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

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

Phase 1 Report – Section 18
Communicating with the residents in an emergency

REPORT OF

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Fire Safety Engineering

12th April 2018

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On behalf of	:	Grenfell Tower Inquiry
On instructions of	:	Cathy Kennedy, Solicitor, Grenfell Tower Inquiry
Subject Matter		To examine the circumstances surrounding the fire at Grenfell Tower on 14 June 2017
Inspection Date(s)	:	6th October, 1st November, 7-9th November 2017

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18 Communicating with the residents in an emergency

18.1 Purpose of Section 18

18.1.1 In this Section 18, I will explain the means available for LFB to communicate with residents in Grenfell Tower during the fire once the "stay put" strategy was formally changed by the London Fire Brigade (LFB) Incident Commander.

18.1.2 In my opinion, the issue of communications with residents should be further investigated by the Inquiry. The issue is important because where there is a change in guidance from "stay put" to "all out", there are practical limitations on how to communicate the change in advice to residents. This is relevant to understanding the events on the night of the fire and for the future, given the number of other residential buildings in the UK with a building envelope formed of similar materials to Grenfell Tower.

18.1.3 In this Section, I identify a number of issues relevant to communications. The use of 999 calls during the Grenfell Tower fire is the subject of separate expert evidence and witness evidence. I will not address this issue in detail here, but I provide a summary of my understanding only, in defining what communications are available.

18.1.4 At Grenfell Tower, the "stay put" strategy was formally ended by the LFB Incident Commander at 02:47. This meant that from this time, the guidance to be given to residents (by any means) was to make their own way out of the building, and that they were no longer safe in their location. Once the decision to formally end the "stay put" strategy occurred, this meant the residents (a) needed to know about this change, and (b) they needed direction on what to do because of that change.

18.1.5 It is important to remember that if a resident had made a Fire Survival Guidance call (and therefore was still in the building and in communication with the emergency services at this time), it is likely that they did not feel able to evacuate by themselves. As I have explained in Section 14, conditions in many lobbies and the stair could have appeared unsafe to residents still in Grenfell Tower from as early as 01:25. Therefore, the guidance to self-evacuate may have appeared in conflict to conditions outside their own front door. This perception of hazard will have been different depending on the individual and their location.

18.1.6 In this section, I explain the methods of communication available to tell residents to leave and whether it was possible to communicate the change in stay put guidance to residents using those methods during the Grenfell fire. I will also identify issues relevant to communications with persons who require assistance to evacuate.

18.2 Regulatory Requirements

18.2.1 The Building Regulations 2010 addresses emergency communication under Part B1, as follows:

"The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times."

18.2.2 The current statutory guidance (and associated detection and alarm system standards) does not require high-rise residential buildings to be provided with an interlinked fire alarm system. This is because the guidance assumes that the fire will be contained within one flat. The guidance in ADB 2013 on means of escape from flats is as follows:

"2.3 The provisions for means of escape for flats are based on the assumption that:

a. the fire is generally in a flat;

b. there is no reliance on external rescue (e.g. by a portable ladder);

c. measures in Section 8 (B3) provide a high degree of compartmentation and therefore a low probability of fire spread beyond the flat of origin, so that simultaneous evacuation of the building is unlikely to be necessary; and

d. although fires may occur in the common parts of the building, the materials and construction used there should prevent the fabric from being involved beyond the immediate vicinity (although in some cases communal facilities exist which require additional measures to be taken)."

18.2.3 The definition of stay put from BS 9991:2015 makes the same assumption:

"*when a fire occurs in a flat or maisonette, the occupants of that dwelling evacuate, but occupants of all other dwellings can safely remain in their dwellings unless directly affected by heat and smoke or directed to leave by the fire and rescue service".*

18.2.4 As a result, the guidance in the UK does not require there to be any system or process to either automatically sound a fire alarm in every flat or to sound an alarm in the common lobbies outside each flat. Unless a resident communicates with the emergency services by calling 999, there is no other manual or automatic means to communicate with them within the building.

18.2.5 I have explained in Section 15 and Appendix G that there was no automatic or manual means to sound a fire alarm throughout Grenfell Tower. This is in accordance with the statutory guidance.

18.2.6 The only alarm sounders, where provided, were localised within individual flats, and responded to conditions in that flat only.

18.2.7 It is therefore important to investigate what practical and realistic alternative provisions could have been made on the night of the fire at Grenfell Tower, to inform recommendations for the future.

