify its use[60].

2.3.4 **Contribution of insulations to fire growth/spread.**

(1) **Relative contributions of insulation products.** WP2 testing enabled quantification of the relative contribution of the components of the cladding system. Celotex RS5000[61], Kingspan K15[62]and Aluglaze XPS window infill panels[63]are unlikely to have been a primary contributor to heat release during the fire in terms of the total amount or rate of energy release, particularly within the timescales relevant to external fire spread. However, the relative ease of ignition of Aluglaze, may be significant as regards initial growth of the fire outside the kitchen window of Flat 16, where failure of the kitchen window extraction fan would have directly exposed the XPS core to heating, likely ignition, and flaming accompanied by the potential downward mobility of molten, potentially flaming, XPS.[64]The ease of ignition of both RS5000[65]and K15[66]may be relevant in terms of initial growth of the fire outside the kitchen window of Flat 16, in that either could have been one of the first cladding materials ignited, thus promoting ignition of other materials that were present at that location such as the PE core of the RB ACMPE cassettes. Clearly each of RS5000, K15 and Aluglaze XPS have heats of combustion that would immediately and obviously preclude their classification as materials of limited combustibility **"MOLC"**[67].

---

[55] Bisby T/290/35:10-20
[56] WP2 Report, par 680 **{LBYWP200000001/127}**
[57] WP2 Report **{LBYWP200000001/47}**
[58] WP2 Report par 583**{LBYWP200000001/112}** stated fixing case (c) never grew to full involvement of the ACM, but he clarified by his evidence at T/291/18:25-19:4 it would have done so if the line burner had been left a few minutes longer.
[59] Bisby, T/291/38:9-18 strongly disagreed that fixing case (c) might comply with B4: "*B4 requires us to adequately limit the external spread of fire. If you have ACMPE used in anything other than insubstantial quantities, I don't think you can be confident that you've done that as a designer*".
[60] Bisby T/291/26:24-27:20: "*..the right question is... does it have the potential to cause a very big fire? And the answer is going to be, unless it's used in insubstantial quantities, yes, it does have that potential*".
[61] WP1 Report, par 104 **{LBYWP100000002/118}.**
[62] WP1 Report, par 717 **{LBYWP100000002/119}.**
[63] WP1 Report, par 693 **{LBYWP100000002/117}.**
[64] WP1 Report, par 694 **{LBYWP100000002/117}.**
[65] WP1 Report, par 705 **{LBYWP100000002/118}.**
[66] WP1 Report, par 718 **{LBYWP100000002/120}.**
[67] WP1 Report, par 358 **{LBYWP100000002/64}.**

(2) **Significance of combustibility of insulation.** The use of combustible insulation is of secondary, or even tertiary importance[68]: it did not greatly alter the cladding system's response but accelerated the full involvement of the ACMPE (due to ignition and surface flaming of the combustible insulation)[69].The use of mineral wool without foil facers also resulted in growth to full involvement of the ACM more rapidly than tests using foil faced combustible insulation thereby demonstrating combustibility of the insulation facing the cladding is not a prerequisite for extensive fire spread[70]. All the insulation theoretically contributed broadly the same energy up to PE burnout[71], yet mineral wool contributed only 0.1 % of the energy release up to the end of the experiment which is also an indication that the combustibility of insulation is a secondary issue when used in conjunction with ACMPE[72].The combustible insulation's contribution to the fire becoming uncontrollable/upwards spread as a result of the insulation's burning (as opposed to its thermal feedback) was somewhere between 2-10% (i.e. not susceptible to reliable quantification *"relatively minor if it exists at all*[73] *"*).This occurred before the burnout of the PE cladding[74], was not decisive in promoting fire growth and would occur differently depending on where it occurred on the building[75].There was a qualitative difference between K15 and RS5000, in that K15 produced flaming debris whereas RS5000 did not, the consequence could not be ascertained[76].Combustibility of insulation played an obvious role only when large surfaces were unprotected by foil facers, and so able to support ignition and widespread surface flaming[77].Once the fire became irreversible, the insulation will have added to the fire load: damage to the foil facing is inevitable, in that once ACM PE is burning, the foil facers will detach, thereby ceasing to protect against significant mass loss and contributing to the total energy overall[78].The release of additional energy by burning after burnout of the cladding at GT was likely to have been *"pretty minor*[79] *"*.Once the exterior cladding had attained

---

[68] WP2 par 697 {LBYWP200000001/129}
[69] WP 2 Report, par 545**{LBYWP200000001/101}.**
[70] WP 2 report paras 25 and 685 **{LBYWP200000001/4}{127}** Bisby T/290/72
[71] WP 2 report fig 33**{LBYWP200000001/78}**
[72] Figure 34 **{LBYWP200000001/79}** par 655-657 **{LBYWP200000001/123}** as amended in oral evidence from *"..until local burnout of the ACM"* to *"..until local burnout of the cladding"*. Measuring different timescales (in Fig 33 versus fig 34) namely heat release rate up to burnout of PE but under the heat release curve as against total mass loss to the end of the experiment doesn't invalidate his conclusions: Bisby T/290/76:9-79:7
[73] WP2 Report par 683 **{LBYWP200000001/127}** and Bisby T/290/72:1-73:10
[74] Bisby T/290/24:7-25:15; T/290/22:8-23:19; T/290/71:9-25; T/290/83:18-25
[75] Bisby T/290/23:22-24:6
[76] T/290/40:7-17
[77] WP2 Report, par 697 **{LBYWP200000001/129}** Bisby T/289/147:20-23:*"... try and notice the speed with which the RS5000 insulation ignites when the foil facer isn't present. If you blink, you might miss it."*
[78] Bisby T/290:59:9-14; T/290:59:18-24
[79] Bisby was unable to put a percentage on it: T/290/71:9-25.

irreversible fire growth, that would in turn cause the insulation to burn as well, provided it is combustible, regardless of whether it is foil faced[80].

(3) The fact that combustible insulation was not significantly causative of fire growth/spread at GT does not mean it would not be causative in other constructions[81],and in particular in cladding incorporating CBs without other combustible rainscreen products[82].In any event, the events surrounding the testing and marketing of both K15 and Celotex RS5000 as well as Aluglaze XPS clearly warrant close scrutiny and recommendations by the Inquiry.

2.4 **Contribution of systems to smoke spread: the smoke control system "SCS"**

2.4.1 Whilst the SCS was only ever designed to remove smoke from one floor at a time (the assumption being that a fire would exist only on one floor at a time) such systems take on increased significance in terms of life safety if they malfunction, as the SCS at GT did, and actively contribute to smoke spread in the protected areas which they are meant to keep reasonably free of smoke. The evidence has illustrated the immense risk to building safety in permitting individuals considered to be experts in their field, but who are nonetheless unregulated and without formal qualification, to design critical life safety systems. The lack of documentation associated with the SCS at GT is not a mere administrative failing but reflects a lack of contemporary engineering analysis that the principal designer (PSB) ought to have regarded as indispensable. CFD or other numerical analyses ought to have been carried out but were not and critical design decisions ought to have been adequately communicated and documented but were not. PSB's attitude was that Mahoney, a purported expert, simply knew the answers from experience and that ought to have been enough. Given each system is building specific, this approach could never be legitimate. It reflects a level of arrogance which compromises safety. PSB's own expert conceded that Mahoney's reliance on his experience alone, without the assistance of hand calculations or CFD modelling was not the "*right way of designing these systems*" and that had he been advising on the project he would have insisted such work was done.[83]

2.4.2 PSB complained in its Smoke Control Opening Submissions of unfair criticism following years of microscopic scrutiny by lawyers and experts.[84] The evidence shows that one does not need a microscope to identify PSB's failings, which are of such a basic and fundamental nature

---

[80] Bisby T/290/60:25-61:5.
[81] Bisby T/289/186:6-15.
[82] WP2 Report paras 705-707: these are "*legitimate and crucially important questions*" requiring additional fundamental research **{LBYWP200000001/130}**
[83] Lay, T/286/152:1-14.
[84] PSB Smoke Control Opening Submissions at [10] {**PSB00001376/2**}

that they ought to have been glaringly obvious to others at the time, not least Max Fordham who examined and commented on PSB's proposals[85]and Building Control.

2.4.3 PSB, Mahoney and Lay have sought to justify the SCS design on various different and often contradicting bases, but that only underlines the essential problem; there was no coherent design basis for the SCS. Had there been, and had it been adequately documented, the SCS would not have required such extensive and disproportionate investigation.

2.4.4 **Regulatory Requirements and the Route to Compliance**

(1) **Regulation 4(3): Non-Worsening**. The SCS at GT needed to achieve the FR. Failing that, the non-worsening principle[86]needed to be satisfied, but at GT this could not be demonstrated (without CFD analysis) as the outputs of the existing system could not be measured or calculated as it was non-functioning. Accordingly, the FR had to be met. Responsibility for achieving the FR ultimately rests with the relevant designer. Compliance with ADB is no guarantee that FR will be achieved, and this is in part due to the fact that each system is building specific, but in any event the experts agree that, at GT, an alternative approach to that contained in ADB was required. Where the original SCS did not meet the FR in any respect reliance upon the so-called non-worsening principle in respect of that non-compliance would theoretically have been a legitimate alternative. PSB's expert however uses the non-worsening route to justify the system, albeit on a flawed basis insofar as he suggests an unscientific subjective test, and indeed a perverse one, insofar as he suggests a non-functioning system could be the benchmark[87].Mahoney belatedly claimed during oral evidence that this was the approach he adopted[88] (a claim not made in either of his witness statements nor any contemporaneous design document). The evidence remains however that the non-worsening approach was simply not the route adopted at time;[89]it was not practicable[90]to determine the performance of the existing system as it was non-functioning and there was a reluctance (encouraged by Exova[91]) to incur the cost of a CFD analysis.[92]

---

[85] Email Max Fordham to Rydon dated 5.2.16 {**JSW00002309/2**} and on 1.3.16 {**ART00005660/7}.**

[86] Regulation 4(3) of the Building Regulations 2010.

[87] T/287/111:16 to 112:7 Lay endorses a general "*qualitative judgement*" allegedly made that the SCS was no less satisfactory. Lane considers this an illegitimate approach to Reg 4(3): T/287/25:12-18. Lay's view (contrary to both Menzies and Lane) that a legitimate, although ill-advised, means of applying the non-worsening principle would have been to use the *non-functioning* system as the comparison baseline T/287/21:5-15.