18.2.8 In this section, I identify the issues that I consider require further investigation, but I am not seeking to draw any firm conclusions at this stage.

18.3 Reminder of the critical times on 14th June 2017

18.3.1 I have presented my analysis of the critical times in detail in Section 13 of this report.

18.3.2 At 00:55, just before the initial fire incident in Flat 16, the Metropolitan Police Services (MPS) record of evacuation times (MET000080463) and number of fatalities within Grenfell Tower (MET00012529) indicate there were 294 people in Grenfell Tower spread over the 23 residential storeys of the building.

18.3.3 As I have explained in Section 13, the initial guidance being provided to residents was to stay in their flats. This guidance was disseminated by the LFB control room officers in response to 999 calls.

18.3.4 As I have explained in Section 14, smoke had entered lobbies on multiple levels by approximately 01:25. Additionally, by approximately 01:40, the stair had become substantially smoke logged. This represented a psychological impediment as well as a potential physiological impediment to residents being able to escape.

18.3.5 At 02:47 the Incident Commander instructed that guidance being provided to residents through Fire Survival Guidance calls should change to inform residents to leave the building if they were able. At this time, there were 107 residents still within the building, spread between Level 10 and Level 23.

18.3.6 At that stage, and as a result of investigating the systems available within Grenfell Tower, and the procedures identified in fire service training manuals, it appears to me that there were three forms of emergency communication available to LFB to direct residents to leave Grenfell Tower:

a) Audible warnings from outside the building (e.g. amplified announcements made over a loudhailer);

b) Fire Survival Guidance calls between residents and LFB control centre; and

c) Firefighters making their way to the flat entrance door and directing occupants in person.

18.3.7 I discuss these forms of communication further in the following sections.

18.4 Announcements made from outside the building

18.4.1 The use of loudhailers is acknowledged as a feasible method of communication to be used with occupants of a building. For example, the Fire and Rescue Service operational guidance document GRA 3.2 *Fighting fires in high rise buildings* (most recently published in February 2014 by DCLG) discusses communication on Page 31, excerpted below. Please refer to Appendix D of my report for further discussion of the intent and applicability of this guidance. The use of public address systems or loudhailers is specifically noted as a potential alternative means for communication with building occupants.

Communications

Where appropriate and available, the Incident Commander must consider the use of alternative radio channels to manage the volume of radio traffic.

Where there are communication difficulties, specialist equipment, such as a leaky feeder radio cable, Airwave radios or repeater equipment, can be used and the Incident Commander should also consider the use of internal or mobile telephones, public address systems or loudhailers to communicate with building occupants.

Figure 18.1: Excerpt from page 31 of GRA3.2 -*Fighting fires in high rise buildings*

18.4.2 I understand that loudhailers are part of the LFB inventory equipment (see LFB response to a freedom of information act request on 18th March 2011, FOIA909.1 Part 1, http://www.london-fire.gov.uk/Documents/FOIA909.1.pdf)

18.4.3 Use of loudhailers can provide information from LFB to occupants, however there is no means for the building occupants to reply, other than shouting or waving from windows. As the communication is in one direction only, there is no way that fire fighters outside the building would be able to confirm that all residents have heard and understood any directions given.

18.4.4 The use of loudhailers would not provide the LFB with information about where all persons requiring assistance may be within the building. It would not provide a route for firefighters to understand the hazards that specific individuals in the building may be facing, nor would it allow the occupants to inform the firefighters about the specific help they may require to exit the building.

18.4.5 Additionally, announcements made by loudhailer would not be able to provide specific direction to individual residents regarding the hazards they may face on trying to exit the building.

18.4.6 At this stage, I have not seen evidence that the LFB relied on loudhailers to communicate the change in stay put advice to residents in Grenfell Tower. In my view, it would have been difficult for the LFB to use loudhailers effectively for the following reasons:

a) The height and physical mass of the construction of Grenfell Tower, and the other sources of noise inside and outside the building from fire engines, pumps, smoke alarms, firefighters and residents and the fire itself, would have made it difficult for residents to hear and understand communications.

b) The acoustics within the building, especially the stairs, would have created echoes and reverberations.

c) The acoustic links between the stairs and flats are also complex. Announcements would need to pass through at least two doors to reach residents inside apartments from the stair. The route from the stair into each flat is not straight and therefore sound would have to reflect off surfaces within the lobby before occupants in flats would be able to hear it, adding to potential distortion of the announcement.

d) Other noises from firefighters (e.g. radio conversations and BA alarms) would have impacted intelligibility in areas away from the location of the loudhailer.

e) In order for loudhailer announcements to be made in lobbies, a firefighter would need to reach the lobby. As identified in Section 14, this was not possible in many cases. Additionally, if fire fighters could reach lobbies, then direct contact with residents could be made by knocking on doors.

18.4.7 There is evidence in the witness statement of Collins (MET00010086) that megaphones were used to communicate with specific individuals on the 14th June 2017:

"They are going to die if they jump out. At least they will have a chance of coming out if we can get to them. Some did. There were some that had linked up some bedding and started to climb out down that. Advised them to stay put. Stay where they are, we will get to you. I got one of the firefighters to go down and get me a megaphone and I just started shouting 'stay where you are' 'stay where you are'. This may have been about half two maybe (0230 hours), quarter to three (0245 hours).

At that point I still believed that they had a real chance of fire crews getting up to them and getting them out. That was the best chance of survival. Certainly jumping out of the window they weren't going to survive. They were way too high. So the advice from me for them was 'stay where you are we will get to you' seemed relevant."

18.4.8 And also from Collins (MET00010086), between 07:00 and 08:00:

"As much as we could do we were doing and then Gary took the megaphone and got on the roofs of the low rise building and started communicating with him [resident of the 11th floor] *to actually get his flat number so they could give a more specific direction to the BA crews on which floor he was."*

18.5 Emergency calls to London Fire Brigade

18.5.1 In accordance with Article 7(2)(c) of the Fire and Rescue Services Act 2004, a fire and rescue authority must:

"*make arrangements for dealing with calls for help and for summoning personnel*"

18.5.2 The primary form of this arrangement is the 999 emergency call service.

18.5.3 Guidance for the Fire and Rescue authorities on management of emergency calls is provided in the Fire and Rescue Service Circular 54-2004, *Emergency Call Management* published by the ODPM and dated 8th December 2004.

18.5.4 Annex D of the 2004 Emergency Call Management circular identifies 3 stages to a call relating to a fire incident:

a) Stage 1 – *"Primary questions, which aid the mobilising decision"*, e.g. address, type of fire, persons involved, etc.

b) Stage 2 – *"Assessment questions that help build a picture of the incident, aid mobilising decisions, and assist the safety of responders and the caller"* e.g. the type and layout of building, how many persons may be involved or injured and how they are affected by the fire, any specific hazards such as gas cylinders, animals, overhead cables. During this stage, the guide indicates that the Control Room Officer (CRO) is to determine how the resources required at the incident may need to be adjusted and what information may be needed by the Incident Commander on site.

c) Stage 3 – *"Pre-arrival advice designed to assist the safety of the caller and the public at the scene"* Also termed *"Pre-arrival safety advice"* by the guide, a call reaching this stage is intended to provide practical advice to the caller regarding how to assist injured people and safety advice. This stage includes Fire Survival Guidance.

18.5.5 Section 3.2 of the *Emergency Call Management* circular goes on to state:

"3.2 The overall aim of using the above stages is to ensure that the response is appropriate to the types of risk and calls attended, reduce the risk to responders and improve public safety. This is achieved by the provision of timely, accurate and relevant information, which will better equip the FRS to:

- *Resource appropriately against the identified risk (dynamic mobilising)*
- *Reduce risk to the first emergency service crews by the provision of information of the threat, pre-planning and briefing*
- *Reduce risk to the public and the environment by the provision of appropriate and accurate information, of the potential effects of any occurrence and how to implement the necessary control measures to aid public safety."*

18.5.6 Therefore, the communication made between the caller and the CRO as part of the emergency call would provide LFB with:

a) Knowledge of the location of occupants in a building;

b) Understanding of the hazards that threaten them;

c) Understanding of what assistance specific individuals require; and

d) A means to provide guidance and direction to occupants trapped in the building.

18.5.7 And the call provides the caller with:

a) Reassurance that their situation is known;

b) Information on conditions elsewhere in the building that might affect their escape route; and

c) Practical guidance on how to protect themselves if they cannot escape.

18.5.8 As noted above, if a caller is unable to escape unaided, the emergency call becomes a "Fire Survival Guidance" call.