[88] Although he used the term "betterment".

[89] As Menzies agrees paras 35-38 of her report {**BMER0000007/8**} and T/168/184:17-22 and T/168/185:22-24

[90] Noting Lane's view that it was possible to determine existing performance via a CFD analysis: T/287/40:10.

[91] See T. Ashton email dated 15.1.14: *"It would be possible to carry out a CFD analysis…but we haven't budgeted for this…Given that what we are proposing is a significant improvement over what exists, I think RBKC are being unreasonable…"* {**SEA00000160}.** This reasoning was circular, since the conclusion that the proposed system was a significant improvement could not be reached without an analysis such as CFD.

[92] T. Ashton email dated 17.3.14 {**MAX00004350}.**

Whilst significantly cheaper hand calculations were instructed by TMO,[93]those calculations, by Max Fordham, merely provided an estimated extract rate (m3/s) from the existing system and whilst it predicted that the proposed push/pull system would achieve a higher extract rate, there was no analysis which determined that the proposed system was no worse in terms of compliance with the FRs.[94]More importantly, RBKC BC never saw the hand calculations,[95] which in any event were produced *prior* to the involvement of Mahoney, who fundamentally changed the nature of the proposed system in any event and BC, despite asking, never received m3/s extract rates for the installed SCS.[96]It follows that there was never in fact any comparison between the original extract rates and those generated by Mahoney's design.

(2) **Regulations 8 and 11: Reasonableness**

Mahoney gave evidence that because, in his view, it was "*impossible*" to achieve compliance with the FRs or any established guidance at GT, he could instead simply come up with a design which sought to protect the stair but which "*didn't comply with anything*".[97]This approach resembles the argument, advocated by Lay, that the standards imposed by the BRs are flexible and ultimately yield to a test of reasonableness. This is a misinterpretation of Regulations 8 and 11, but in any event, even Lay ultimately acknowledges that any such flexibility lies in the hands of BC and not the designer.[98]The argument is therefore of no assistance to PSB, since there is no evidence that the BCO at GT issued any such explicit dispensation.[99]Rather it seems that Mahoney's attitude is reflective of a "*climate*" in industry whereby practitioners, not limited to BCs, seek to relax the requirements of the BRs resulting in the application of what Dr Lane described as "*worrying standards*".[100]Lane was careful not to lay this criticism solely at BC's door, but the practice of using BC as a gatekeeper is failing drastically.

2.4.5 **Failure to Document/Absence of Design Basis**

(1) PSB's design documentation did not explain how the FR would be met by the proposal nor did it contain any clear explanation of the design basis.[101]PSB's expert conceded that there was

---

[93] C. Williams email dated 31.03.14 {**MAX00004366**}.Note Menzies' views: (1) that hand calculations are less reliable than CFD: T/168/188:16-25 .(2)These calculations, unseen by building control, were not a reliable basis of comparison anyway because they did not deal with the issue of leakage: T/168/194:1-3.

[94] M Smith email to D Bradbury 23.10.14{**JSW00002935**}; See also Paragraph 2.4.6(2) below.

[95] Menzies: T/168/193:19-25 to 194:3.

[96] As such, comparison of extract rates was not the basis of approval by the BCB Hanson: T/154/220:23.

[97] Mahoney, T/155/44:18 to 45:2

[98] See Paragraph 1353 of Lay's Report {**LAY00000001/419**}

[99] Lane, T/287/21:25.

[100] Notably *not*, in Dr Lane's experience, on the basis of Regulation 8 and 11: T/287/21:2-18.

[101] Dr Lane, Phase 2, 5.1.7 and 2.1.8 **{BLARP20000035/114} {/11};** PSB Technical Submission Rev.6 **{PSB00000214}**

a lack of detailed analysis and documentation in relation to the SCS,[102]yet made concerted efforts to downplay the significance and importance of adequate analysis and documentation. Having argued vehemently in his report that the BRs do not impose a duty to document how compliance is achieved, Lay conceded orally there was such a duty.[103]Clearly, adequately documenting the design basis is one of the most critical aspects of demonstrating and achieving compliance with BRs. Since the design basis was not documented, it is unclear how BC signed off the design; Hanson's evidence that he thought the design basis was the SCA Guide, despite no design documents mentioning it, was unconvincing. He claimed it was clear because all the details submitted followed the SCA Guide,[104]but this isn't true,[105]and when confronted with Lane's table demonstrating the extent of non-compliance with the SCA Guide, Hanson had no real answer.[106]Such documentation is not required merely to demonstrate compliance to the BCB, but to permit those who operate/maintain the SCS in future to understand the objectives and functions of the SCS. Absence of such documentation was intolerably dangerous.

(2) The Inquiry will doubtless not believe that PSB conducted some detailed and careful analysis of the SCS design but simply failed to document it; Mahoney does not claim as much. We said in our Smoke Control opening, that Mahoney was dancing on a pin head[107]and during his oral evidence he fell off. His evidence has been capricious and lacks any credibility. The Technical Submission gave the misleading impression that the design was a pressure differential system in line with the principles of BS EN 12101-6 and Mahoney's first witness statement perpetuated that impression.[108]He changed his evidence in his second witness statement,[109]claiming he developed a *"performance-based building appropriate solution"* similar to the *"Mechanical Extract, Natural Inlet"* system described in the SCA Guide,[110]which he considered was *"sufficient to meet the requirements of the Building Regulations"*.[111]His

---

[102] In admitting at Para 8 of his report that Dr Lane's criticisms are *"to some extent valid"* {**LAY00000001/14**}
[103] T/286/42:5-8 and 45:12. Such a duty is imposed by Regulations 14, 17 and 38 of the BRs - see Lane Supplemental Report at 2.3.3 and 9.2.63 {**BLARP20000043/26**} and **{/219}** and also Lane at T/287/22:20.
[104] Hanson, T/154/119:5-6
[105] Mahoney accepted that the SCA Guide methodology was not followed, because instead he was following the "betterment" route: T/155/186:10-21 and he accepted the design did not comply with the SCA Guide: T/155/176:14-17.
[106] Hanson, T/154/191:14 to 193:8
[107] Para 1.2, BSR T1 Module 3 Smoke Control Opening Submissions {**BSR00000074/2**}
[108] Mahoney's First Statement at Paras [26], [27], [51], [52] and [54] **{PSB00001329}**; Mahoney accepted that [52] of his First Statement did say the design was in line with BS EN 12101-6 and said it was therefore incorrect: T/155/124:1.
[109] Dated 26.3.21 {**PSB00001373**} which, notably, came after Lane's Appendix J report dated 24.10.18 {**BLAS0000031**} and after PSB's instruction of Lay on 20.12.19 {**LAY00000001/23**}
[110] Albeit he gave the SCS various different descriptions: *"mechanical extract depressurisation system"*, a "*Colt Shaft mechanical shaft system"* and *"similar to but not the same as, the Mechanical Extract, Natural Inlet system detailed in the SCA Guide 2012"* Mahoney's 2nd Statement paras [41] and [52] **{PSB00001373/8} {/11}.**
[111] Mahoney's 2nd Statement at par [74] **{PSB00001373/14}.**

position changed yet again under oath when he sought to allege that he hadn't designed a system at all[112]and instead adopted the non-worsening approach to compliance.[113]Aside from being untrue, it is clear his understanding of such an approach is fundamentally flawed. He was inconsistent as to whether the design satisfied the FR; at times he said this wasn't possible,[114]at others he said the design satisfied B1 and B5.[115] The latter position of course is at odds with the non-worsening principle, which could only apply to elements which did not satisfy the FR. He also considered that the principle was satisfied merely by way of "*betterment*" of the "*ventilation rate*" and no more;[116]as Lay accepted,[117]under non-worsening, the new system must be no worse in its non-compliance *with the relevant FR* than the old: it is insufficient to arbitrarily select a performance criterion and improve the system vis-à-vis that criterion alone (particularly where the systems being compared are fundamentally different). Such an approach is unrecognised by the BRs, albeit in Lane's view reflects a common misconception.[118]

(3) Mahoney claimed that when following the "*betterment*" route to compliance, it was not necessary to follow, or document, "*a logical step-by-step approach*" to design;[119].That is clearly wrong, but a convenient stance for him to take, since it absolves his failure to do so at GT. The sparse design documentation is silent on the non-worsening principle as a means of compliance, but erroneously suggests the route adopted was compliance with BS EN12101-6.

2.4.6 **Particular Design Failures**

(1) **Extended Travel Distances: Protection of Stairs Only**

Mahoney accepted that he was fully aware at the time of designing the SCS that there were extended travel distances at GT[120]and accepted that there was a regulatory requirement for the design to protect both the stairs *and* the lobby.[121]PSB's expert accepts (based on the SCA Guide) that "*excessive*" travel distances required protection of the lobby. Providing inlet air via the stair door (as the SCS did) was inappropriate.[122]The word "*excessive*" however is Lay's, intended to subvert the generally accepted[123]guidance that travel distances beyond 7.5m are

---

[112] For example, T/155/25:4-5, although he later conceded that he did design the SCS: T/155/175:22-25.
[113] He referred to this as "*betterment*" throughout his evidence e.g. T/155/65:2-4.
[114] Mahoney, e.g. T/155/44:18-25 and T/155/65:10-17
[115] Mahoney, T/155/131:23-25
[116] Mahoney, T/155/110:20-25 and 111:1-2.
[117] Lay, T/286/19:10-11; See also Lane to similar effect T/287/24:23-25 and 25:1-18.
[118] Lane T/287/25:12-18.
[119] Mahoney, T/155/186:16-21.
[120] Mahoney, T/155/53:9
[121] Mahoney, T/155/45:14-17
[122] Lay Report, Para 542{**LAY00000001/168}.**
[123] 7.5m is the figure used in ADB 2013 Table 1 {**CLG00000224/30}**, BS 9991:2011 Figure 6 {**BSI00000621/36}** and the SCA Guide at 2.1, which defines extended corridors as between 7.5m and 15m {**RBK00001778/6}.** Only the LGA Guide used Lay's 10m figure, and that guidance was not to assist in the

classified as *extended* and require mitigation. The SCA Guide prohibits reliance on *any* form of natural leakage for replacement air for "*extended*" corridors (over 7.5m)[124].