18.5.9 The process is also explained in the witness statement of CRO Adams (MET00007762).

"A call may sometimes become a 'Fire Survival Guidance' call or FSG in short. A call becomes FSG when a caller is unable to get out of a building/house due to fire or smoke. This initiates a set procedure on our system to deploy certain appliances and ask set questions such as where they are in the building. A CRO [Control Room Officer] *would raise their hand to inform a supervisor who will usually come over and listen to the call to assess what resources are required." ... "A CRO would usually stay on the phone to the caller until rescued."*

18.6 Fire Survival Guidance (FSG) calls

18.6.1 As explained in Section 18.5 above, the purpose of FSG calls is to provide specific knowledge to fire fighters about the location of occupants and fire conditions in the building, and to provide specific guidance to occupants about the hazards that exist elsewhere in the building and practical means to protect themselves from fire.

18.6.2 FSG is provided by Control Room Officers (CRO) in the fire control centre directly to people calling 999. To be directed by a FSG call, a resident would need to know to call 999 and to relay critical information to the CRO about their location and circumstances, and follow their directions.

18.6.3 Page 18 of GRA 3.2 2014 states:

"Fire and Rescue Authorities must also have effective arrangements in place to handle fire survival guidance calls from residents and others when they believe they are unable to leave the building due to disability, poor mobility, illness or the affects of fire.

Fire and Rescue Authorities should consider both generic procedures for persons expected, likely or advised to remain in their homes (unless directly affected by heat, smoke or fire) as well as bespoke arrangements for specific buildings.

Fire survival guidance call arrangements should include:

- *details of how calls will be passed to and recorded at the incident*
- *their impact on resources and mobilising*
- *a re-evaluation process to ensure the balance of risk to the public is reviewed if circumstances change (which may result in a change to the advice previously given)*
- *how information will be exchanged between callers, Fire Control and commanders at the incident."*

18.6.4 Page 28 of GRA3.2 goes on to state:

"Fire Control rooms may receive numerous fire survival guidance calls during a high rise incident and these calls can provide vital information, which the Incident Commander can use to locate and prioritise persons requiring rescue.

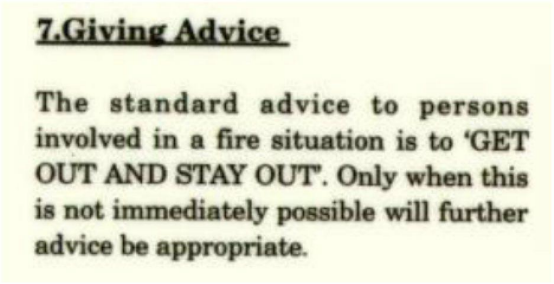
…

Control operators may obtain more accurate information as to the location of the fire and/or persons in need of rescue or reassurance than that gathered by an Incident Commander who is on scene.

…

The advice offered to callers to remain in their property during fire survival guidance calls must be re-evaluated throughout an incident. Where circumstances make it necessary, an Incident Commander may need to consider changing the advice given. For example, callers may need to be advised to leave their property or to be guided from it by firefighters. The Incident Commander should also consider making use of all available systems within the building to communicate with occupants."

18.6.5 Specific fire service guidance regarding Fire Survival Guidance calls is provided in the document *Fire Control Personnel Training: Emergency Call Handling Techniques – Fire Survival Guidance* (dated 12th April 1994). With regard to giving advice to callers, the 1994 training materials identifies that:



7.Giving Advice

The standard advice to persons involved in a fire situation is to 'GET OUT AND STAY OUT'. Only when this is not immediately possible will further advice be appropriate.

Figure 18.2: Excerpt 1 from 1994 training manual

18.6.6 The 1994 manual also identifies that the CRO must be able to balance the immediate safety of the caller with the benefit of the caller being able to leave the building as it states:

"The Fire Control Operator will be required to make rapid judgements which may well be subject to scrutiny after the event when all the facts are known.

Clearly the Fire Control Operator cannot be aware of all the circumstances and the advice given may unwittingly lead the caller into further danger. Equally, though, prolonging the attachment and providing reassurance without giving advice may lead the caller to remain in a place of danger when escape might have been possible."

18.6.7 Additional guidance on conducting FSG calls is also provided in the 2004 circular, excerpted in Figure 18.3

Fire survival guidance	**Assess the situation** • What is preventing the caller escaping? • Alternative means of escape? • Location of caller/other persons in building **Assess the caller** • Age • Gender • Ethnicity • Mental or physical disability **Protect caller** • Open window • Keep low • Keep smoke out/seal door edges • Breathe slowly • If caller is in immediate danger, advise to open window, drop bedding or cushions to the ground to break fall, get out feet first and lower themselves to full length of arms before dropping. **Assist Rescue** • Caller to make noise • Mark window/location

Figure 18.3: Excerpt from Emergency Call Management circular (54-2004, 2004)

18.6.8 To be directed by FSG calls, a resident would need to know to call 999 and be able to speak and understand English sufficiently well (under stressful circumstances) to relay critical information to the CRO about their location and circumstances, and follow their directions.

18.6.9 In terms of ability to pass information to the caller, the CRO is reliant on their own understanding of spread of fire in buildings and information coming from the incident.

18.6.10 The rapid spread of fire over the whole of the façade of Grenfell Tower and internally was unprecedented, meaning that it would have been difficult for CROs to provide advice based on previous experience.

18.6.11 Additionally, as I have explained in Section 14, at the time the stay put strategy was changed the stair and lobbies were substantially smoke logged over its whole height and restricting where fire fighters could reach to report on conditions. Therefore, the CROs may have needed to make FSG calls without having the benefit of specific information from the incident.

18.6.12 Response to FSG calls then requires fire fighters to move to the location of the caller. As I have explained in Section 14, poor visibility, increasing tenability problems, plus the need to rely on breathing apparatus hampered the efforts of firefighters carrying out rescues.

18.6.13 Additionally, there was a large volume of FSG calls made on the 14th June 2017. Ashman (MET00007509) took over managing FSG calls from approximately 09:00. In the handover briefing Ashman states that by this time they had received 174 FSG calls and had either dealt with them or were still dealing with them.

18.6.14 There is evidence of the FSG calls identifying persons who required assistance to escape (Egan, MET00007515 and LFB00000003), excerpted below).

> There were also issues getting to a man on the 11th Floor who was disabled. He was in flat 83. He was a priority. The guy was on a balcony on the front face of the building. Most firefighters were being

Figure 18.4: Excerpt from Egan witness statement (MET00007515)

> 02:01:43 MESSAGE FROM CONTROL: Fire Survival Guidance (FSG) information passed to fire ground: 'FLAT 161, 23RD FLOOR 10 PERSONS, FLAT 204 ON 23RD FLOOR, ONE PERSON, FLAT 14, ONE PERSON, FLAT 9, 2 ADULTS , 3 CHILDREN, ONE IN WHEELCHAIR, FLAT 175 20TH FLOOR, 5 PERSONS INSIDE ALL CALLS PASSED TO CU8 AT APPROX 01:50'

Figure 18.5: Excerpt from LFB incident communication log (LFB00000003)

18.6.15 In principle, FSG calls are the most effective method of communication during a fire. However, on the 14th June 2017 it would have been difficult for those handling FSG calls to provide guidance to residents given the extent of the fire, the resulting conditions in the single stair and the number of FSGs made.

18.7 Fire fighters knocking on doors

18.7.1 The third method for communication with occupants of high-rise blocks of flats is for firefighters to go from door to door making contact with residents individually.

18.7.2 To achieve this, sufficient numbers of firefighters need to be deployed into the block to reach all doors. The conditions in the stair and lobbies on each floor would also need to be such that firefighters could safely approach each flat door, and that the action of opening the flat entrance door would not expose the residents to untenable conditions nor cause untenable conditions in the lobby.

18.7.3 If no answer is given at a specific flat, the firefighters potentially need to break into the flat to confirm that it is empty, rather than containing residents in need of assistance. Additional firefighters may also be required to assist the residents of each flat out of the building.

18.7.4 In the event of a fire as envisaged by the statutory guidance, i.e. a fire contained in a single flat, the resources required to undertake this method of communication are not significant. Firefighters would need to knock on doors on the fire floor and, potentially, the flats directly above the flat of fire origin

for one or two floors above. In Grenfell Tower, this would equate to about eight flats.

18.7.5 Undertaking this approach in the whole of the block would have taken significant resources (Grenfell Tower has 129 flats over 23 storeys.). Further, as I have explained in Section 14, conditions in the stairs and lobbies were such that fire fighters were having difficulty in navigating the building, making flat-to-flat communication very difficult. There was also a short window of time during which the stairs were free of smoke on all floors.

18.8 Occupants requiring assistance to escape

18.8.1 As I explain in Section 15 and Appendix G, the statutory guidance does not deal with evacuating persons who require assistance from high-rise residential buildings. In Approved Document B, the Introduction B.v states only that:

"Note: Some people, for example those who use wheelchairs, may not be able to use stairways without assistance. For them evacuation involving the use of refuges on escape routes and either assistance down (or up) stairways or the use of suitable lifts will be necessary."