(2) Mahoney claimed to have considered the issue of extended travel distances, but that because it was impossible to mitigate them at GT, he made the conscious design decision to focus on protection of the stair only. This self-assuredly definitive conclusion is a surprising one when one considers that he reached it without carrying out any CFD or other numerical analyses to confirm it. Dr Lane's view is that it was not possible to definitively rule out other options, such as a push-pull system,[125]without such analysis.[126]Far from explaining this in any design documentation, the fact of the extended travel distances is not even mentioned. This in itself was a critical failure; as Dr Lane explained, the decision to protect the stair alone was one that needed to be communicated and specifically accounted for by Exova in the fire strategy for GT because the SCS was not a system that could work in isolation.[127]If the SCS could not mitigate smoke conditions in the lobby, then it was essential that the fire engineer was aware of this so that other mitigating actions could be considered,[128]and so that those maintaining the building understood the additional level of importance attributed to maintenance of fire doors and dampers for example.[129]The most likely scenario is that Mahoney was aware of the problem but elected to ignore it. Not only did Mahoney's actions fail to mitigate the occurrence of smoke in the protected lobby, but his design (which depressurised the lobby) probably actively drew smoke into the lobby and thereby worsened conditions.

(3)**B3 Compartmentation: Dampers**

As explained in our Smoke Control Opening Submissions, the North and South shafts at GT were protected shafts in order to maintain compartmentation in compliance with Regulation B3(3) and the performance of the dampers was integral to that purpose.[130]Astonishingly, both Mahoney (PSB)[131]and Hanson (Building Control)[132] admitted they did not even consider B3.

---

design of a building or any elements therein, but to assist those conducting FRAs to comply with the RRO and the Housing Act. Guidance documents of that kind are known to contain less onerous standards and are inappropriate for use in respect of controlled building work as Clause 0.21 of ADB 2013 warns: Lane Supplemental at 2.6.8-2.6.9 {**BLARP20000043/31}.**

[124] SCA Guide (Rev 2, 2015), Section 6.4.4, 6th paragraph {**RBK00001778/38}.**

[125] Lane's view was theoretically a push-pull system was a viable design solution which could protect both the stairs *and* the lobby, and could not be ruled out definitively without numerical analysis: T/287/67:21-70:6 and T/287/73:5-14.

[126] Lane, T/287/77:11-12

[127] Lane, T/287/78:17-25-80:2.

[128] Lane T/287/81:10-82:2

[129] Lane T/287/83:10-25

[130] BSR T1 Smoke Control Opening, Para 2.3.10(2) {**BSR00000074/12}**

[131] Mahoney T/155/47:14.

[132] Hanson T/154/52:1. Menzies' evidence was that this was not a reasonable approach to have taken: T/169/49:18

Notwithstanding that fact, Mahoney accepted he was aware that smoke control dampers were required at GT, however his sole justification for specifying dampers which had no formal classification to any standard,[133]was that suitable smoke control dampers were not available on the market; aside from the fact that this was not explained in any of the design documentation,[134] and that there is no contemporaneous evidence that PSB did try to source a smoke control damper at the time,[135] Dr Lane has demonstrated that it is likely to be false.[136]

2.4.7 **Commissioning Failures**

(1) As with the design itself, the commissioning records for the SCS were dangerously deficient. Partlow (PSB) was responsible for commissioning the SCS, and he admitted that the commissioning records were less detailed than was usual and that this was the result of time pressures being applied.[137]The commissioning method statement was full of errors as Partlow admitted,[138]the cause-and-effect analysis was inadequate,[139]and the commissioning records lacked sufficient detail to permit any form of meaningful interrogation. Partlow's recollection is inevitably unreliable so long after the event. He stated that dampers 3 (smoke inlet) and 4 (environmental inlet) were unconnected at the time of commissioning and were fixed in the open position,[140] however we know that post-fire damper 3 was found in the closed position and in fact it was damper 2 (smoke outlet) which was not wired[141]meaning Partlow was either mistaken at the time, or his recollection has failed him. In order for smoke to be extracted from the South shaft it was essential that damper 3 was open. The fact it was closed represents a major failing of the system, which would have resulted in smoke entering the South shaft. With no means of extraction via Level 2, the stack effect would take over a fill the shaft with smoke. The substandard dampers had no smoke leakage performance allowing smoke to enter lobbies on all floors: a major breach of B3 compartmentation. Witness evidence from the night of the fire suggest this is precisely what happened.

(2) Partlow claimed to have done many things, but which were not documented. Incredibly, Lay used the absence of documentation as a factor in favour of commissioning having been

---

[133] As accepted by Lay: T/286/192:5
[134] MahoneyT/155/214:7
[135] Lane T/287/198.
[136] Her search was a brief one in light of time restraints however she was able to identify multiple suitable alternative dampers that were available at the time. Although she accepted the particular smoke control dampers she found might protrude from the wall at GT: T/287/195:22-196:22. The fire and smoke dampers did not however and would have had substantially better performance than those installed at GT: T/287/197:6.
[137] Partlow, T/156/176:23 to 177:2
[138] Partlow Second Witness Statement dated 26.3.21 at [11] {**PSB00001372**}; Partlow T/156/32:14
[139] Lane, Phase 2 Report at 8.9.56 {**BLARP20000035/370**}
[140] Partlow, T/156/142:8-17
[141] Lane, Phase 2 Report Table 12.3 **{BLARP20000037/58}**

adequate.[142]The absence of documentation means, by definition, commissioning was not carried out in a minimally professional manner and therefore strongly suggests inadequacy. The Inquiry is invited to so conclude. Moreover, as Lane made clear, it is not enough to simply carry out the steps required of commissioning but fail to document the data,[143]and in any event, even accepting Partlow's evidence at face value, Lane expressed serious reservations about the reliability of the process Partlow said he conducted. For example, there was an overreliance upon the HMI panel to check that dampers were operating, without physical checks, such that the process could confirm that signals were being sent but not how the dampers were reacting to those signals.[144]There was also an inherent flaw in the process in that the commissioning was carried out on a piecemeal basis at different points in time,[145]with Partlow relying upon the results of checks he carried out when the system was not fully operational. As Lane explained, it is *vital* that the data recorded is the system as it was in its final end state.[146]

(3)Whilst the inadequacy of the commissioning process was primarily the responsibility of PSB, the role of BC in accepting the documentation as adequate must also not be overlooked, particularly since BC did not attend the commissioning and never met with Partlow.[147]Both Menzies and Lane agree RBKC BC fell below the standards of the reasonably competent BCB by failing to request a cold smoke test to demonstrate that the system worked before signing off on it, particularly since the design was unsupported by CFD/other numerical analysis.[148]This was a safe and easy test to carry out which might well have identified the inadequacies of the SCS, whether by design or due to inadequate commissioning.[149]

3. OVER-ARCHING SUBMISSIONS ON CAUSATION

3.1 Approach adopted.

3.1.1 Whilst the Inquiry must not make findings as to liability[150], given the requirements to ensure accountability, discharge the State's investigative obligations and prevent recurrence (by meaningful recommendations) an inquiry must necessarily make findings as to conduct

---

[142] Q: "So even though the documentation falls below the standard you would like to see, you don't think that, overall, the commissioning process did? A: "I don't have any evidence that says it wasn't adequate, yeah" (T/286/237:19-23)
[143] T/287/211:6
[144] Lane T/287/212:7-213:6 and 215:9-25
[145] Partlow T/156/151:14- 152:10
[146] Lane T/287/212:14- 213:6
[147] Partlow T/156/198:8-199:7; although RBKC did attend a demonstration of the system on 5 May 2016 {**PSB00001129**}
[148] Menzies T/169/61:20-21, Lane T/287/220:12-14.
[149] Lane T/287/218:4-9.
[150] But by s2(2) IA2005 notwithstanding the prohibition on ruling on civil/criminal liability, an inquiry should not be inhibited from discharging its functions merely due to the risk that liability may be inferred from its factual findings/recommendations.

judged by objective standards which indicate responsibility for a disaster[151].There is considerable coincidence between causation of harm and legal responsibility for that harm[152]. When we say responsibility, we mean conduct, causation and fault must be shown, or at least fault and conduct occasioning harm[153](as opposed to liability without fault).We acknowledge the plethora of potential causes of action against a wide range of parties for discrete breaches of duty for which the test of causation is different[154].However, the *but-for* test is in any case inapt, given the complex factual matrix of events leading to the GT fire, where multiple concurrent causes acting in combination led to the use of ACM PE, rapid proliferation of the fire, exacerbated by the lack of compartmentation and the SCS leading to smoke spread and consequent loss of life[155].

3.1.2 Responsibility for the disastrous fire at GT and the deaths resulting from it lies primarily with those responsible for selecting or allowing the use of ACMPE cladding panels; since it was that which caused the uncontrollability and rapid spread of the fire. Like many disasters however, GT was the product of multiple failures of competence and organisational failures which ultimately resulted in a technical failure. Examining only the circumstances which led to the use of ACMPE (the fundamental cause of the disaster) does not do justice to the full circumstances and causes of the extent of the disaster and number of deaths. We stress our analysis focuses solely on those we see as most responsible, but is far from an exhaustive list of all those who played a significant part in the disaster.

3.1.3 **Ranking of Responsibility.** In order to attempt some ranking of those primarily responsible for the full extent of the disaster we consider responsibility in the following order: (1) responsibility for the speed/extent of fire growth/spread (the use of ACMPE); (2) responsibility for contribution to spread of toxic smoke due to poor compartmentation (the question of the precise effects of toxicity are dealt with in a separate submission); (3)

---

[151] Supreme Court of Canada decision in **Canada (AG) v Canada (Commissioner of Inquiry on the Blood System) [1997]3 SCR 440.** Reasoning summarised in Beer on Public Inquiries paras 2.132-2.137

[152] Lord Hoffman in **Environment Agency v Empress Car Co (Abertillery) Ltd [1999]** 2 AC 22 at [31] *"One cannot give a commonsense answer to a question of causation for the purpose of attributing responsibility under some rule without knowing the purpose and scope of the rule"*

[153] See Hart and Honoré *Causation in the Law* 2nd Ed paras (i) & (iii) pp xliv & xlv

[154] This would be true of Government's potential liability under Art 2 ECHR. The test for causation for a breach of Art 2 ECHR is not the same as under common law but is instead *"whether the protective measures that were reasonably open [to the Defendant] could have had a real prospect of altering the outcome and avoiding death"*: **Van Colle v Chief Constable of the Hertfordshire Police [2007]** EWCA Civ 325 at paras [82]- [83]

[155] The but-for test has long been recognised as inadequate (over or under-inclusive) and inapt if harm is caused by various contributions each of which could have caused identical harm or where none of the contributions was on its own sufficient to cause the harm: **Financial Conduct Authority v Arch Insurance (UK) Ltd and Ors v Hiscox Action Group [2021] A.C. 649 at [182]-[185].**

responsibility for failure to ensure there were adequate Means of Escape **"MoE"** for those with disabilities (the concomitant PEEPs are addressed in the other T1 submissions) .

3.2Responsibility for the speed/extent of fire growth/spread

3.2.1**Ranking of responsibility.** In Phase 1, the Inquiry found that the principal reason for the rapid fire growth/spread up, down and around the tower, was the presence of ACM PE cladding panels, which acted "*as a source of fuel for the growing fire.*"[156]Bisby and Torero's Phase 2 experiments have confirmed ACM PE was primarily responsible (par 2.3.1). The CPs who bear significant responsibility for the extent of fire growth and spread at GT resulting from the use of ACM PE may be split into two groups ranked in order of responsibility. It seems to us that the first group bears primary responsibility for the selection of or tolerance of the use of ACMPE. The first group comprises (1) Arconic (cladding manufacturer); (2) Studio E (Lead Designer and architect); (3) Exova (fire engineer). Those bearing secondary liability are (1) Harley as cladding sub-contractor; (2) Rydon as D&B contractor; (3) RBKC BC (4) Government as custodian of the statutory regimes governing fire safety.

GROUP ONE

3.2.1 **Arconic**

(1) Active targeting of PE on GT despite known risks: Despite its knowledge of the dangers of ACMPE dating back to 2007[157], Arconic, through its UK representative, Deborah French, specifically targeted GT, via CEP and Harley, as a project upon which it sought to push the use of Reynobond ACM panels.[158]It is of particular note, and should weigh heavily in the Inquiry's analysis of responsibility, that by the time that Arconic was actively targeting the Grenfell project in this manner, Arconic, had advised CEP that notwithstanding the well-publicised ACM fires in UAE, it continued to supply *"both PE and FR core"* and could *"control and understand what core is being used in all projects due to the controlled supply route we have"*, promising that it could *"follow what type of project is being designed / developed and then offer the right Reynobond specification including the core."*[159]Arconic could and should have identified PE as unsuitable for use on GT; and French could not justify Arconic's failure .[160]

(2) Procurement of knowingly false/misleading BBA certificate: Prior to targeting GT, Arconic had recognised that to sell in the UK, in particular to the public housing market, it needed a

[156] Phase 1 report Vol 4para 23.52, 23.54. **{INQ00014817/58}; {INQ00014817/59}**
[157] T1 Module Closing 2 Submissions par 2.3**{BSR00000070/3}**
[158] See M1 closing submissions paragraph 5.2.
[159] **{CEP00049717}.**
[160] French T/88/144:22-24.

BBA certificate[161],which it deployed at GT in April 2014.[162]The knowingly false and misleading statements in this certificate as to RB PE's fire performance of are of seminal relevance to Arconic's responsibility for the rapid fire spread and growth at GT. The BBA certificate stated that the panels (without distinction between FR or PE) *"may be regarded as having a Class 0 surface"* and that a "*standard sample"* achieved class B (without distinction between riveted or cassette), which Schmidt accepted was *"thoroughly misleading."*[163]The Inquiry has heard how Arconic intentionally procured the certificate in this misleading form by disclosing only the class B result for PE riveted;[164]omitting the result for PE cassette equivalent to class E[165]; and in failing to disclose to BBA that it had tested only FR, but not PE, to obtain class 0.[166] As Arconic recognised, even the class B for PE riveted, was *"not really reflective of the riveted system in general"*[167]and appears to have been specifically engineered or arranged to pass[168] through using a 50mm cavity, which on Arconic's own evidence is unrepresentative of the 20mm cavity used in practice.[169]This is borne out by the fact that the 2005 class B result was later cancelled and replaced by CSTB classification report of 31.1.14 classifying both PE rivet and cassette as class E[170]which in breach of its contractual obligations, Arconic did not disclose to BBA. The causative relevance of Arconic's deception of BBA was confirmed by Albon, who emphasised that had Arconic shown the class E test to the BBA prior to the issue of the certificate, it is unlikely the certificate would have been issued in the terms it was.[171] If Arconic had acted properly in its BBA application and disclosed a full, honest and accurate set of test data for PE in its original 2008 application; and subsequently updated BBA in relation to the 31.1.14 classification report as it was obliged to do; any BBA certificate which Arconic held at the time of circulation on the GT project in April 2014 would have distinguished between the fire performance of FR and PE, noting that PE had not obtained class 0 and had in fact been classified as class E. If a BBA certificate in such terms been provided to the design

---

[161] **{MET00053158_P13/164}.**
[162] Email 23.4.14 French to Harris (Harley) cc Geoff Blades of CEP **{MET00053173/370}.**
[163] Schmidt T/92/74:7-9.
[164] CSTB test 7.1.05 (rivet) **{ARC00000358}.**
[165] CSTB test 7.1.05 (cassette) **{ARC00000359}.**
[166] Arconic BBA application form **{BBA00000157/26}.**
[167] **{MET00064988/121}.**
[168] **{MET00064988/121}.**
[169] Wehrle par 64 **{MET00053105/17}** and **{/18}** and Wehrle/Bauer email exchange of 4.7.11. {MET00053158/184}.Although Mr Bonhomme of CSTB expressed the opinion that the size of the air gap *"probably"* had no influence on the performance of RB 55 PE cassette **{METCSTB00000105/16};** Bonhomme accepted (i) he was not an expert **{METCSTB00000105/15}**; (ii) agreed in principle the air gap may be an important parameter **{METCSTB00000105/11}**; and (iii) expressed no opinion in relation to the influence of the air gap on the performance of PE riveted (which was the relevant test).
[170] **{ARC00000393}.**
[171] T/109/164:12-18.

team **"DT"** in April 2014, notwithstanding the ineptitude of the DT and/or any uncertainty as to class 0's status, it is extremely unlikely that ACM PE would have been used on GT.

(3) Failure to warn its customers of dangers of PE: Arconic had the opportunity to correct its prior misdeeds and alert those involved at GT of the dangers of PE before its installation, alternatively post installation but before the fire, yet failed to do so. In April 2015 Wehrle informed Arconic's senior management that PE was Euroclass C-E and flammable and should not be used on buildings over 8-10m depending on the country[172]and later warned in stark terms that all projects must urgently be switched to FR.[173]Email exchanges in July 2015 make clear that Deborah French, Vince Meakins and Gwenaelle Derrendinger were well aware of the lack of class 0 certificate in the UK market[174] yet failed to raise any alarm on current let alone past projects. By 2016, Arconic's French sales team was instructed to specify only FR for buildings regardless of height[175] yet Schmidt could not explain why that same critical directive was not issued in the UK market.[176]Arconic could and should have done so, both in respect of current/planned projects and those already constructed. However, to the bitter end, Arconic claims RB55 was capable of being used in a safe and compliant manner[177]and that the BBA certificate was not misleading.[178]Ironically, Arconic submits: *"findings in relation to responsibility have to be made on the basis of the facts as known at the time"*[179].The BSRs agree: the evidence of Arconic's knowledge of the true performance of its PE cassette panel is damning; and Arconic's conduct the more culpable for it. Arconic's knowing deception of BBA and the DT makes it the most responsible for fire spread and growth at GT.

3.2.2 **Studio E "SE"**

(1) Failure to produce compliant specification: As Lead Designer, SE was required to prepare a compliant design including selection of products[180].Had SE done its due diligence on what compliance with the BRs required and in particular which products might satisfy the FR, it would have identified ACM panels with a PE core as unsuitable for a complex building such as GT. Instead, given its lack of experience of high-rise projects and over-cladding of occupied buildings[181]it approached CEP for assistance in March 2012[182] who (as per Arconic's marketing

---

[172] **{MET00053157/261}.**
[173] **{MET00053158_P06_0099}.**
[174] **{MET00053180/1} to {MET00053180/3}.**
[175] **{MET00053158_P06/99}.**
[176] T/93/2-:18-21:8.
[177] Arconic M2 closing submissions T/174/66:25 – 67.
[178] T/174/68:25-69:3.
[179] Arconic M2 closing submissions T/174/64:3-6.
[180] NBS Specification **{TMO10040461} {SEA00000169}.**
[181] **{SEA00014273/32}.**
[182] **{SEA00003965}.**

strategy) began nudging SE towards Arconic's RB cladding panels.[183]SE ultimately produced a predominantly proprietary specification providing various alternatives for cladding panels but without stating any required fire performance.[184]Sounes accepted that a proprietary specification was adopted for aesthetic reasons[185].The specified cladding panel was Zinc Proteus HR honeycomb and the proposed manufacturers were said to be *"indicative"* and might be replaced with *"similar or equal alternatives"*[186]but without any minimum performance requirements/functionality being expressly required.

(2) Lack of design review: The change from zinc to aluminium composite cladding was proposed at a meeting with RBKC planners on 8.5.14[187]attended by SE. Had SE completed any or any adequate routine design review in line with RIBA recommended practice, it would have identified that this decision to fundamentally change the cladding system required a major investigation of the RB system to check its compliance with FRs and ADB[188]which if carried out properly would have revealed the differing fire performance of PE and FR.