18.8.2 No further guidance is provided for residential buildings in either Approved Document B or Approved Document M (which relates to access to and use of buildings).

18.8.3 The absence of specific guidance is noted in section 16.12 of the LGA Guide *Fire safety in purpose built blocks of flats* (May 2012):

"*Although inclusive design is fundamental to new 'general needs' purpose-built blocks, the Building Regulations do not stipulate additional fire safety measures that must be provided as a consequence."*

18.8.4 The only clear guidance I am aware of is in Section 70.11 of the LGA Guide where it deals with common means of escape. In this section, the guide refers to the provision of a refuge or a lift as follows:

"Many older and disabled residents will find it difficult to use stairs in the event of a fire, and additional measures may need to be considered. These could include temporary safe refuge areas or spaces within existing protected lobbies and stairs. If lifts are provided, where reasonably practicable, consideration should be given to the provision of evacuation lifts that residents may use in the event of a fire."

18.8.5 However, section 79.9 of the LGA Guide, which deals with preparing for emergencies, appears to contradict this:

"In 'general needs' blocks of fats, it can equally be expected that a resident's physical and mental ability will vary. It is usually unrealistic to expect landlords and other responsible persons to plan for this or to have in place special arrangements, such as 'personal emergency evacuation plans'. Such plans rely on the presence of staff or others available to assist the person to escape in a fire."

18.8.6 Further it provides in 79.10 to 79.11:

*"Even in sheltered housing schemes, there will be reliance ultimately on rescue by the fire and rescue service in the event that residents cannot escape by themselves. However, in sheltered housing schemes, it is commonplace to hold information relating to any res*ident with particular mobility or other issues affecting their ability to escape. This can be made available to the fire and rescue service on arrival at the premises (e.g. by keeping it in a 'premises information box', which can only be unlocked by the fire and rescue service, at the main entrance).

It is not realistic to expect such an approach to be adopted where there are disabled people and others requiring assistance in a 'general needs' block. Any attempts to keep information of this kind must be updated regularly as inaccurate information could potentially be more harmful than no information."

18.8.7 There is also non-statutory design guidance for high rise blocks of flats in BS 9991:2015 which states:

"Providing an accessible means of escape should be an integral part of fire safety management in all residential buildings. Fire safety management should take into account the full range of people who might use the premises, paying particular attention to the needs of disabled people.

NOTE 1 It is the responsibility of the premises management to assess the needs of all people to make a safe evacuation when formulating evacuation plans."

18.8.8 In the next stage of my work I intend to explore the provisions made by the relevant parties to assess the needs of occupants that required assistance to escape at Grenfell Tower. I also intend to explore how this information was communicated to relevant residents and LFB before the night of the fire. It is also important that the Inquiry investigates how many residents in Grenfell Tower required assistance to evacuate, whether they were known to the fire brigade and the steps taken to rescue them.

18.9 Conclusions

18.9.1 In this section, I have identified the current forms of communication available for residents and firefighters when (a) there is no automatic communication provision in a building (b) the Stay Put strategy needs to change.

18.9.2 In my opinion, it is important to understand how LFB could communicate with residents and the extent to which limitations on communications affected rescue operations. I recommend that the Inquiry investigates these issues further.

18.9.3 However, at this stage, I note the following key matters:

a) The current approach in the statutory guidance is that blocks of flats are not provided with an automatic or manual means of raising an alarm

sounder or providing voice alarm announcements. Where there is a large fire in a high-rise block of flats, such as at Grenfell Tower, it is not possible to easily communicate changes in advice (e.g. from "stay put" to "all out").

b) Where there is no central alarm system to alert residents to the need to evacuate, firefighters are dependent on loudhailers, 999 calls, FSG calls and directed evacuation of every flat individually by firefighters knocking on doors. These methods have significant limitations, especially in a major multi storey fire, such as that at Grenfell Tower.

c) The limitations on communication would have caused difficulty on 14th June 2017, especially when the "stay put" guidance was formally changed. It is not clear at this stage how the "all out" message was communicated to residents who were still in the Grenfell Tower.

d) In light of the number of other residential buildings in the UK with a building envelope formed of similar materials to Grenfell Tower, serious consideration should be given to changing the current approach.

e) I am also concerned about how the above limitations on communications affect those who require assistance to evacuate from high-rise residential buildings.