(3) Failure to advise on Exova: Under its retainer by TMO, SE was obliged to advise on the need for and scope of services by consultants and specialists[189]and under its appointment by Rydon, was required to incorporate the input of other consultants into both the scheme design and detailed proposals.[190]SE failed to ensure Exova was properly instructed by Rydon in respect of the cladding system's impact on B4 compliance; and as set out in paragraph 3.2.5(2) below wrongly did not challenge Rydon's approach of obtaining only *ad hoc* and off the cuff advice: *"Thanks for the heads up on the Exova position."*[191]As set out in M1 closing submissions, SE should have either insisted on a *"fuller"* service from Exova or alternatively ensured that they themselves as architects understood the requirements of both the FR and ADB2 .Instead, they left such work to Harley and failed to check Harley's work.[192]A reasonably competent architect would "*absolutely*" have reverted to Exova once Rydon was appointed and asked Exova to produce the B4 analysis of the chosen rainscreen.[193]Had SE provided Exova with the cladding build up and specifically instructed them on Rydon/SE's behalf, to consider its compliance or otherwise with B4, it is at least possible that Exova would have identified the non-compliance

[183] {**SEA00003941**} {**SEA00003943**} {**CEP000000150**} {**MAX00003490**}.
[184] Section H92 {**SEA00000169/63**}.
[185] T/7/159:25-160:21; T/7/161:1-14; T/7/162:1-9.
[186] NBS H92 first par {**SEA00000169/64**}.
[187] Williams, par 190 {**TMO00840364/34**} {**TMO10005900**}.
[188] Hyett, par 4.4.45 {**PHYR0000004/113**}.
[189] RIBA Services 2010 {SEA00009824_0005}.
[190] Par 24 Schedule A of SE's Appointment to Rydon {**RYD00094228/10**}.
[191] {**SEA00011749**}.
[192] Hyett par 4.4.22 {**PHYR0000029/88**}.
[193] Hyett, T/65/143:13-20.

of the proposed cladding given the flawed nature of the BBA certificate for RB and no testing of the GT system had been carried out. Against that, the product data sheet for RS500 which Exova was emailed (but Ashton claims not to have read)[194]was also flawed and in any event showed non-compliant insulation was being used, yet Ashton did not detect non-compliance[195].

(4) Failure to read BBA certificate: On receipt of the certificate in April 2014, SE failed to read beyond the front page, and so failed establish fire performance.[196]In Hyett's opinion, SE should have reverted to the manufacturer to establish that the panel colour selected for GT would meet the test requirement necessary for BBA certification. Absent such assurance, SE should have insisted on a dedicated test being carried out on the preferred panel colour and refused to specify it without such certification.[197]Had SE done so, it would have been clear there was no relevant test data supporting class 0/class B for the colours selected for GT.

(5) Cavity barriers **"CBs"** and the Crown:[198]SE fundamentally failed to identify and address the need for CBs in accordance with Diagram 33 of ADB.[199] In particular, SE failed to specify CBs to close window openings[200].As a result, there was no protection against the passage of fire and smoke around the window opening directly into the cavity behind the rainscreen cladding.[201]Although any intumescent CBs in a metal rainscreen cladding system would have been doomed to fail in any event, when SE was reminded that in fire cladding would fail and CBs would not stay in place[202]it should have reconsidered the whole design. On the Crown, there were no horizontal CBs to close the top of the columns or the parapet at roof level;[203] which was simply neglected by SE: the NBS specification provided no details.[204]The site of the Crown was found to be a site of devastating lateral fire spread[205]which SE could have avoided had it properly considered how ACM PE would perform in this location in the event of a fire.

3.2.3 **Exova**

(1) Given Exova's involvement throughout the project (albeit latterly on an ad hoc basis)[206] and the fire engineer's pivotal role in ensuring compliance and safety of the building from a

---

[194] {**SEA00011724**} and the attached data sheet {**RYD00018155**} Ashton T/18/46:20
[195] Lane, par 9.2.53 {**BLARP20000017/292**}
[196] Hyett, T/64/149:21-150:1
[197] Hyett, par 4.4.60 **{PHYR0000029/99}.**
[198] Sounes T/7/136:14-20.
[199] Hyett, par 4.4.130 **{PHYR0000004_0153}.**
[200] Hyett, par 4.3.68 **{PHYR0000004_0049}** and paragraph 4.4.130 **{PHYR0000004_0153}.**
[201] Hyett, par 44.136 **{PHYR0000004_0158}.**
[202] **{EXO00001434}.**
[203] **{SEA00002551}.**
[204] **{SEA00000169_0067}**
[205] Phase One Report, Vol 4, paras 23.55-23.57 **{INQ00014817/59}** resulting in very significant loss of life
[206] As explained in BSR T1 Module 1 Closing Submissions at Paragraph 3.5.3, the suggestion from Exova that its involvement came to an end by November 2013 should be rejected {**BSR00000073/13**}

fire perspective by elaborating in the FSS what *"adequately"* meant (par 2.1.2 above), Exova bears very significant responsibility (already explained[207]). Although Exova was at no material time specifically made aware that ACMPE was being used at GT, Exova set a complacent tone, which (together with the below) contributed to ACM PE being used at GT, and therefore to the scale and severity of the fire spread.

(2) Exova demonstrated utter complacency, and was negligent,[208]in failing to complete its work on the FSS for GT as refurbished and for drafting it in the terms it did. All issues of the FSS failed to state over-cladding was part of the refurbishment, as Exova should have known[209]and did know.[210] Exova induced complacency about the compliance of the cladding by virtue of all issues of the FSS containing the same statement: *"the proposed changes will have no adverse effect on the building in relation to external fire spread"*.[211]Whilst this was caveated by :*"this will be confirmed by an analysis in a future issue of this report"*, no such analysis was ever conducted and in any event the statement should never have been made, since Exova had carried out no analysis to support it. Instead, and as a bare *minimum* Exova should have defined the regulatory requirements and defined *"adequately"* in terms of the performance standard required for the external wall construction,[212] but did not. Instead, it allowed this statement to remain in the FSS without resolution which gave others a false sense of security as to the safety, compliance and importance of the over-cladding.[213]

(3) Exova ought to have found out what cladding was to be used as part of the refurbishment, however it exhibited a general lack of proactivity in seeking critical information,[214] even when copied into correspondence discussing the use of aluminium cladding.[215] It is Dr Lane's view that as at 18.09.14, Exova should have recognised the need for a revised FSS and advised its client that it was necessary to complete the FSS and in particular the B4 analysis.[216] Had Exova

---

[207] BSR T1 Module 1 Closing Submissions, Section 9 {**BSR00000073/35**}

[208] Lane considered that Exova's conduct in respect of the OFSS amounted to *"very serious professional negligence"* {**BLARP20000017/187**}

[209] Lane: T/61/168:16-17

[210] See Ashton email dated 31 March 2015 referring to *"zinc cladding"* {**SEA00013049/1**}

[211] Exova FSS Issue No.3 dated 7 November 2013 {**TMO00828399/9**}

[212] Lane T/61/168:16-25 and see s2.1.2 above.

[213] Sounes considered that the FSS confirmed that the over-cladding would have no adverse effect T/8/51:14-20 and T/8/52:5-11; Crawford also clearly considered that the statement by Exova referred to over-cladding having no adverse effect T/10/27:24; Simon Lawrence also claimed to have taken comfort from this statement, and Exova's reputation in the industry, that the works would have no adverse effect provided they (i.e Rydon) otherwise complied with the Building Regulations: T/23/98:3-22.

[214] BSR T1 Module 1 Closing Submissions, Par 9.1.1 {**BSR00000073/35**}

[215] Lane's view was that in light of the correspondence received by Terry Ashton he ought to have known that the cladding panels were changed to rainscreen aluminium cassettes had he acted as a reasonably competent fire engineer T/62/64:4.

[216] Lane: T/62/51:15- 52:24.

carried out a full and competent B4 analysis, including detailed consideration of the effect of the proposed ACM PE cladding it would have concluded that the arrangement was non-compliant; as discussed at 2.1.2 above it should have come to a view as to whether the use of ACM PE at GT could satisfy the FR by "*adequately*" resisting external fire spread; it is submitted that no competent analysis by Exova could have concluded the use of ACM PE at GT would satisfy B4 since it would have identified RB55 used at GT was not class 0/B. At the very least, Exova ought to have identified that Celotex RS5000 was not a MOLC and therefore did not comply with Paragraph 12.7 of ADB. That being so, the irrefutable conclusion Exova ought to have reached was that the use of a combustible insulation ruled out the linear route to compliance for both the insulation *and* the cladding because non-compliant insulation used as part of a system using 'compliant' cladding would render the entire system non-compliant unless supported by a valid BS 8414 system classification. There was no such system classification for ACM PE and RS5000.

(4) Had SE received advice from a *"top tier*[217]*"* fire engineer of Exova's perceived calibre[218], informing SE that the cladding did not meet the FRs, thereby rendering GT non-compliant, the overwhelming likelihood is that such advice would have been followed and the build-up changed. Exova's "*main business was fire testing and research"* of which the consultancy division merely formed a part, and Ashton had access to that expertise at the time of his involvement in GT[219].That, taken together with the warnings in BR135 3rd ed of the preponderance of new products coming onto the market and international fires, should have made Exova aware of the dangers of cladding materials[220].The whole point of utilising an engineer of Exova's calibre is to ensure that the greatest possible insight is brought to bear on the project. Instead, and on the contrary, Exova's reputation and behaviour simply created a false sense of security.

GROUP 2

3.2.4 **Harley**

(1) Whilst SE and Rydon bear primary responsibility for signing off the design of the façade as compliant with BRs, and whilst Rydon has overall contractual responsibility as D&B contractor, Harley produced those non-compliant designs having held itself out as a specialist

[217] As Ashton agreed: T/16/25:1-5
[218] Lane T/61/68:4-69:20
[219] Ashton T/16/27:6-28:1
[220] Lane T/61/195:21-196:25

in façade design.[221]It was also Harley who proposed,[222]and in fact *pushed* for ACM PE to be used.[223]Had Harley acted with the reasonable skill and care to be expected of a competent cladding contractor, it would not have proposed ACM PE, or Celotex RS5000,[224]for use at GT and instead would have proposed compliant products. This follows from the evidence of the Inquiry's cladding expert who gave evidence that a reasonably competent cladding contractor would have read Section 6 of BBA Certificate for RB and realised its limitations,[225]would have been fully aware of the requirements of Section 12 of ADB and would have concluded that ACM PE was non-compliant and unsafe to use on high rise buildings.[226]

(2) In fact, Harley's consultant designer, Lamb,[227]did not check whether ACM PE was compliant with FR and ADB. He did not read the BBA certificate, nor it seems did anyone else at Harley during the GT project.[228]Whilst the first page of the BBA certificate was misleading, a competent cladding contractor exercising reasonable skill and care would have read it in full and understood that the Class 0 classification did not apply to ACM with a PE core, or in cassette form or, at the very least, in the colour selected.[229]Had Harley done so, it would have advised that a different cladding product was required instead, or at least made the DT aware of the non-compliance and hazard identified.[230]

(3) That Harley did not act in the manner set out above is sufficient to find it bears significant responsibility. Harley's failures are however not a mere absence of skill or care, but are wilful. It is more likely than not that Harley *did* know that ACM PE was non-compliant and dangerous,[231]but nonetheless proposed it (and had used it on most of its previous projects[232]). In that sense, Harley's actions amount to wilful non-compliance, making it all the more culpable for the consequences.

3.2.5 **Rydon**

---

[221] As Hyett rightly emphasised: **T/64/83:24-84:17.**
[222] *See* Harley's Specification {**RYD00046822**}
[223] BSR T1 Module 1 Closing Submissions, Paras 5.2 and 8.1 {**BSR00000073/19} and {/29}**
[224] BSR T1 Module 1 Closing Submissions, Par 8.2 {**BSR00000073/30}**
[225] Par 25 of Report of J. Sakula {**JOS00000001/6**} and Sakula T/125/165/:10-15
[226] Sakula T/125/198:15-25 and T/125/208:10
[227] Whose actions Harley are responsible for as a matter of contract, and whose work ought to have been checked by Harley.
[228] Ray Bailey claimed to have read it in 2008. Even if correct, his failure to re-read it was negligent as illustrated by the fact that his recollection of what it said about the product was entirely incorrect: *See* BSR T1 Module 1 Closing Submissions, Par 8.1 {**BSR00000073/29}**.
[229] Par 25 of Report of J. Sakula {**JOS00000001/6**}
[230] Sakula, T/125/200:7-12
[231] BSR T1 Module 1 Closing Submissions, Section 6 {**BSR00000073/19**}; Daniel Anketell-Jones: "*... as we all know; the ACM will be gone rather quickly in a fire!"* {**HAR00006585/1}.**
[232] Harley's "*recurring experience"* that clients adopt the cheapest cladding option – ACM {**SEA00008790}** and that ACM had been "*tried and tested (on many Harley projects)"* {**HAR00005444**}.

(1) Failure to identify cladding non-compliance Although ultimately selected by TMO, the choice of ACM PE was pushed hard by Rydon (in conjunction with Harley) for mutual financial gain[233].Rydon undertook responsibility for the design of the works done either by SE or Harley[234],yet Blake confirmed there were no discussions within Rydon about which route to compliance was proposed for the cladding system[235]and Lawrence accepted that Rydon did nothing itself to ensure that the cladding panels were suitable for use over 18m and simply relied on others.[236]Any purported reliance on the "confusion" created by the status of class 0 rings hollow: Rydon did not attempt to understand what was required. Even when Williams (TMO) expressly sought clarification from Rydon on the fire performance of the new cladding[237]her email went unanswered[238]albeit she claims to have received an oral confirmation of compliance from Rydon's Lawrence.[239]

(2) Failure to engage Exova: Rydon deliberately and unjustifiably chose not to engage Exova[240] and failed to notice that Exova's fire safety strategy included no reference to CBs.[241]As set out in Module 1 closing submissions, despite being included on highly pertinent email exchanges on this topic, Rydon did not consider instructing Exova or any other fire safety consultant on the issue of CBs[242]which ought to have revealed that the design was fundamentally flawed. If Rydon had acted in accordance with its contractual obligations, it should at the very least have identified the insulation as patently in breach of ADB12.7 and that the linear route was being followed. Rydon should have realised it needed input from Exova order to determine the compliance of the cladding.

3.2.6 **RBKC Building Control "RBKC BC"**

(1) As we have emphasised, RBKC BC's role was to provide the final line of defence against the dangers posed by non-compliance with BR.[243]Whilst the disaster could not have happened but for the acts and omissions of construction professionals and manufacturers, it is conceivable that it may not have happened had RBKC BC exercised reasonable skill and care in carrying out its duties. We say may not have happened for the reasons at (3) below. In any event, BC

---

[233] They discussed internally:*"the basis of [the meeting with planners] is to propose the material change from "Zinc" to "ACM – Aluminium" cladding…so KCTMO can achieve their maximum VE target.***{RYD00004142}**
[234] JCT D&B 2011 as amended clause 2.17 **{RYD00094235/69}.**
[235] Blake T/28/86:8-12.
[236] Lawrence T/23/179:2-7.
[237] **{RYD00023468}.** T/55/146:19-20.
[238] T/24/164:8.
[239] See M1 closing submissions section 3.7.1 **{BSR00000073/15}.**
[240] **{SEA00011749}** and Sounes para 372 **{SEA00014273/152}.**
[241] Lawrence, T/25/5:25-26:4.
[242] Lawrence, T/25/7:14-25.
[243] BSR T1 Module 1 Closing Submissions, Section 11 {**BSR00000073/42**}.

should not be regarded as a complete safety net for BR compliance; since BC is not present for all stages of construction.[244]Notably at GT the primary non-compliance (ACMPE cladding) was not covered up and incapable of inspection by RBKC BC, rather the cladding was plainly visible.

(2) BC's role is to ensure a minimum level of safety for building occupants.[245]RBKC BC's failures have been set out previously in detail,[246]however in short, despite being aware cladding was being used at GT, Hoban did little if anything to check whether it was compliant,[247]and simply assumed the DT had complied with BR.[248]

(3) RBKC BC's failure to ask for and ensure it received detailed information about the cladding system was its *"fundamental failing"*.[249]Had it insisted upon the provision of such obviously important information, it would have identified that ACMPE cladding was being used.[250]Such a dereliction of duty was causative, since had RBKC BC obtained the full details of the cladding, and checked them against the requirements of the BR and ADB, it might possibly have concluded that ACMPE was non-compliant (as Hoban now acknowledges it was[251]) communicated this to the DT and may not have issued a completion certificate.[252] RBKC BC's failures are in that sense an effective cause of ACMPE being used at GT, and therefore the scale and severity of the fire spread. Hoban should have been capable of appreciating the RBPE was not in fact Class 0 (or at the very least that the colour selected at GT was nor shown as class 0) and was therefore non-compliant BC Officers ought to be able to interrogate such certificates competently. According to Menzies, a reasonably competent BCO would have interrogated the BBA certificate in full, would have been familiar in general terms with the different aspects of BBA certificates, would have identified any caveats and instances of reliance upon test results,

---

[244] Menzies, T/60/68:17-21
[245] Menzies, T/60/70:20-23
[246] BSR T1 Module 1 Closing Submissions, Section 11 {**BSR00000073/42**}.
[247] Menzies' view was that a reasonably competent BCO would have read the BBA certificate for ACMPE in full including any caveats: **T/60/99:13-16,** however it seems likely that if Hoban read it at all, he did not read past the front page: BSR T1 Module 1 Closing Submissions, Par. 11.1.3 {**BSR00000073/43**}.
[248] BSR T1 Module 1 Closing Submissions, Par. 11.1.3 {**BSR00000073/43**}.
[249] Menzies' opinion is that RBKC BC's failure to ask for detailed information about the cladding system was a *"fundamental failing"* {**BMER0000004/124**}.
[250] As Menzies made clear, a competent BCO should query the products used on site, should never assume product compliance and should check product testing information carefully: T/60/96:15-18 and T/60/97:14-24; Menzies also makes clear that RBKC BC should have requested a *"cladding package"* with all the details of the construction of the external wall: Par 303 of her report {**BMER0000004/96-97**}
[251] Hoban, T/45/199:21-25 and T/45/200:1-3
[252] Regulation 17 of the Building Regulations 2010 required RBKC BC to have been satisfied that the work complied with Schedule 1 of the Building Regulations (including B4) before issuing a completion certificate. The use of ACMPE, particularly in conjunction with combustible insulation, was (in the absence of a BR 135 classification) non-compliant with ADB and therefore, without further justification, did not comply with Schedule 1, B4.

and in the case of the latter, take steps to further investigate the test results relied upon.[253] On this basis, Hoban ought to have identified that RBPE was not Class 0 and therefore non-compliant[254]. However, even had Hoban done so, there is a reasonable likelihood that ACMPE would have nonetheless been used at GT. Rydon had a specific financial motivation to use ACM[255]and would likely have sought a way to keep it on the building. It would not have needed to try that hard, since during that time[256] the BCA TGN 18 desktop route to compliance had become mainstream and was well known.[257] Whilst TGN18 desktops were not in fact a route to compliance (see 2.2 above), it is likely that had a desktop approving ACMPE been procured[258], then faced with such a report Hoban would have conceded. Martin was contemporaneously concerned BCOs would be swayed by dubious desktops[259]. As ACMPE was used on so many other HRBs, it is reasonable to assume this may have transpired and then the disaster may well still have happened. ACMPE, even in conjunction with mineral wool[260]would, if cassettes were used, likely have had a similar outcome to the fire which in fact occurred at GT.

3.2.7**The role of Government**

(1) **Deficiency of ADB** It is clear that Government bears some responsibility for facilitating the disaster by its failure to address the weaknesses in the regulatory regime[261]. It is unarguable that ADB was contradictory to the FR (as rehearsed in our Module 6 closing[262])in that, despite Government's argument to the contrary, ADB permitted ACMPE even after the 2006 *"filler"* amendment. It is also clear that Government was aware of the risks to life posed by class 0 as

---

[253] Menzies: T/60/99:16 and T/60/102:14-20

[254] As a matter of policy, however the Courts have held that BCB's are generally not liable, at least for economic loss: **Murphy v Brentwood District Council [1991]** 1 A.C 398 (in the context of negligence); **Tesco Stores Ltd v Wards Construction (Investment) Ltd [1995]** 7 WLUK 254, 76 BLR 94; **Herons Court v Heronslea Ltd and Ors [2019]** EWCA Civ 1423; (in the context of the Defective Premises Act 1972).There is good reason for this, in that it would be wrong for public servants who are inevitably less skilled and considerably more generalist than those in the private sector, to be the ultimate gatekeeper. It is for those who charge large fees and carry insurance commensurate to the risks to bear the primary burden of responsibility.

[255] BSR Module 1 Closing Submissions, Par 2.2.7 {**BSR00000073/6}**

[256] Practical Completion of GT was 4 .7.16{**ART00005636/1**}

[257] BCA TGN 18 first issue June 2014 {**BCA00000016}**. NHBC's evidence was that following first issue of TGN 18, testing houses were overwhelmed with desktop requests, which was the reason for issuing Rev1 to widen the category of person that could conduct them (See Para 190(d) of Evans' Witness Statement {**NHB00003020/70}** and Lewis T/224/99-100). Demand for desktops at BRE nonetheless remained high as at Dec 2015 {**BRE00004636/6}.**

[258] The fact that there had been no successful BS8414 tests of ACMPE (or FR) did not deter even Exova from producing a desktop comparing tests using CP board/Trespa/Teracotta and K15 with ACMFR and K15 even after GT fire **{KIN00000172/2}{7}{9}**

[259] Martin T/255/119:9-17; 120:22-121:5; 123:1-17

[260] DCLG Test 2, Mineral Wool and ACMPE: {**CLG00016732}**

[261] T1 Module 6 Closing par 1.2**{BSR00000196/3}**

[262] S3 **{BSR00000196/9}**

at the date of that amendment[263].Mr Martin had, prior to the amendment proposed that any material in the external wall be MOLC[264]but this was rejected given the *"massive knock on effect"* of prohibiting timber frame construction and plasterboard[265].In the event, however, following GT, Government did seek to cure the problem by prescription within BR (2018) albeit excluding plasterboard[266].Government should have reacted, post Martin's 2005 warning, at the very least by clarifying ADB to make clear it did not permit ACMPE (the dangers of which it had been aware since the 2001/20002 CC1924 testing).Clarification of (non-mandatory)ADB would however not have prevented GT, given the permissive nature of the outcomes regime including BS8414 and desktops together with industry's wilful circumvention of the FR[267].To avoid the disaster, Government would have had to introduce prescription within BR as it ultimately did in 2018 following GT. On one view Government did not use all the tools reasonably available to it, and in view of the long period of inaction from the Select Committee and CC1924, the Panel may well feel that prescription should have been introduced before GT. (2) Various factors make it difficult to analyse the extent to which, if at all, the outcome would have been different had BR/ADB been more robust. The evidence with which GTI must grapple is:(i)GTI experts predominantly consider the available guidance was intelligible to a competent designer and as a fact the designers did not claim to be confused by it;(ii)There was, before GT, extensive wilful non-compliance unrelated to ACMPE: the use of non-MOLC insulation was prohibited and CBs were required but not uniformly used;(iii)Product selection was largely profit/relationship driven, and both the insulation manufacturers and Arconic was aware of its product's non-conformance and non-compliance, yet, in that knowledge, Arconic and Celotex both specifically targeted GT through its designers/contractors. Arconic, a powerful market leader, was determined to offload its RB55 onto the UK market and specifically public buildings[268],presumably seeing local authorities as a soft target;(iv) BBA/UKAS were so ineffectual that these powerful manufacturers whom BBA regarded as their *"customers"* were able to manipulate them into producing fundamentally misleading BBA certificates. Whilst if Government had introduced a ban on combustibles (thus banning Arconic/Celotex/Kingspan's product), manufacturers could not have marketed them as they did, but given the extent of

---

[263] Martin T/251/187:22-190:8 Awareness that Class 0 did not meet FR, even though compliant, led to Martin's letter advising external wall guidance *in need of clarification* **{CLG00018832}**

[264] {CLG00018833}

[265] Burd T/240/46:15-47:25

[266] Reg 7(2)(ii)

[267] This is best evidenced by NHBC's *"Acceptability of Common Wall Constructions"* July 2016 Note **{NHB00002744}** which appears to have been introduced as a result of pressure from industry: T1 M6 openings 11.1 **{BSR00000096/41}**

[268]**{MET00053158_P13/162}**

deception practised by all three of these manufacturers, and the fact their marketed products did not even conform to the tests they claimed to have, there a strong possibility that such practices would have continued in some new guise, resulting in such non-conforming products remaining in circulation post any ban. It is true that the manufacturers sought to exploit any loophole or ambiguity they could, but their actions went far beyond the exploitation of poorly drafted regulations; they actively sought to circumvent the FR (see 3.2.7(1) Fn 265 above) and to dishonestly mislead certifiers and the market, in some instances committing fraud. Industry's persistence is best demonstrated by Kingspan's orchestration of a political campaign, even after GT, involving KS building weaknesses into the tests of A2 cladding[269]to persuade Government that its Building safety tests were flawed, in that A2 products might also fail BS8414 tests, and pressing Government to change its guidance on its failed test 7 (phenolic insulation and PEFR[270]).

3.3 **Responsibility for contribution to spread of toxic smoke due to poor compartmentation**. In Phase 1, the Inquiry found that the fire on the outside of the tower quickly entered many flats and smoke spread widely through the interior of the building, noting that the rapid failure of compartmentation and the speed at which smoke was able to spread into the lobbies and stairs was of *"very considerable concern"* [271].The evidence suggested that a number of factors were likely to have contributed to the loss of effective compartmentation, including the absence of self-closing devices on flat entrance doors[272]and the inability of flat doors adequately to resist the spread of smoke.[273]

3.3.1**RBKC/TMO: Fire Doors and Self-Closers**

(1) Fire doors and self-closing devices are critical to maintaining compartmentation in the event of a fire. Such features are all the more important if the evacuation strategy is SPS.

(2) At the time of the GT fire, a substantial number of door-closers were non-functioning or had been removed.[274]In the absence of operational door closers on flat doors, it was inevitable those doors would be left open during evacuation unless pulled shut, thereby permitting smoke ingress into the lobbies and breaching compartmentation. Indeed, the Phase 1 Report finds that a number of doors to the "Flat 6s" remained open due to the absence of effective self-closing

---

[269] Our M2 Closing submissions par 12.3.2 **{BSR00000070/44}** Jenkins (Euroclad, owned by KS) emailed Pargeter 11.4.18. to say he had: *"...introduced as many features/details as possible to ensure it [BS8414 test using A2] has the best chance of performing poorly"* **{KIN00004658/2}**

[270] KS email to P. Robinson (DCLG) cc Martin and Ken Knight 10.10.17**{KIN00002388}**

[271] Phase 1 Report, para 24.1; para 24.28. {**INQ00014817/62** and **{/69}**

[272] Phase 1 Report, vol 4 par 24.31. **{INQ00014817/70}**

[273] Phase 1 Report, vol 4 par 24.34. **{INQ00014817/70}**

[274] Par 5.3.2 and footnote 510, BSR T1 M3 Opening Submissions {**BSR00000066/48}**; See also Phase 1 Report, Volume 4, Paragraphs 24.31-24.33 {**INQ00014817/70}**

devices, therefore permitting smoke ingress into the lobbies.[275]Whilst closers were likely to have been poorly specified by Manse Masterdor in the first place, the more causative failure was the mismanagement of their maintenance, repair and/or replacement by TMO and RBKC. There was no system of planned maintenance or routine inspection for doors generally, save for *ad hoc* inspections which LFB had said was insufficient and put TMO in breach of the RRO.[276]RBKC's Laura Johnson was actively hostile to resolution of the issue, having refused an annual door closer inspection programme (which had been required by LFB) for cost reasons and TMO simply accepted this, despite being acutely aware of the importance of such a programme[277] and accepting that it had responsibility for the same.[278]

(3) The majority of flat front doors had been replaced in 2011, those doors did not have the requisite smoke leakage rating meaning that they were not capable of inhibiting smoke ingress into corridors even when closed;[279]indeed, based on firefighter and BSR evidence, the Phase 1 Report found a number of the flat doors failed to control the spread of smoke effectively and this contributed to the early spread of smoke in some areas of the tower.[280]Responsibility for this fault must rest with Manse Masterdor, who falsely claimed that the doors were FD30s.

3.3.2 **SCS Compartmentation Failures**

(1)**TMO:** The design for the new gas riser agreed by the TMO on 30.11.16[281]placed the gas riser in the stairwell and involved changing the configuration of fire compartmentation, by making the boxed in lateral pipework in the lobbies part of the stairwell fire compartment.[282]The consequent unsealing of the entry between the protected stairwell and common lobby was non-compliant with section 6 of IGEM/G/5.[283]tRIIO had not put temporary firestopping around the oversized holes through which the laterals passed in the lobbies whilst the construction process was ongoing and the boxing-in had not yet been completed[284]which a reasonably competent contractor ought to have done given that the issue had been pointed out to it.[285]The evidence shows smoke could have entered the body of the stairwell via the oversized penetrations of the

[275] Phase 1 Report, Vol 4, Paragraphs 24.31-24.33 {**INQ00014817/70**}
[276] Par 2.5.2, BSR T1 M3 Closing Submissions {**BSR00000085/18-19**}
[277] Paras 2.5.2 and 3.7, BSR T1 M3 Closing Submissions {**BSR00000085/19**} and {**/30**}.
[278] Maddison T/123/176:18
[279] Par 5.3.1, BSR T1 M3 Opening Submissions {**BSR00000066/47**}
[280] Phase 1 Report, Volume 4, Paragraphs 23.34-24.35 {**INQ00014817/70-71**}
[281] **{TRI000000791}** and later updated in March 2017 **{TRI000001224}.**
[282] M3 Opening Submissions par 5.4.1 **{BSR00000066/49}.**
[283] Hancox [367-368] **{RHX00000012/162}.**
[284] Dolan, T/160/175:19-176:8.
[285] **{TRI000000985/3}** Hancox, T/161/166:8-170:12.

compartment wall[286]and could have travelled from one lobby to another.[287]TMO bears a large part of responsibility for this state of affairs, as it was repeatedly warned that all holes in any compartment wall where pipes penetrate must be sealed and suitably fire stopped.[288]Yet it failed to take any action to ensure this was resolved whilst the works remained incomplete. This passivity is perhaps explained (but not excused) by TMO's view that this was a National Grid project on which its involvement was *"minimal"*.[289]

(2) **PSB**

(i) As identified above (Paragraph 2.4.6.(3)) PSB's specification of dampers specified was not for smoke control dampers as required, and therefore risked breaching compartmentation via the protected shafts. This risk materialised in both the North and South Shafts.

(ii) North Shaft As already explained,[290]Lane concludes from BRE's post-fire investigations that it was likely that North Shaft dampers on Level 11 were open for the duration of the fire. Lane also relied upon witness evidence indicating that smoke was observed in the Level 11 lobby to conclude that smoke was most likely to have entered the Level 11 lobby via the open dampers.[291]As well as breaching compartmentation between floors, this also reduced the effectiveness of the roof fan and therefore the performance of the SCS at Level 4.[292]Lane considered this to be a failure of commissioning/maintenance, however maintenance failures are more causatively significant since an appropriate inspection and maintenance programme ought to have detected and resolved any commissioning faults. It was TMO's responsibility to put in place adequate inspection and maintenance procedures which it failed to do[293]. Notably, during Mr Steadman's weekly activation of the SCS he did not physically check the dampers were working on every floor, but instead relied upon the HMI screen alone and always tested from the Ground Floor.[294]

(iii) South Shaft. As explained in our Smoke Control Opening Submissions, the Level 2 smoke extract system could not draw smoke down the South Shaft due to Damper 3 closing.This

---

[286] Hancox [371] **{RHX00000012/186}.**
[287] Hancox [374] **{RHX00000012/187}.**
[288] {**TMO00829834} {TMO00831999}.**
[289] **{TMO00861343}.**
[290] Par 4.1.1, BSR T1 M3 Smoke Control Opening Submissions {**BSR00000074/17}**
[291] The other potential source of smoke was via flat doors being left open due to an absence of self-closing devices, however Dr Lane noted that the smoke was observed prior to the point in time that flat doors were likely to have been left open. Dr Lane's Phase 2 Report, Section 12 at 12.31.2(h)(i) {**BLARP20000037/78};** also see 12.20 "*Level 11 – Post-fire condition of smoke control equipment"* and 12.21 "*Level 11 – Timeline of conditions within the lobby"* storyboards at {**/48-50}.**
[292] Lane: T/287/228:7-229:2.
[293] Par 3.2.3, BSR T1 Smoke Control Opening Submissions {**BSR00000074/15}**
[294] Steadman: T/146/65:18-66:4.

failure is PSB's.[295]As a result, rising smoke filled the South Shaft and could leak through the substandard dampers, even when closed. This again was a breach of compartmentation, which worsened conditions in the building as a whole.[296]

3.4 **Responsibility for failure to ensure adequate MoE for disabled people "MOE/D"**

(1) **Exova** bears responsibility for the seminal failure, by any iteration of the FSS, to explain that MOE/D were required. The BR/ADB were sufficiently clear that buildings must be constructed on the principle inclusive design[297].Yet Ashton insisted ADB did not provide the same requirements for residential buildings as it did for commercial and admits no consideration was given to incorporating MOE/D into the FSS[298].Drs Barker and Pearson also suffered from the delusion that there was no legal requirement to provide adequate MOE/D in general needs (as opposed to commercial) buildings[299],and even though Pearson accepted Exova assumed there were disabled people in GT[300], he added: *"there was no expectation from the regulator to go beyond that"*[301].This is typical of industry's tendency to blame the regulatory regime for their own ignorance. In any event, the fact of a so-called *"evacuation lift"* in Stokes' FRAs, should have prompted Exova to address the need for MOE/D[302].Exova's assumption was simply that disabled people would self-evacuate and "*if nothing else, wait in the stairwell until the fire has been put out"*[303].It is hard to believe that a world-class fire engineer could take such a wrong-headed and sclerotic approach, which equates to an abdication of its duty to ensure peoples' safety[304].This fundamental misunderstanding by Exova, if such it was, led to a deficient FSS which did not allude to MOE/D (and on the contrary referred to *"the fire-fighting lift*[305]*"*) made it likely that MOE/D would be neglected by other professionals and indeed TMO/RBKC, since the FSS is the blueprint for the building's safety (par 2.1.2 above).

---

[295] Par4.1.3, BSR T1 Smoke Control Opening Submissions {**BSR00000074/18**}
[296] Par 4.1.4, BSR T1 Smoke Control Opening Submissions {**BSR00000074/19**}
[297] Lane T/62/90:24-91:3
[298] Ashton T/17/152:20-153:154:21; T/18/3: 18-5:15
[299] Barker T/15/143:7-11 even volunteered: *"if they had mobility issues, maybe [GT] wasn't the best place for them to live"*
[300] Albeit she had not been told the precise number, but even had she been would probably not have acted differently T/19/143:13-144:4
[301] Pearson T/19/138:11-25
[302] Lane T/62/93:7-94:17
[303] Pearson T/19/140:18-19
[304] "*Fire engineering is about protecting people… a massive responsibility*": Lane T/61/126:13-23
[305] FSS 7.11.13 Iss 3 Par 3.1.5 **{TMO00828399/9}.** Exova should have established the lift was not an evacuation lift: Lane T/62/98:6-16. Sounes had told Cooney (Exova) it was not a firefighting lift: Sounes: T/21/197:21-198:18. He claimed he may have been confused in that he was aware it was not a firefighting shaft, but ostensibly Cooney had been told it was not a firefighting lift.

(2) **SE.** Sounes was aware of the need for inclusive design, and of the presence of disabled people in GT, hence his commissioning DBA to consider access in Stage E[306],yet the resultant *"accessible design guidance[307]"*was silent on egress, contrary to ADB and other guidance[308]. Instead, SE inappropriately assumed the vulnerable would take refuge in other flats on the same floor[309].SE failed to raise this point with Exova, despite the FSS' silence on MOE/D. Sounes was probably aware that there was no firefighting lift (par 3.4.1(1) Fn 303 above), and this makes SE's failure to provide any MOE/D all the more serious. It would have been practicable to upgrade the GT lifts to FF lifts, with the possible exception of the dual power supply[310].

(3) **RBKC and TMO**. RBKC was well aware that adequate MOE/D were required in general needs blocks[311]and yet failed to improve MOE in the refurbishment. This despite RBKC's awareness it may be necessary to evacuate even blocks with an SPS[312].TMO was aware Stokes' FRAs suggested there were adequate MOE/D (see 3.3.3 below) but did not question it and, as has been well-rehearsed[313],exacerbated the problem by failing to provide PEEPs for GT residents. When TMO commissioned the refurbishment of the lifts they sought an accessible lift[314]yet failed to procure either a Firefighting or an evacuation lift. Worse still, TMO misdescribed the lifts as Firefighting/evacuation lifts[315],even though Wray *"remained unconvinced that they were firefighting lifts[316]"*.

(4) **Stokes** failed to address Art 15 RRO (which required evacuation in the event of imminent danger) and s15&16 of PAS 79 including ensuring an emergency plan was in place, and was insufficiently proactive in establishing the nature of the disabled demographic and arrangements for their evacuation[317].Stokes did not apply his mind to whether or not there were disabled people in GT, instead he assumed there were none, as he expected to be told[318].His FRAs however created the dangerous impression that *"the building is provided with reasonable arrangements for [MOE/D][319]"*including that the lifts were firefighting/evacuation lifts[320].This

---

[306] DBA fee proposal for inclusive access consultancy 22.10.13 **{SEA00008056}**
[307] **{SEA00009496}**
[308] See s3.8 T1 M1 closing **{BSR00000073/16}**
[309] Thread Jess/McQuatt 12.11.12**{SEA00006551}**
[310] T1 M3 Closing 5.1.1**{BSR00000085/39}**
[311] T1 M3 Opening s 4.9.3 **{BSR00000066/34}**
[312] T1 M3 Opening s4.5 **{BSR00000066/16}**
[313] T1M3 Closing 2.4.4 **{BSR00000085/17}**
[314] See s5.2.1 T1 M3 Opening **{BSR00000066/44}**
[315] S5.1.2 M3 Closing **{BSR00000085/41}**
[316] Wray T142/95:2-15
[317] T1 M3 Opening s 4.8.4 **{BSR00000066/28}**
[318] T/137/94:23-95:10
[319] See e.g. **{CST00003084/20}**
[320] Stokes T/137/189:7-23

despite the fact that a reasonably competent risk assessor would be expected to be familiar with the HMG guide *MOE for Disabled people*, BS999 and British standards on lifts[321].

(5) **Government** was aware for a period *"long before"* 2004 that MOE/D was inadequate and comprised *"one of a range of things that we needed to do[322]"*.Government also had the opportunity to change the *defend in place* premise of ADB to that contained in BS9991 (which provided for evacuation if SPS was withdrawn) yet failed to do so[323].The prolonged period during which Government was aware of the paucity of guidance yet failed to act, results in a system which posed a threat to life.

4. **Conclusion**. The full extent of the disaster was caused by a complex combination of corporate greed with complete disregard for safety, professional incompetence, oversight and organisational failings and facilitated by an insufficiently robust regime. Certain protagonists however tower above the rest in terms of their responsibility. Principally Arconic, Exova and SE. Arconic's responsibility is obvious. Exova and SE are professionals with ultimate responsibility for design at GT and specialist training. Exova's role in fire safety was pivotal and set a tone for the entire project. Exova's failure to explain or even allude to MOE/D in its FSS inevitably led to a greater number of deaths given the proportion of GT disabled residents[324].SE bears responsibility for the ultimate selection and approval of ACMPE but also bears a share of the responsibility for its failure to address MOE/D. This conclusion does not detract from the many faults of other parties, but the need to ensure accountability demands identification of root causes.

Stephanie Barwise KC

Marie-Claire O'Kane

Dalton Hale

[321] Lane T/170/39:11-40:13

[322] Martin T/257/160:4-16

[323] See our Module 6 Closing par 3.5 **{BSR00000196/16}**

[324] Lane M3 Report Chapter 6 para 14.1.16 and 14.9.1(b)-(g): 46 of the 203 adult residents present on the night of the fire (23%) had a sensory, mobility or cognitive impairment; 41% of adult residents with sensory, mobility or cognitive impairments died in the fire; compared to 18% of adults with no defined impairments **{BLARP20000042/5} {BLARP20000042/25}**